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MASTER OF SCIENCE

"Körpergrößentrends in fossilen Landschildkröten aus dem Neogen"

"Body size trends in Neogene testudinid tortoises"

vorgelegt von

Julia Joos

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1 Zusammenfassung

Körpergrößenvariationen entlang räumlicher und zeitlicher Skalen zu beschreiben und zu verstehen ist seit geraumer Zeit ein zentraler Punkt der Evolutionsbiologie. Die Körpergröße eines Organismus ist vor allem deshalb so interessant, weil sie ein universelles Merkmal aller Lebewesen ist, das von vielen Faktoren beeinflusst wird und mit evolutionären und ökologischen Prozessen im Zusammenhang steht. Besonders interessant sind dabei extreme Ausprägungen, die viele Vor- und Nachteile mit sich bringen. In der Erdgeschichte gab es wiederholt sehr große Tiere, die Megafauna. Während des Quartär starben zahlreiche dieser Arten aus, darunter viele Säuger. Das Aussterben der Säugetiermegafauna ist sehr gut untersucht und zum Großteil wird der Mensch dafür verantwortlich gemacht. Allerdings gab es auch noch andere Vertreter der Megafauna, beispielsweise Riesenschildkröten, von denen nur wenige Arten auf vereinzelten Inseln bis ins heutige Zeitalter überlebt haben. Wieso kontinentale Arten ausstarben und wie ihre Entwicklung verlief ist weitestgehend unklar. Im Rahmen dieser Arbeit wurden Körpergrößenverteilungen von rezenten und fossilen Testudinidae vom Miozän bis heute untersucht, mit dem Ziel allgemeine Entwicklungstrends bezüglich ihrer Körpergröße zu ermitteln. Die Analysen ergaben, dass Landschildkröten eine bimodale Körpergrößenverteilung haben, die sowohl räumlich als auch zeitlich weitestgehend konstant bleibt. Rezente Testudinidae sind signifikant kleiner als fossile und auf Inseln vorkommende Landschildkröten sind signifikant größer als die auf den Kontinenten lebenden. Über die Zeit jedoch scheinen Testudinidae im Schnitt keine nennenswerte Änderung in der durchschnittlichen Körpergröße aufzuweisen, ihre generelle Körpergrößenevolution kann am besten als Stasis beschrieben werden. Untersucht man jedoch die kontinentalen Testudinidae separat, ist ein Trend erkennbar, der allerdings insgesamt nicht-direktional verläuft. Diese Beobachtung lässt sich auf das Aussterben der kontinentalen Riesenschildkröten zurückführen, was zu einer starken Verringerung der Körpergröße gegen Ende des Pleistozäns führte. Diese Abnahme der durchschnittlichen Körpergröße lässt sich auch auf globaler Ebende und bei Inselarten beobachten, allerdings weniger stark ausgeprägt. Ob nun der Mensch die Verantwortung für das Aussterben der Riesenschildkröten trägt, lässt sich nicht abschließend klären, obwohl einiges darauf hindeutet. Höchstwahrscheinlich handelt es sich aber um ein Zusammenspiel aus anthropogenem Einfluss und klimatischen Veränderungen.

2 Introduction

2.1 Body size evolution

The body size of organisms has been of interest to researchers for a long time (Haldane, 1928; Peters, 1983). It is a universal trait that can easily be measured and compared among different organisms (Smith et al., 2016). Furthermore, it is readily available for many animals in the fossil record which allows for comparison with extant species. In general, a number of biotic and abiotic factors including habitat, resource availability, competition, climate and many more influence body size which is also linked to ecological and evolutionary processes (Blackburn and Gaston, 1994; Blueweiss et al., 1978; Smith and Lyons, 2009). Specifically, body size is dependent on resource availability, intra- and interspecific competition and environmental conditions during development, genetic predisposition, and a trade-off between costs of early vs. late maturation, namely investing in growth or reproduction (Stearns and Hoekstra, 2000). Extreme habitats or environmental conditions can result in extreme body size changes, i. e. in dwarfism, either due to restricted resources or reduced predation, or gigantism, which is usually linked to reduced competition. Finally, extreme body size is constrained by physical, physiological and structural properties, e. g. newborns of marine mammals like whales need to weigh at least 5 kg to maintain their body temperate due to the high rate of convective heat loss in the water (Downhower and Blumer, 1988; Smith et al., 2016). Different body sizes are associated with different requirements. On the one hand, larger animals need more resources, therefore usually occupy a larger territory and have longer generation times than smaller ones, which is associated with a lower population density. On the other hand, they are also less prone to predation, live longer and have increased competitive abilities (Smith et al., 2016; Stearns and Hoekstra, 2000).

Patterns of body size variation across spatial and/or temporal scales have been described for many animal groups and some have been summarised as ecological rules (Angielczyk et al., 2015; Millien et al., 2006). For example, Cope's rule describes the gradual within-lineage body size increase over time (Cope, 1887). According to the island rule large species become smaller on islands, because of a reduced predation risk, while small species often show an increase in body size due to reduced competition (Foster, 1964). Bergmann's rule states that animals attain a larger body size at higher latitudes (Bergmann, 1848), which can be considered a special case of the temperature-size rule, which predicts an increase in body size at lower temperatures (Angilletta et al., 2004). While such patterns have been well documented (Millien et al., 2006), the underlying mechanisms might not be the same across all taxa and require further investigation (Smith and Lyons, 2009).

2.2 Maximum body size - Megafauna

In many taxa a right-skewed body size distribution is observed, which means that smaller body sizes are more abundant than large ones (Blackburn and Gaston, 1994; Kozlowski and Gawelczyk, 2002; Lyons and Smith, 2008). Evolutionary theory implies that this skewed distribution is the optimal distribution of body sizes, taking into account all external constraints (Smith and Lyons, 2009). But what factors determine its shape? As stated above, a large body size is associated with certain advantages and disadvantages (Smith et al., 2016). In the history of Earth, animals have repeatedly attained very large body sizes, although patterns of when and how often maximum body size is achieved are inconsistent across time and different animal groups (Smith et al., 2016). Some famous examples of giant forms are the large insects from the Carboniferous/Permian period, the giant non-avian dinosaurs from the Jurassic/Triassic, the giant mammals from the Quatenary or today's largest animal, the blue whale (Smith et al., 2016). Animals with a body mass exceeding 44 kg are referred to as megafauna (Barnosky, 2004; Koch and Barnosky, 2006; Rhodin et al., 2015; Sandom et al., 2014). It has been suggested that large animals are more prone to extinction than smaller ones, because their longer generation times and descreased population densities make them vulnerable in case of a diminished population size (Koch and Barnosky, 2006). During the Quaternary, a huge number of large mammals which were considered megafauna went extinct (Koch and Barnosky, 2006; Lyons and Smith, 2008; Smith et al., 2016). Two possible reasons for this extinction event have been discussed: climate change and anthropogenic influence (Koch and Barnosky, 2006). Some recent studies suggest that human influence has been the main driver of extinctions of mammalian megafauna (Barnosky, 2004; Gibbons, 2004; Sandom et al., 2014; Schuster and Schüle, 2000).

While the mammalian megafauna as well as their extinction have been well investigated, the herpetofauna has also lost a considerable number of species during the Quaternary (Blain et al., 2016). For example, many turtle and tortoise species have gone extinct, with several large species among them, which can also be considered megafauna (Froyd et al., 2014; Pedrono et al., 2013; Rhodin et al., 2015). One popular example of a giant tortoise is *Megalochelys* *atlas*, which frequently reaches carapace lengths of over 2 m and occured throughout Asia, on the mainland and on several islands (Arnold, 1979). Similarly sized tortoises have also been found in southern Greece (Bachmayer, 1979) In fact, giant tortoises were abundant on the continents as well as on many islands throughout the Neogene (De Lapparent De Broin, 2002). In contrast, nowadays giant tortoises are present only on two island regions in the tropics, the Galapagos Islands, which are located off the western coast of Ecuador, and the West Indian Islands, which consist of Madagascar and its surrounding islands (Baur, 1889; Braithwaite, 2016)

2.3 Giant Tortoises - Testudinidae

In the fossil record two clades of terrestrial tortoises have been identified, which both contained giant forms. One is the family Meiolaniidae, which occurred exclusively in Argentina, Australia and its surrounding islands and is completely extinct nowadays (Hay, 1908; Sterli, 2015). The other one is the family Testudinidae, which comprises all extant terrestrial tortoises as well as many extinct or fossil taxa (Auffenberg, 1974; van Dijk et al., 2014). The testudinids included giant forms and occurred on all continents but Australia (Fritz and Havaš, 2007). Testudinidae have been known in the fossil record from the Eocene onwards, the earliest fossils being *Hadrianus* which are known from North America and Europe and probably originated in Asia (Cope, 1871). Body size played an important role in the earlier times of testudinid taxonomy (De Lapparent De Broin, 2000; De Lapparent de Broin, 2001). In the beginning, all tortoise fossils were assigned to the genus Testudo, but around the 20th century tortoises were grouped into two clades based on body size (de Lapparent de Broin et al., 2006). Large taxa were all assigned to the genus *Geochelone*, while small tortoises were assigned to *Testudo* (De Lapparent De Broin, 2000; De Lapparent de Broin, 2001). Eventually, over the past few decades, the taxonomy has been revised for many clades (De Lapparent De Broin, 2000). In the Americas, all tortoises are now referred to as either *Hesperotestudo*, *Gopherus* or *Chelonoidis*, with the latter containing all extant Galapagos giant tortoises (Fritts, 1984). In Europe, the genus *Cheirogaster* has been introduced but is currently being replaced by *Titanochelon*, although not all species have been revised accordingly yet (Pérez García and Vlachos, 2014). Small species still belong to *Testudo*, which contains the extant species *T. graeca*, *T. hermanni*, *T. marginata*, *T. kleinmanni* and *T. horsfieldii* (Fritz and Havaš, 2007). In Asia and Africa, which are the two current biodiversity hotspots for turtles and tortoises in general , many different taxa have now been differentiated

(Holroyd and Parham, 2003). In Asia, the genera *Geochelone*, *Indotestudo* and *Manouria* are present (Claude et al., 2011; Tong et al., 2006). On mainland Africa there are seven extant genera: *Homopus*, *Psammobates*, *Kinixys*, *Malacochersus*, *Chersina*, *Stigmochelys* and *Centrochelys*, the latter consisting of only one species, *Centrochelys sulcata*, which is the largest extant continental tortoise with a carapace length of about 80 cm (Hansen et al., 2010). In the West Indian Islands (Madagascar, Seychelles, Aldabra etc.), there are three extant gerena, *Astrochelys*, *Pyxis* and the giant *Aldabrachelys*, as well as the extinct *Cylindraspis* (Austin et al., 2003; Austin and Nicholas Arnold, 2001).

Both on the contintents and on remote islands giant tortoises exceeding carapace lengths of 2 m were abundant in former times and have frequently been found in fossil deposits (Pritchard, 2013; Rhodin et al., 2015). The presence of large tortoises on islands has been explained by their ability to float and to survive for months without water or food (Cheke et al., 2016; Gerlach et al., 2006; Patterson, 1973). However, the abundance of giant tortoises on these remote oceanic islands along with their resilience and survivability without resources made them a very attractive food item for humans, especially in the whaling industry (Townsend, 1925). In addition to the exploitation of giant tortoises on islands, both small and large tortoises and turtles were also frequently eaten on the mainland (Thompson and Henshilwood, 2014). Tortoises are easily captured, do not need a great amount of preparation before they can be cooked and can even be kept as a "staple" since they stay alive for quite a while withoud food or water (Thompson and Withers, 2003; Thompson and Henshilwood, 2014). Intensive hunting and exploitation has been suggested to affect tortoise body size (Speth and Tchernov, 2002); since larger individuals are more easily visible and yield more meat, they are more prone to exploitation than small ones (Rhodin et al., 2015). This may have lead to a decreased body size within a tortoise population where tortoise consumption is common. For this reason, tortoise body size has even been suggested as a proxy for human population size in some areas (Steele and Klein, 2005; Stiner et al., 1999). To this day, turtles and tortoises are still being eaten in some countries, although many are endangered (Rhodin et al., 2015).

Apart from anthropogenic influences, climate probably also affected tortoises (van der Sluis et al., 2014). As ectotherms, turtles and tortoises are inherently more dependent on climate than endotherms (Delfino et al., 2003). Especially large tortoises are very temperature-sensitive due to their unique physiology and morphology (Swingland and Frazier, 1979; Swingland and Lessells, 1979). In the fossil record, large tortoises are considered to be an indicator for warm periods characterized by mild winters (Hibbard, 1960; Schleich, 1981), since they are thought to not have been able to dig themselves burrows for hibernation like modern *Gopherus* tortoises do (Carlson, 2000; Stoyanov, 2009). Additionally, giant tortoises run a high risk of overheating and display behavioral thermoregulation to keep their body temperature below a dangerous or even lethal value (Schleich, 1981; Sturbaum, 1982). Many extant tortoise species are endangered and extinction rates have been especially high for insular species since the Pleistocene (Rhodin et al., 2015). In fact, a number of giant insular tortoise species went extinct relatively recently within just few centuries (Rhodin et al., 2015). Understanding how giant form of tortoises evolved and how their size relates to their extinction, can hold valuable information about basic evolutionary processes and can even find application in current conservation efforts (Hansen et al., 2010).

2.4 Aim of this work

Testudinidae have an excellent fossil record due to their rigid shell, which is easily preserved and provides information on body size (Lujan et al., 2014). Conversely, other skeletal structures like limbs and especially skulls are rarer in the fossil record (Lujan et al., 2014). For this reason, it is difficult to resolve phylogenetic relationships of fossil tortoises, since phylogenetic inferences are often are often drawn from skull features (De Lapparent De Broin, 2000; De Lapparent de Broin, 2001; Lujan et al., 2014). However, since Testudinidae are monophyletic, comparisons can be studied on the clade level.

In this study, I am interested in several aspects of testudinid body size. First, how body size data is distributed within Testudinidae in general. For the description and exploration of body size distributions, I follow the methods described in Lyons and Smith (2008). Secondly, since many large-bodied species have gone extinct, I would expect extant tortoises to be smaller than fossil ones. Thirdly, as extant tortoises reach larger body sizes on islands than on the mainland, if this pattern can be observed in fossil testudinids as well. Finally, the main goal of this study is to identify general body size trends in tortoises (Testudinidae) on a global scale across the last 20 million years.

Giant tortoises, that only occur on islands nowadays, used to be abundant on continents until many species went extinct several hundreds of years ago (Pritchard, 2013; Rhodin et al., 2015). Therefore, I would expect body size to decrease over time and this change to be reflected in the evolutionary trajectory. To test this, the methods of Hunt (2006, 2008) and Hunt and

Carrano (2010) are used. The mean of a trait, in this case carapace length, over time is fitted to different evolutionary models - either stasis, unbiased random walk or a generalized random walk - and identify the model that describes the observed trend best (Hunt and Carrano, 2010). The development of body size or any other trait over time can follow different evolutionary trajectories, that describe general trends of trait evolution. If a trait changes in a way where it fluctuates around a mean so that the net change over time is near zero, this obersvation is described as stasis (Hunt, 2006). The variance around the mean, referred to as volatility, can be high or low in this case, but the defining property is that these fluctuations result in no change after all (Hunt, 2006). If a trait does show a net change, this change can either be directional, referred to as a generalized random walk, or non-directional, which is described as an unbiased random walk (Hunt, 2004; Hunt et al., 2015).

Changes in body size on the clade level can either be due to selective forces affecting the whole clade (trends) or individual species being influenced by different causes (tendencies) (Hunt, 2006). A trend can be an increase or decrease in minimum, mean or maximum size of a clade and can be caused by differing speciation and extinction rates and therefore occur independently of within-lineage tendencies (Smith et al., 2016).

3 Material & Methods

3.1 Data collection

I collected data on body size of fossil testudinids from the Miocene until recent times. The body size data set includes 24 fossil genera, comprising almost 100 fossil species. The majority of the data was obtained from the primary literature (Table S12). To find relevant publications, I relied mostly on the references listed in the FosFarBase (Böhme and Ilg, 2003), the Paleobiology Database (http://paleobiodb.org), and the review on fossil turtles and tortoises by Rhodin et al. (2015). Furthermore, the FosFarBase (http://www.wahre-staerke.com/, last accessed 23.03.2017) provided fossil occurrences of testudinids all over the world, including their exact localities and age (Table S14). The FosFarBase contains 769 testudinid occurrences from 647 localities between the Eocene (33.9 - 56 mya) and the Holocene (0.0117 - 0 mya) (Fig. 1). Of those, 641 occurrences from 534 localities were of relevant age (Miocene to Holocene, 23.03 - 0 mya). However, although the FosFarBase already contained a lot of fossil occurrences, the literature review showed that additonal data not recorded in the FosFarBase was readily available in the existing literature. The final body size data set includes 376 data records from 193 localities, of which 106 localities are present in the FosFarBase.

For extant testudinid taxa, I measured dry material (n = 67) from the collection of the Museum für Naturkunde zu Berlin (MfN) with an accuracy of the first decimal (unless stated otherwise) using calipers. In addition, body size data (n = 173) from the literature was included (Table S13), most were obtained from Itescu et al. (2014). I could not find body size data for three species, namely *Chelonoidis porteri*, *Kinixys nogueyi* and *Kinixys zombensis*, but since the following analyses were conducted on the generic level only (see below), this lack of data is negligible.

3.2 Body size estimation

Body size is reported as straight carapace length (SCL) in mm. When SCL for fossil taxa was not available from the primary literature, it was estimated (n = 254) either from plastron length (PL) or appendicular elements (Table S12). For carapace length estimations based on plastron length, the measurements from the MFN collection material were used to calculate the ratio between SCL and PL. Since the SC/PL ratio did not show a significant difference among species (Kruskal Wallis Test, $P > 0.05$; SCL/PL between 0.95 - 1.47), a single general

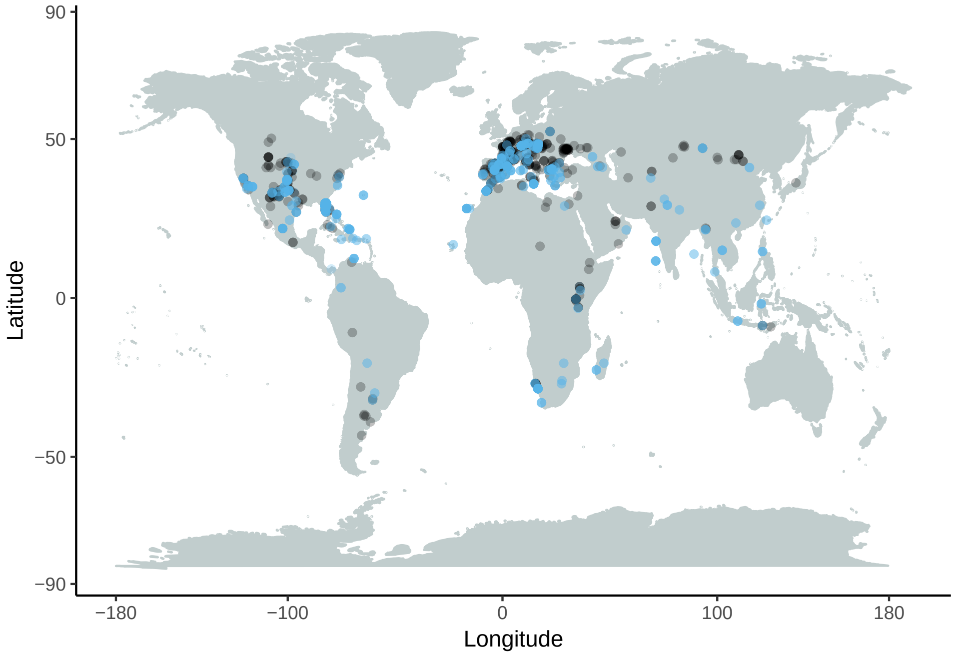


Figure 1: Map displaying fossil occurrences of Testudinidae from the Eocene to the Holocene across the world. Body size data was available for 106 localities from the Miocene until the Holocene (blue circles). The other localities (black circles) which are listed in the FosFarBase were either older or there was no body size data available for them. Testudinidae are frequently recovered in the fossil records of Europe and North America.

ratio (SCL/PL = 1.1) was calculated for all testudinids and hence used for the SCL estimations unless stated otherwise (Table S12). For estimations based on femora and humeri, ratios based on data provided by Hutterer et al. (1998) and Franz et al. (2001b), respectively, were used. A number of publications did not state measurements but instead provided scaled figures of the fossil remains, from which either SCL directly or PL, humeri, or femora lengths for estimating SCL could be measured.

3.3 Analyses

All subsequent analyses were performed with R 3.4.1 (R Core Team, 2017), including the packages `dplyr` (Wickham et al., 2017) to prepare the data for the analysis and `ggplot2` (Wickham, 2009) to create figures. The R package `vegan` (Oksanen et al., 2017) was used to create randomized sample-based accumulation curves, which show the increase in individuals, species or genera per sampling unit and are therefore used to determine if sampling is sufficient or not in terms of covering diversity and richness (Thompson and Withers, 2003). Most commonly these accumulation curves are conducted at the species level, but they can also be applied to higher taxa like families and genera (Gotelli and Colwell, 2011, 2001). The accumulation curves also give information about species richness, relative abundance and diversity (Thompson and Withers, 2003). Typically a species accumulation curve shows an initially steep, continuously decreasing slope and converges to an asymptote, when the maximum number of species has been reached. However, this shape can be affected in several ways (Gotelli and Colwell, 2011, 2001); when a lot of rare species opposed to only a few abundant species are present or if sampling is conducted on a large geographical scale, the transition between the initial slope and the following flatter slope of the curve may be lower and the slope towards the asymptote may be rather long or an asymptote may not be reached at all within figure margins . Since the data set in this study relies on literature, references were used as a sampling unit (x-axis). Sampling accumulation curves were created both at the species and the genus level, since genera of fossil testudinids are relatively well resolved whereas determination on the species level is still obscure in some cases, because fossil species are frequently based on single individuals that are often incompletely preserved as well (Brattstrom, 1961; De Lapparent de Broin, 2001). Since genera were better sampled than species (Fig. 3, S2 (a) - (b)), all subsequent analyses were performed on the generic level. Additional sampling accumulation curves for the continents were created (Fig. S2 (c) - (i)), to check if subsequent analyses could be applied to these subgroups.

3.3.1 Descriptive statistics

To explore the data structure, normalized histograms with density curves and boxplots of the entire data set and several subgroups (fossil vs. modern, insular vs. continental) were created. Descriptive statistics like mean, median, variance, skewness and kurtosis were calculated with the R package `moments` (Komsta and Novomestky, 2015; Table S11) for the raw and log-transformed data.

While mean, median and variance describe the location and distribution of a data set, skewness and kurtosis are referred to as 'shape statistics', which give information about symmetry (skewness) and the weight of the tails compared to the rest of the distribution, i. e. outliers will results in a higher kurtosis. However, the accuracy and suitability of these shape statistics has been debated, since sample size, extreme values and homogeneity of the data impact their results and uncertainties are higher than when mean and median are used (Bai and Ng, 2005; McNeese, 2016). Especially for small sample sizes, the histograms might provide more reliable information about the structure of the data set than skewness and kurtosis (McNeese, 2016).

The Wilcoxon Rank Sum Test (unpaired data) was used to test for differences in body size between modern and fossil taxa as well as between insular and continental taxa. To be able to compare different subgroups, a random subsample (1000 repeats) of the respective larger subgroup was taken to compare equal sample sizes. For the majority of random subsamples, the median coincided with the real median (see Appendix D), therefore subsamples were assumed to reflect the actual sample and subsequently used for statistical comparisons. The Kruskal-Wallis test was used to test for differences among subsamples, e. g. body size per time bin and body size per continent. As post-hoc test, a multiple comparison (`kruskalmc()`) (Siegel and Castellan, 1988) was conducted to identify which groups differed significantly from each other.

3.3.2 Body size trends over time

To investigate trends in body size over time, the R package `paleoTS` (Hunt, 2015) was used. Data was split into time bins according to stratigraphic stages (Table 1, Fig. 2), with the exception of the two lower stages of the Miocene, which were considered as one time bin, because the last bin otherwise would have contained only two data records. Bins were chosen to reflect stratigraphic stages to ensure a decent sample size in each bin and because an exact dating was not available for all localities, but often only a rough estimate of the stratigrahic stage. To prevent sampling bias and because sampling accumulation curves showed that the genus level was better sampled than the species level, the mean SCL per genus was calculated before summarising mean SCL per time bin for the timescale analysis. The paleoTS plots display the mean trait over time and can be fitted to different evolutionary models: stasis, where the trait mean fluctuates around a steady mean (no change), generalized random walk (GRW), where the trait mean increases or decreases over time (directional change) or unbiased random walk (URW), where the trait mean changes over time but not in a way where these changes accumulate and move the trait mean in a specific direction (non-directional change). Model fits are based on maximum-likelihood estimation and model support is reported as Akaike Information Criterion (AICc), with the lowest values indicating the best suited model. Additionally, Akaike weights are reported, which give the proportional support for each model. PaleoTS plots and model-fitting was performed for the entire data set, continental, and insular genera subsets. The same approach was repeated for European and Eurasian genera for all data, as well as continental and insular genera separately.

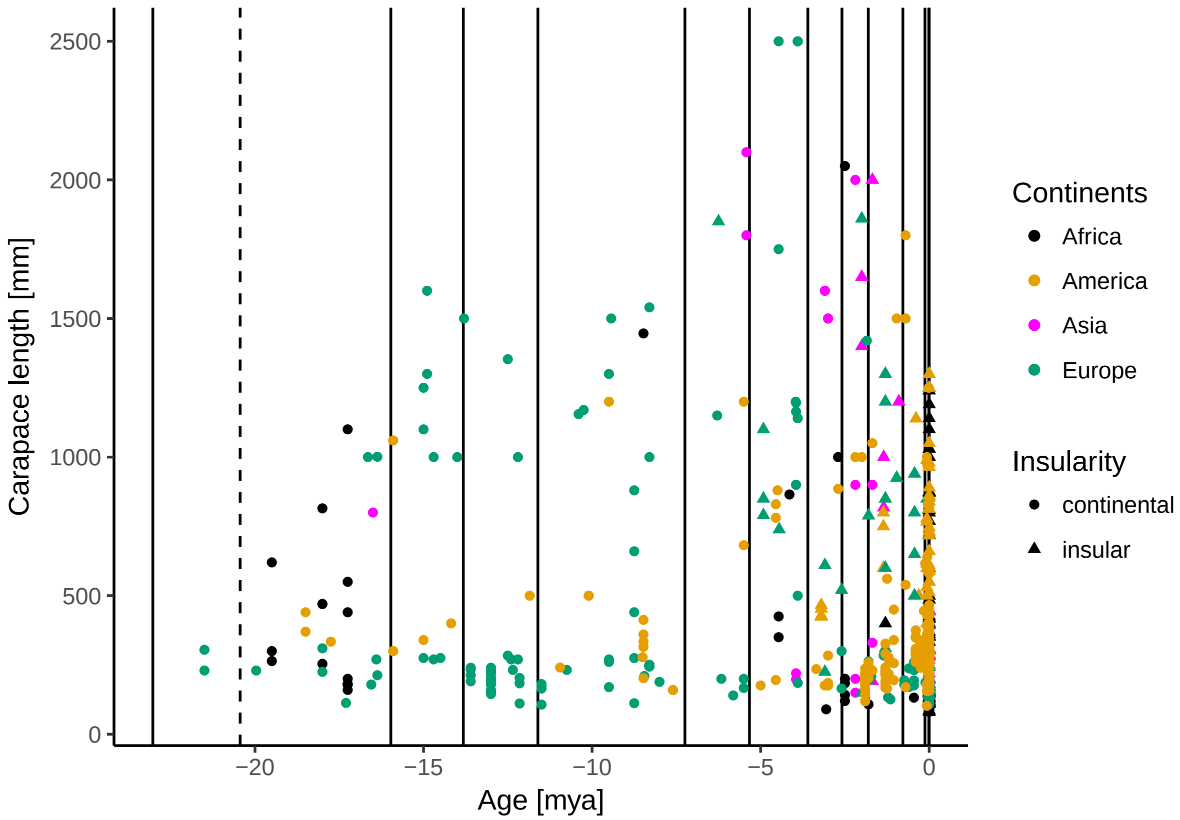


Figure 2: Carapace length plotted over time, indicating insular (triangle) and continental species (circles) and colour indicating the continents. Straight lines indicate stratigraphic stages which were used as time bins, the dashed line indicates the border between the two stages of the Lower Miocene, which were consideres as one time bin. The largest testudinids recorded occur in the Pliocene of continental Europe.

Table 1: Time ranges, mean age per bin, corresponding stratigraphic stages and epochs, and respective sample sizes (on individual, species and genus level). Apart from the modern samples, which include all extant genera, the Lower Pleistocene contains the highest sample size.)

Age Range [mya]	Mean Age [mya]	Stages	Epochs	n (Individuals)	n (Species)	n (Genera)
0 - 0.0117	0.00585	Modern	Modern	254	66	18
0.0117 - 0.126	0.06885	Upper Pleistocene	Upper Pleistocene	50	18	8
0.126 - 0.781	0.45350	Middle Pleistocene	Middle Pleistocene	53	13	7
0.781 - 1.81	1.29350	Lower Pleistocene	Lower Pleistocene	57	27	12
1.81 - 2.59	2.19700	Gelasian	Lower Pleistocene	33	15	9
2.59 - 3.6	3.09400	Piacencian	Upper Pliocene	24	15	10
3.6 - 5.33	4.46600	Zanclean	Lower Pliocene	31	17	8
5.33 - 7.25	6.28900	Messinian	Upper Miocene	12	9	6
7.25 - 11.6	9.42700	Tortonian	Upper Miocene	46	20	9
11.6 - 13.8	12.71400	Serravallian	Middle Miocene	27	8	6
13.8 - 16	14.89500	Langhian	Middle Miocene	18	14	9
16 - 23	19.50000	Burdigalian/Aquitanian	Lower Miocene	31	15	9

4 Results

4.1 Sample-based accumulation curves

To see if sampling was sufficient, sample-based accumulation curves were created. The sample-based accumulation curve (SAC) on the generic level shows a relatively low intial slope and a long upward slope to the asymptote, which does not reach full saturation (Fig. 3). In contrast, the species accumulation curves, both per reference and per locality, show only a slight initial increase and, for the same number of references/sampling units, are far from reaching an asymptote (Fig. S2 (a), (b)). This demonstates that sampling is sufficient on the generic but not on the species level, which is the following analyses were conducted on the generic level. Accumulation curves for individual continents show that Europe reflects the trend of the overall dataset, with a long upward slope after the initial steep slope (Fig. S2 (h) - (i)). This shows that Europe and Eurasia are sufficiently sampled, whereas the other continents would require further sampling (Fig. S2 (c) - (g)). For this reason, the timescale analysis was only conducted for Europe and Eurasia, but not for the other continents.

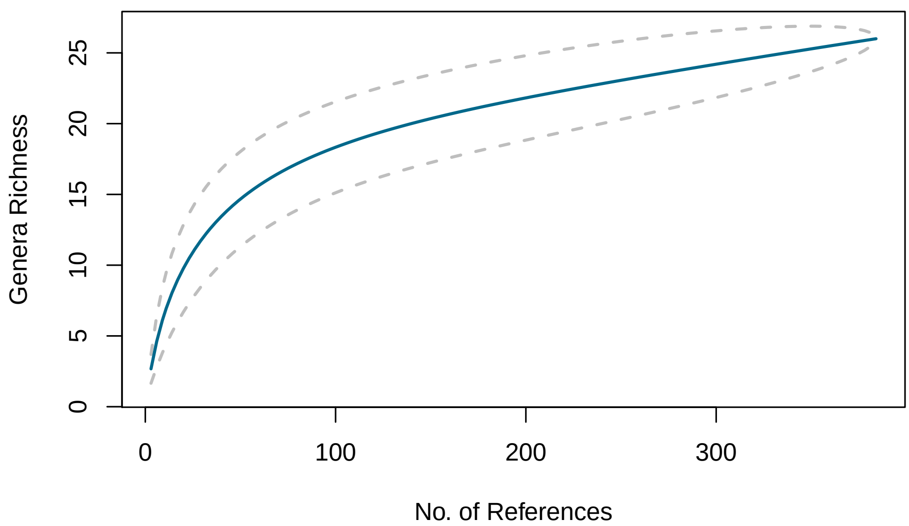


Figure 3: Sample-based accumulation curve of fossil genera per reference. Dashed lines represent the confidence interval.

4.2 Descriptive statistics

To explore the strucure of the data set, histograms with density curves were created. The histograms indicate that testudinid body size is not normally distributed (Fig. 4), which is supported by QQ-Plots for raw as well as log-transformed data (Fig. S3).

The body size distribution is moderately right-skewed (Table S11), with a higher frequency of smaller body sizes. Body size ranges from a minimum of 80 mm to a maximum of 2500 mm for the entire data set. When comparing body sizes on a temporal scale, the minimum body size per stratigraphic stages excluding modern taxa ranges from 90 mm to 270 mm, while the maximum reaches values between 1100 mm to 2500 mm. The highest maximum body size was observed in the fossil record from continental Europe with a carapace length of 2500 mm.

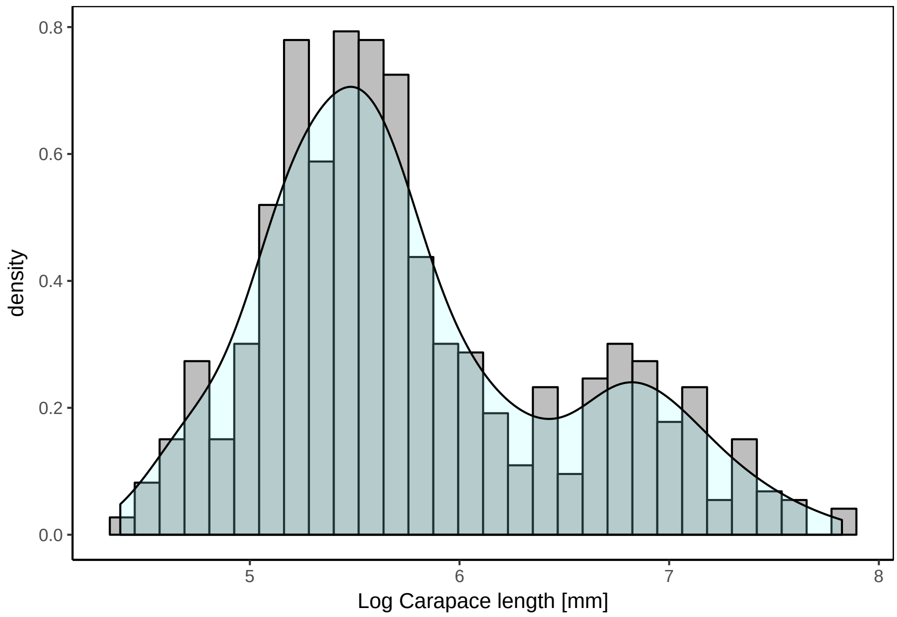
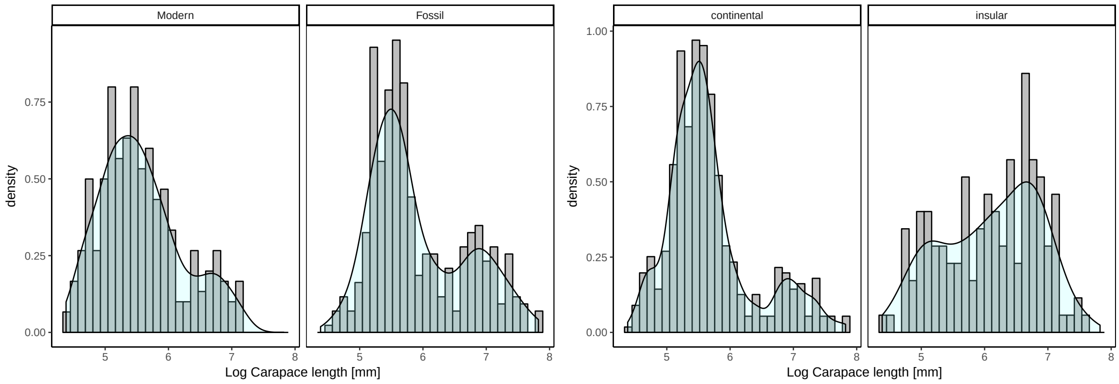


Figure 4: Body size distribution of the complete data set. The data is bimodally distributed and right-skewed.

Considering insularity, body size distribution is right-skewed for continental taxa, but left-skewed for insular species, meaning larger body size is more frequent than smaller body size on islands. The overall pattern of bimodality is also apparent when splitting the data set into fossil and modern taxa (Fig. 5 (a)). Insular taxa are left-skewed when only considering fossil taxa, but modern insular taxa have a skewness close to 0, indicating a symmetric distribution (Table S11). Kurtosis suggests light tails with no/few outliers (kurtosis < 3) for insular and modern insular species, whereas continental species have a heavy tail (kurtosis > 3; Table S11).



(a) Fossil vs. modern

(b) Continental vs. insular

Figure 5: Comparison of body size distributions of modern vs. fossil and continental vs. insular data. All distributions are bimodal. Fossil, modern and continental subgroups are right-skewed whereas the distribution of insular data is left-skewed.

The histograms show a bimodal distribution, wich is also apparent on most sublevels, except for modern insular species (Fig. S4 (a)). Body size distributions are similar, right-skewed and bimodal, for the four continents and reflect the overall trend (Fig. S4 (b)).

To investigate differences in carapace length among stratigraphic stages, between modern and fossil testudinids, and continental and insular testudinids, boxplots were created. Mean body size differs significantly across time bins (Kruskal Wallis Test, χ^2 = 71.441, P < 0.01; Fig. 6). The multiple comparison test showed that modern median body size is smaller than body size in the Upper Pleistocene. Body size within the Pleistocene and between Pleistocene and Pliocene/Upper Miocene does not differ. Serravallian body size is smaller than Langhian body size in the Middle Miocene, but Langhian body size is not different from Lower Miocene body size. These results show that body size is relatively steady over time, only between Modern and Upper Pleistocene as well as within the Middle Miocene a significant difference in carapace length is observed.

Comparison of modern and fossil testudinids showed that modern tortoises are significantly smaller than fossil ones (Wilcoxon Rank Sum Test, W = 22318, P < 0.01; Fig. 7). Furthermore, continental testudinids are significantly smaller than insular taxa (Wilcoxon Rank Sum Test, W = 13854, P < 0.01; Fig. 7).

These results can even be considered in combination as modern continental taxa are smaller than fossil continental taxa (Wilcoxon Rank Sum Test, W = 8046, P < 0.01; Fig. 8) and modern insular taxa are smaller than fossil insular taxa (Wilcoxon Rank Sum Test, W = 631.5, P < 0.01;

Fig. 8))

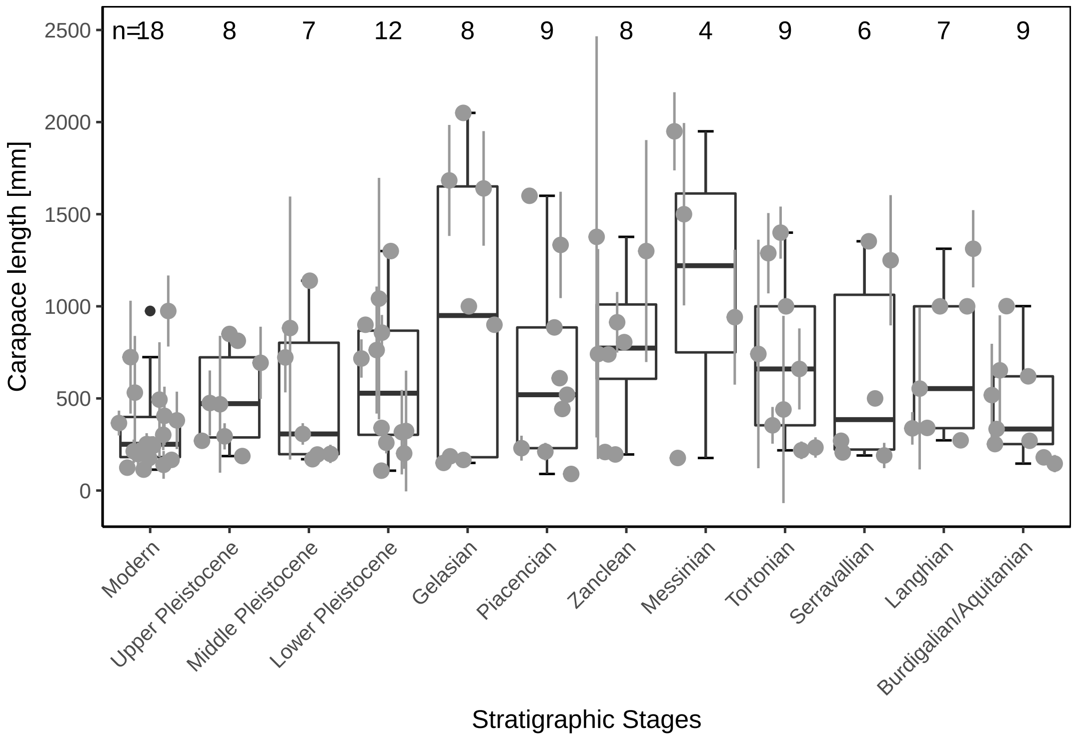
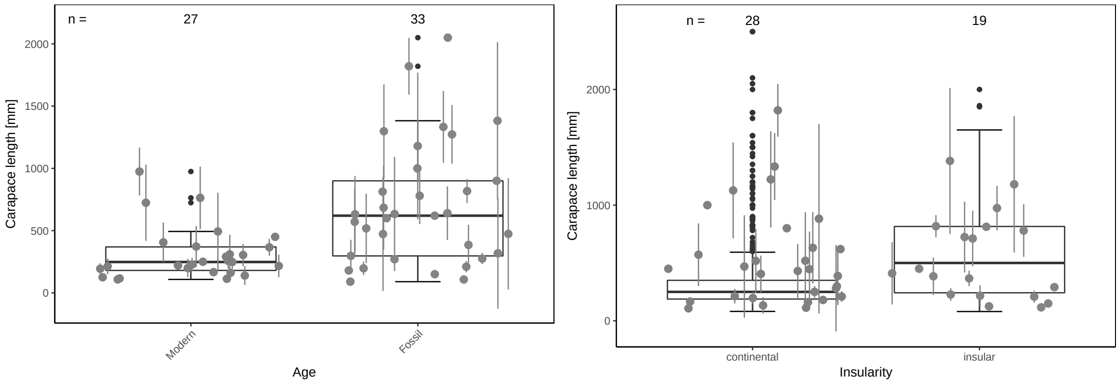


Figure 6: Comparison of carapace length across all time bins. Bold lines indicate medians, boxes indicate lower and upper quartiles, whiskers indicate largest and smallest observations and outliers represent extreme values. Numbers refer to number of genera per time bin. The mean carapace lengths per genera are depicted as grey circles with errorbars indicating the respective standard deviation. Smallest average carapace length and variance is found in modern testudinids.

Finally, body size differs among continents (Kruskal Wallis Test, χ^2 = 34.343, P < 0.01; Fig. 9). The multiple comparison test showed that African testudinids differ significantly from the other three continents in body size. American testudinid body size is comparable to that of Asia, but differs from those of Africa and Europe. Furthermore, Asian and European testudinids are similar in body size.



(a) Modern testudinids have a smaller average carapace length and variance than their fossil counterparts.

(b) Continental Testudinidae have a larger average carapace length and variance than insular testudinids

Figure 7: Comparison of carapace length between (a) fossil and modern as well as (b) continental and insular testudinids. Bold lines indicate medians, boxes indicate lower and upper quartiles, whiskers indicate largest and smallest observations and outliers represent extreme values. Numbers refer to number of genera per time bin. The mean carapace lengths per genera are depicted as grey circles with errorbars indicating the respective standard deviation.

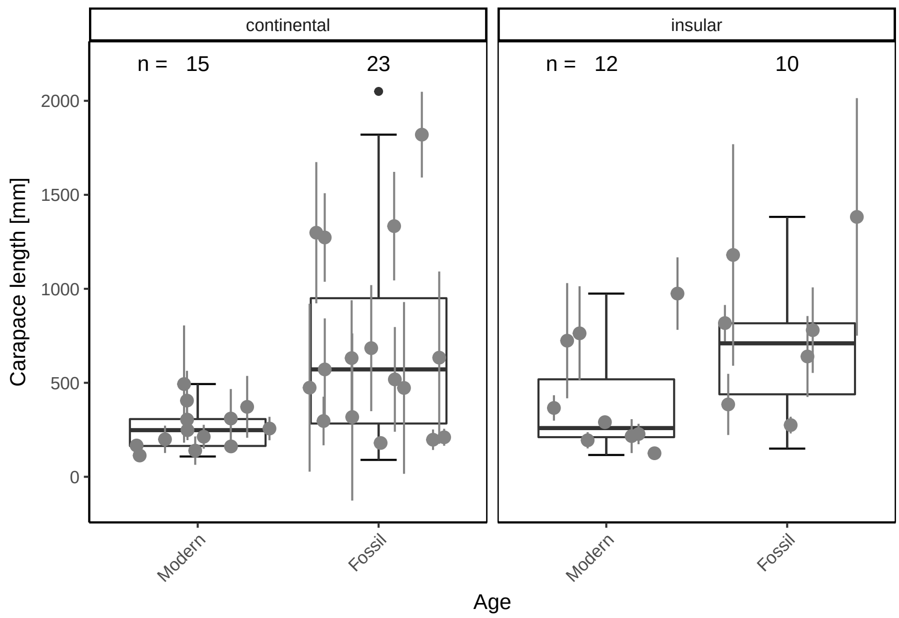


Figure 8: Boxplots fossil vs. modern, continental vs. insular species. Comparison of carapace length among continental and insular Testudinidae of different age. Bold lines indicate medians, boxes indicate lower and upper quartiles, whiskers indicate largest and smallest observations and outliers represent extreme values. Numbers refer to number of genera per time bin. The mean carapace lengths per genera are depicted as grey circles with errorbars indicating the respective standard deviation. Modern testudinids are smaller than fossil ones on both, continents and islands.

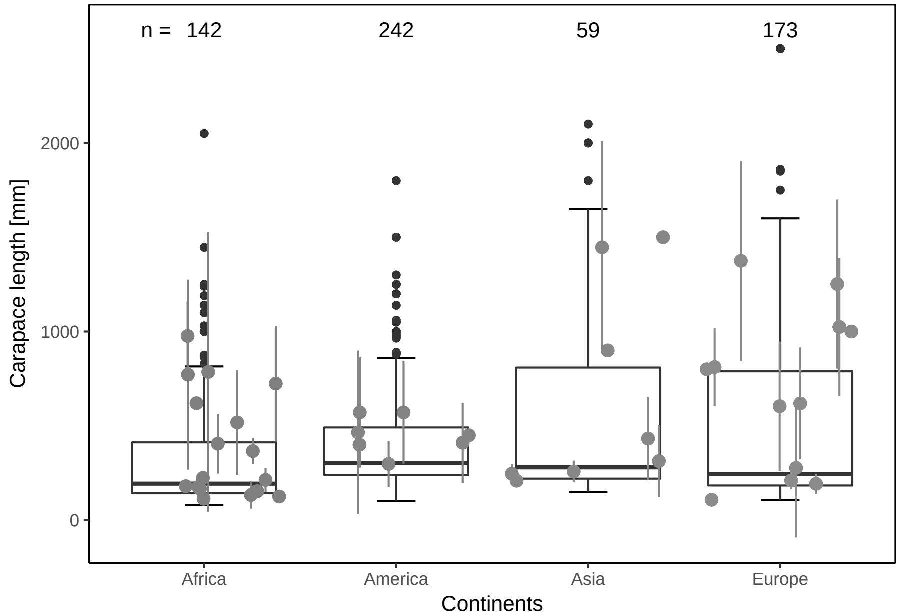


Figure 9: Comparison of testudinid carapace length among continents. Bold lines indicate medians, boxes indicate lower and upper quartiles, whiskers indicate largest and smallest observations and outliers represent extreme values. Numbers refer to number of genera per time bin. The mean carapace lengths per genera are depicted as grey circles with errorbars indicating the respective standard deviation. African testudinids have the smallest average carapace length compared to the other continents.

4.3 PaleoTS analysis

4.3.1 Complete dataset

To investigate the evolutionary trajectory of body size across time, time scale analysis based on the mean carapace length and variance per time bin were conducted and fitted to three evolutionary models (stasis, unbiased random walk and generalized random walk). How mean body size progresses over time is similar for the complete data set as well as continental and insular subgroups (Fig. 10, 11, 12). All show peaks in the Upper Miocene and Lower Pleistocene and a dip during the Pliocene (Table 2, 4, 6). However, the decline in body size is very pronounced for continental testudinids (Fig. 11), whereas body size only slowly decreases on islands (Fig. 12). All three data sets also show a very sharp decline in the youngest time bin. For the complete data set as well as the continental one, body size seems to increase constantly during the Miocene. For the insular data set, the Upper Miocene is the starting point for the analysis, where mean carapace length is even larger than on continents. The model fittings showed that stasis is best supported for both the complete and the insular data set (Table 3, 7). However, while it is very well supported for insular testudinids (100 %, Table 7), the model support for the complete data set is rather weak (50 %, Table 3). In conrast, on continents an unbiased random walk is the best supported model, but also with only a rather weak support (Table 5).

Table 2: PaleoTS object of the complete data set. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Upper Miocene, followed by the Lower Pleistocene.

tt	nn	mm	vv
0.00585	22	330.1456	50307.87
0.06885	8	506.3265	64620.11
0.45350	7	516.4053	155241.85
1.29350	12	593.8669	147507.20
2.19700	8	971.8850	580540.76
3.09400	9	658.0826	271043.73
4.46600	8	785.0792	187937.61
6.28900	4	1141.9375	584378.85
9.42700	9	703.9570	195766.19
12.71400	6	628.3020	285258.36
14.89500	7	687.9619	169914.58
19.50000	9	441.5420	78467.65

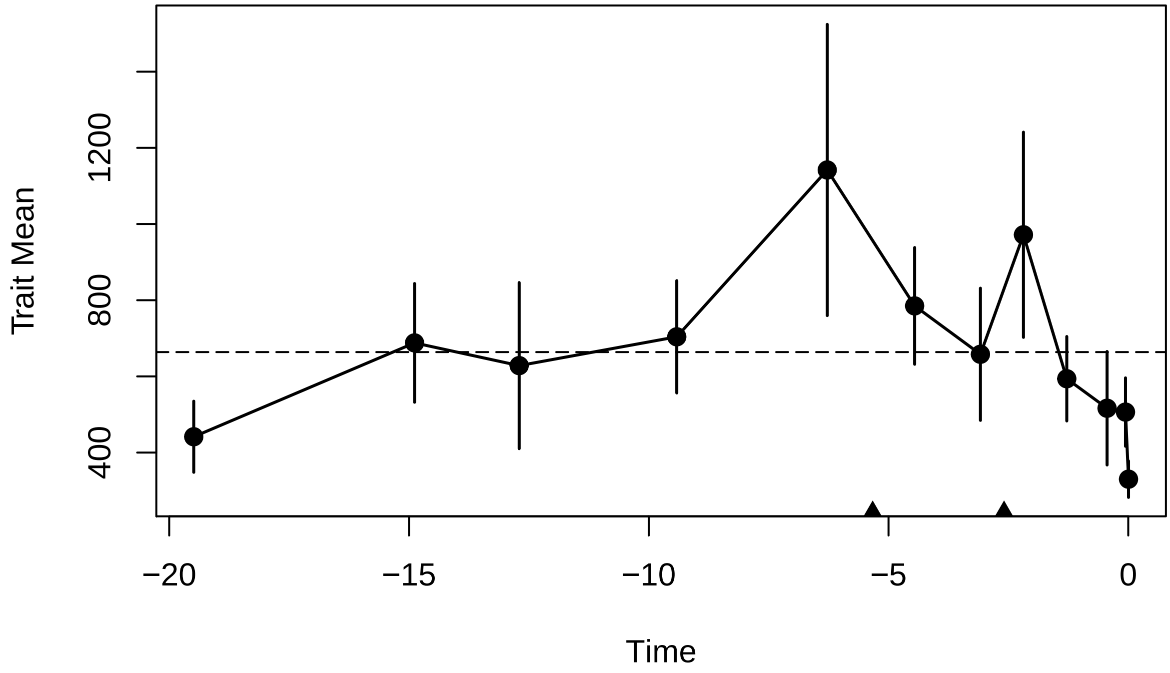


Figure 10: Evolutionary trajectory of Testudinidae body size (Trait Mean) over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size seems to continuously increase until the Upper Miocene, dip and go back up again in the Pliocene and steadily drop with onset of the Pleistocene.

Table 3: Model-fitting results for the complete data set. Stasis is the best although not very strongly supported model, followed by URW.

	logL	K	AICc	Akaike.wt
GRW	-81.31790	2	167.9691	0.161
URW	-82.05721	1	166.5144	0.332
Stasis	-80.16802	2	165.6694	0.507

4.3.2 Continental dataset (excluding insular species)

Table 4: PaleoTS object of the continental data set. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Lower Pleistocene, followed closely by the Upper Miocene.

tt	nn	mm	vv
0.00585	18	240.3544	11701.08
0.06885	6	397.4606	50619.39
0.45350	5	416.9341	200982.12
1.29350	7	346.8484	66240.07
2.19700	7	1103.1067	595507.93
3.09400	6	725.4156	414253.29
4.46600	6	771.3833	259173.08
6.28900	4	1054.4375	531455.93
9.42700	9	703.9570	195766.19
12.71400	6	628.3020	285258.36
14.89500	7	687.9619	169914.58
19.50000	9	441.5420	78467.65

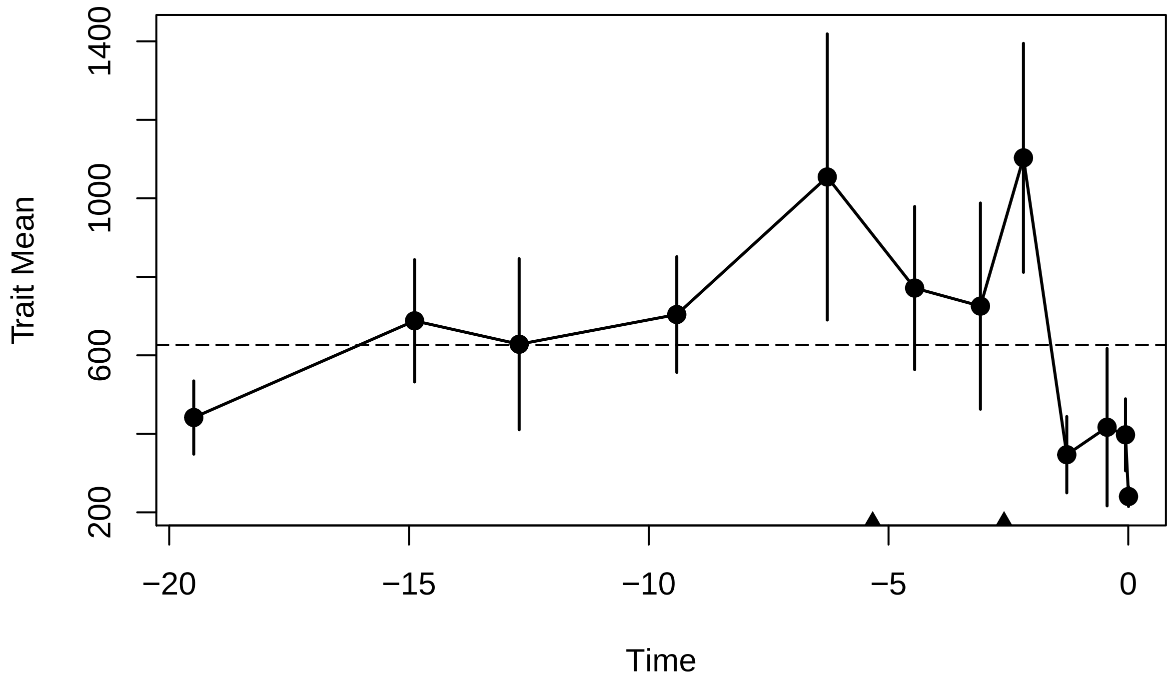


Figure 11: Evolutionary trajectory of Testudinidae body size (Trait Mean) on the continents over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size seems to increase until the Upper Miocene, dip and go back up again in the Pliocene and steadily drop with onset of the Pleistocene.

Table 5: Model-fitting results for the continental data set. URW is the best although not very strongly supported model, followed by GRW.

	logL	K	AICc	Akaike.wt
GRW	-82.26287	2	169.8591	0.300
URW	-83.12577	1	168.6515	0.548
Stasis	-82.93984	2	171.2130	0.152

4.3.3 Insular dataset (excluding continental species)

Table 6: PaleoTS object of the insular data set. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. First records are from the Upper Miocene, where the largest mean carapace length occurs, followed by the Lower Pleistocene.

tt	nn	mm	vv
0.00585	13	416.5655	80682.22
0.06885	4	727.5938	14997.58
0.45350	3	748.8333	142649.08
1.29350	6	829.6744	112964.44
2.19700	3	1178.3333	821158.33
3.09400	4	449.4375	27058.77
4.46600	2	826.1667	15196.06
6.28900	1	1850.0000	0.00

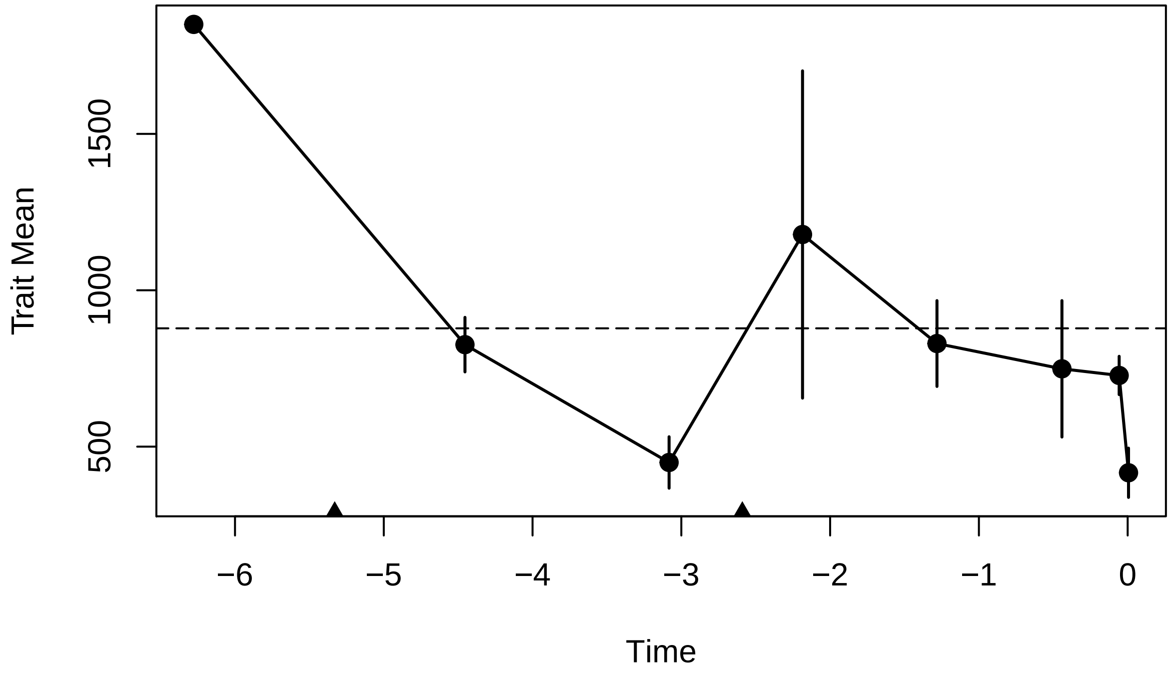


Figure 12: Evolutionary trajectory of Testudinidae body size (Trait Mean) on islands over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size decreases during the Pliocene and goes back up again in the Lower Pleistocene, then drops slowly until it declines sharply in the Holocene.

Table 7: Model-fitting results for the insular data set. Stasis is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-68.57344	2	143.5469	0
URW	-75.76576	1	154.1982	0
Stasis	-60.41581	2	127.2316	1

4.3.4 Per continent

The time-scale analysis was repeated for sufficiently sampled continents, Europe and Eurasia.

Europe, genera

When repeating the analysis for European taxa only, all three groups – complete, continental and insular data – are best described by stasis with a model support between 92 - 99 % (Fig. 13, S7, S8; Tables 9, S2, S4). Mean carapace length over time is similar to the global analysis, althought the drop during is the Pleistocene is much more pronounced in continental European testudinids (Fig. S7), while it is a lot less pronounced in insular European testudinids (Fig. S8). Also, the highest carapace length for European testudinids are found during the Lower Pliocene and Upper Miocene (Table 8, S1, S3)

Table 8: PaleoTS object of European testudinids. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Lower Pliocene.

tt	nn	mm	vv
0.00585	2	148.8559	3338.406
0.06885	3	616.6667	138802.333
0.45350	3	377.8167	89203.953
1.29350	5	697.3717	218431.974
2.19700	2	895.0000	1110050.000
3.09400	3	453.3333	39433.333
4.46600	5	1215.8667	159317.256
6.28900	2	838.3750	875495.281
9.42700	6	800.0508	263434.389
12.71400	5	653.9625	351634.528
14.89500	5	772.0000	223154.375
19.50000	5	533.8533	183706.682

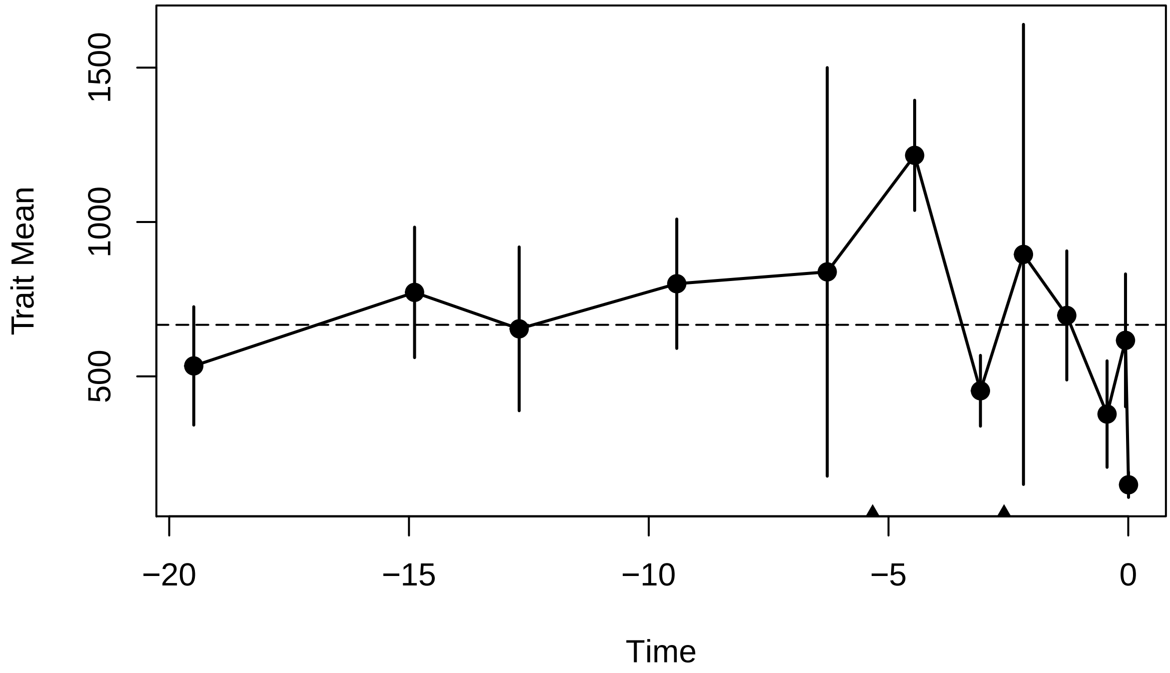


Figure 13: Evolutionary trajectory of Testudinidae body size (Trait Mean) in Europe over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size seems to increase until the Lower Pliocene and generally decline afterwards. However, body size shows two slight peaks, one at the beginnign and one at the end of the Pleistocene.

Table 9: Model-fitting results for European testudinids. Stasis is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-84.14010	2	173.7802	0.006
URW	-85.90727	1	174.2590	0.005
Stasis	-79.01365	2	163.5273	0.990

Eurasia, genera

The results for Eurasian taxa only generally coincide with the results for the complete data set. For Eurasia, the complete data set (Fig. 14, Table 10) and insular taxa (Fig. S10, Table S7) are best described by stasis, with higher model supports than for the global data set (Table 11, S8).

Continental taxa (Fig. S9, Table S6) are best described by an unbiased random walk (Table S6), which reflects the results for the global data set, although model support for Eurasian continental taxa is even higher.

Mean carapace length over time differs from the complete and the European data, at least for entire Eurasia and mainland Eurasia because body size does not peak during the Lower Pleistocene but drops steadily from the Upper Miocene onwards (Fig. 14, S9). On Eurasian islands, however, body size shows a second peak during the Lower Pleistocene (Fig. S10), similar to the complete and European data sets on insular testudinids.

Table 10: PaleoTS object of the Eurasian testudinids. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs from the Upper Miocene to the Lower Pliocene.

tt	nn	mm	vv
0.00585	6	210.8687	10460.89
0.06885	4	530.0000	122579.33
0.45350	3	377.8167	89203.95
1.29350	7	777.5579	162641.14
2.19700	5	909.6667	562217.22
3.09400	5	892.0000	381770.00
4.46600	6	1048.0556	296417.22
6.28900	3	1208.9167	849651.02
9.42700	6	800.0508	263434.39
12.71400	5	653.9625	351634.53
14.89500	5	772.0000	223154.38
19.50000	5	513.8533	162399.35

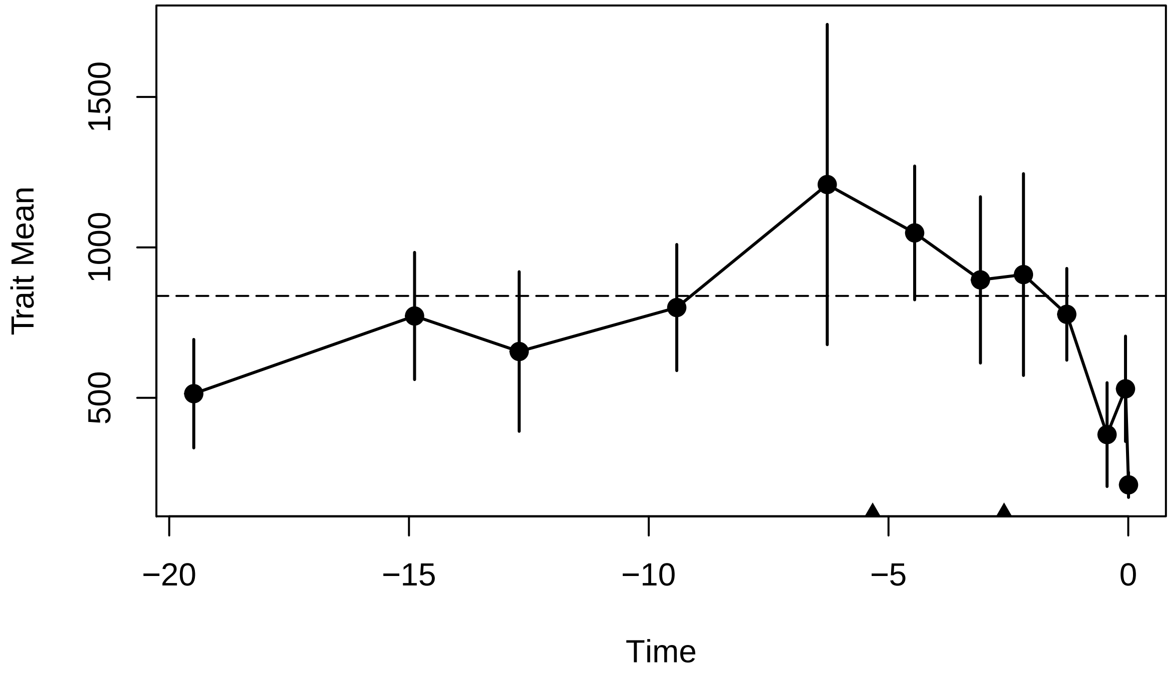


Figure 14: Evolutionary trajectory of Testudinidae body size (Trait Mean) in Eurasia over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size seems to increase until the Upper Miocene and then decline continuously with only one slight peak during the Upper Pleistocene.

Table 11: Model-fitting results for Eurasian testudinids. Stasis is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-78.25066	2	162.0013	0.039
URW	-78.39530	1	159.2350	0.154
Stasis	-75.21099	2	155.9220	0.807

5 Discussion

For this study, a data set comprising 58 extant and 98 fossil species of Testudinidae has been assembled, including body size measurements from 616 specimens. The analyses revealed that Testudinidae have a bimodally distributed body size, which is generally right-skewed except for insular species, where a negative skewness indicates a higher abundance of large-bodied testudinids. It could be confirmed that modern testudinids are significantly smaller than fossil tortoises. Moreover, continental taxa are significantly smaller than insular forms, which has been observed for both modern and fossil testudinids. Surprisingly, the time scale analysis identified stasis as the best-fitting model for the complete data set as well as most subgroups. Only for continental testudinids, globally and in Eurasia, an unbiased random walk was the favoured evolutionary model.

5.1 Data coverage

Sample-based accumulation curves show that genera have been sufficiently sampled, i.e. that further sampling will probably not result in recording more genera. However, this is not the case for species. Since there are fewer genera than species in a clade, it is to be expected that genera reach an asymptote earlier than species (Gotelli and Colwell, 2001). Although the accumulation curve for the entire data set does not completely converge to an asymptote, considering the large area covered (Thompson and Withers, 2003) and the high number of rare genera in the dataset (which are to be expected in a fossil dataset), it can be considered well enough sampled for the present study (Gotelli and Colwell, 2001). The remaining analyses are conducted on the generic level because generic level identifications in the fossil record are more robust than species level identification and genera are better sampled in my data set (Jass et al., 2014). According to Rhodin et al. (2015) 121 species of testudinidae have been recognized in the fossil record since the beginning of the Pleistocene. For 117 species from that time period, body size data could be obtained for this study. Therefore it can be assumed, that at least for the time period since the Pleistocene the data set sufficiently resembles the actual fossil record of testudinidae on a global scale. However, to be able to investigate body size patterns on smaller spatial or temporal scales further body size data should be collected.

5.2 Distribution of testudinid body size

The distribution of testudinid body size is rather homogenous across spatial and temporal scales. Body size distribution is right-skewed on a large scale, as well as for modern, fossil and continental species. Similar patterns have been observed in tortoises (Angielczyk et al., 2015; Jaffe et al., 2011) and frequently throughout the animal kingdom (Blackburn and Gaston, 1994; Kozlowski and Gawelczyk, 2002).

Only insular testudinids show a body size distribution with a negative skewness, which indicates a higher frequency of larger-bodied species. This left-skewed distribution seems to be largely driven by fossil insular species, as modern insular species are not skewed and show a rather flat, symmetrical distribution. Interestingly, Angielczyk et al. (2015) found a strongly left-skewed body size distribution for insular species when investigating the entire clade of Testudines. This observation is probably driven by their well-sampled data set on Testudinidae, which comprises all extant and a few extinct species. The bimodality of overall body size distribution and the consistency across the continents in testudinids observed in the present study is similar to what has been reported for Quaternary mammals, which were observed to have a constant bimodal distribution across alls continents but Australia (Lyons and Smith, 2008; Smith et al., 2004). However, since tortoise body size is only sampled well enough for Europe and Eurasia, these results have to be considered with caution.

When looking at continental tortoises on a temporal scale, the second peak representing large body sizes disappears for modern tortoises, which is probably due to the extinction of large continental taxa and coincides with other findings (Itescu et al., 2014). This may be partially due to the fact that almost half of the extant body size data for this study was obtained from the mentioned publication. Nonetheless, also with the higher number of data records for the present study, the results are consistent with Itescu et al. (2014). Moreover, the disappearance of larger taxa in recent times is similar to what has been observed in the mammalian megafauna during the Quaternary (Lyons and Smith, 2008). For insular species, however, the results of the present study deviate from the observations made by Lyons and Smith (2008). While the bimodal body size distribution of testudinids is constant over time on islands, it is also left-skewed, whereas for mammals the opposite has been observed (Lyons and Smith, 2008). This contradiction is easily explained by the fact that many mammals show a decrease in body size in insular environments due to a lower predation risk as stated by the island rule (Foster, 1964). Insular tortoises, on the contrary, reach larger sizes than continental testudinids, which is consistent with other findings Angielczyk et al. (2015); Itescu et al. (2014); Jaffe et al. (2011). Whether or not these results can be considered as complying the island rule depends on the biogeographic history of giant tortoises and whether they evolved to be large on islands or prior to island colonizations. Many authors agree that tortoises were already large when they colonized the islands, which would contradict the island rule (Itescu et al., 2014; Cheke et al., 2016; Gerlach et al., 2006; Caccone et al., 1999; but see Jaffe et al., 2011). Colonization of oceanic islands via sea dispersal has been argued to be the only plausible explanation for the presence of tortoises on islands (Cheke et al., 2016). Since a larger size improves bouyancy and fasting endurance in tortoises, it seems logical that tortoises first evolved large size and then spread to islands (Cheke et al., 2016; Gerlach et al., 2006; Jaffe et al., 2011; Patterson, 1973; Pritchard, 1996). Modern tortoises are significantly smaller-bodied than their fossil conspecifics, which coincides with earlier findings for animals in general (Blackburn and Gaston, 1994) and reptiles as a clade (Smith et al., 2016). This significant decrease in testudinid body size takes place during the Pleistocene and seems to coincide with the spread of humanity across the globe (Rhodin et al., 2015). One thing to consider, however, is that smaller individuals are less likely to be preserved in the fossil record than larger ones which may introduce a taphonomic bias (Lyons and Smith, 2008). Further, specifically for body size, data on larger species or individuals is more likely to be available in the literature, because they are considered more interesting or significant finds. On the contrary, small species are sometimes only mentioned as being present at the site without providing measurements or photographs.

5.3 Time-scale analysis

The time scale analysis showed that stasis is the evolutionary model that best fits overall testudinid body size evolution, which contradicts my initial hypothesis. Only for continental taxa on a global scale and Eurasian continental taxa, the favoured evolutionary model is an unbiased random walk. Stasis, which describes fluctuations around a mean which in the end do not results in a net change, has often been observed in the fossil record, both on the species and on higher taxonomic levels (Hunt, 2006; Hunt et al., 2015; Pimiento et al., 2015; Smith et al., 2016). Unbiased random walk is a special case of directional evolution, where a trait is equally likely to increase or decrease over time (Hunt, 2004) and has also been observed in the fossil record (Hunt, 2004, 2006; Smith et al., 2016). Stasis may have different underlying reasons, i. e. distinctive ecological conditions in a wide-spread taxon, resilience to environmental change and slow evolutionary rates (Benton and Pearson, 2001; Hunt et al., 2015; Pimiento et al., 2015; Sheldon, 1996). Further, stasis may be observed when evolutionary changes occur quickly within a limited amount of time whereas the remaining time there is no change in mean trait, therefore obscuring evolutionary changes (Hunt, 2004). For all time scale analyses in this study, it looks as though body size increases first and then decreases again, however, most of these changes do not seem pronounced enough to deviate from stasis. Only for continental testudinids, globally and in Eurasia, the sharp drop at the end of the Pleistocene where mean body size as well as body size range decrease strongly, evolutionary change seems to be pronounced enough to be described as a random walk (Hunt, 2004; Hunt et al., 2015). Since the comparison of body size across time bins has shown that body size does not differ significantly over the time period from the Miocene until the Pleistocene, stasis seems plausible for the overall data set. This constancy over time could be a results of the bimodal body size distribution, which might suggets that there is more than one optimal body size for testudinids. Angielczyk et al. (2015) and Jaffe et al. (2011) demonstrated for Testudines that optimal body size can differ based on habitat, which included mainland and island habitats. Since my results suggest a difference between these two habitats, namely that continental taxa are smaller than insular taxa, that may also be the case for testudinids. The unbiased random walk for continental testudinids seems to be influenced by the complete loss of giant forms in recent times, because this extinction leads to a change in mean body size as well as body size range. Additionally, within-lineage changes, referred to as tendencies, towards smaller body size have been suggested for certain continental tortoise species (Franz and Quitmyer Irvy, 2005; Klein and Cruz-Uribe, 2000; Speth and Tchernov, 2002; Steele and Klein, 2005). Thus, the size-biased extinction of giant continental species coupled with tendencies towards body size on the species level, seems to result in an evolutionary trajectory best desribed by stasis. Alternatively, on a global scale and on continents, body size ranges do not change considerably, although the decline during the Pleistocene still results in modern taxa being significantly smaller than fossil taxa.

5.4 Causes for extinction

There are numerous accounts of tortoise exploitation by humans from all over the world (Archer et al., 2014; Avery et al., 2004; Blasco, 2008; Blasco et al., 2011, 2016; Franz et al., 2001a; Karl, 2012; Mudar and Anderson, 2007; Munro and Grosman, 2010; Peres and Nascimento, 2006;

Pritchard, 2013; Sampson, 2000, 1998; Speth and Tchernov, 2002; Steadman et al., 2017; Thompson and Henshilwood, 2014). Accordingly, extinction patterns in tortoises are associated with the spread of hominin and humans. For example, humans spread on the continents first and only later reached islands, which is why many large island species were overexploited during the Holocene leading to their extinction (Rhodin et al., 2015). In many archeological sites where tortoise remains are found, cut or burn marks are visible, indicating human consumption (Archer et al., 2014; Biton et al., 2017; Blasco, 2008; Blasco et al., 2016; Munro and Grosman, 2010). But besides direct anthropogenic threats like hunting, human presence was also associated with issues like habitat fragmentation or, especially on islands, introduced predators or competitors which may have further accelerated tortoise extinction (Sterli, 2015). Tortoises are frequently found associated with dwarf forms of proboscideans on islands (Hooijer, 1951; Vlachos and Tsoukala, 2014), which were found to have been overexploited by humans and only able to survive in regions inaccessible to humans (Surovell et al., 2005). The significant decrease in tortoise body size that was observed during and especially at the end of the Pleistocene also coincides with the time of human spread and may be comparable to the exploitation of the mammalian megfauna, for which human influence has been suggested to be the main cause (Barnosky, 2004; Sandom et al., 2014). Further, for the other clade of terrestrial tortoises, the Australian Meiolaniidae, evidence suggests that human exploitation lead to their extinction (White et al., 2010). However, there are also records of mass mortalities of giant insular tortoises in Mauritius and Réunion associated with volcanic activity, before humans had even reached the islands (Cheke et al., 2016). Moreover, some extant species have been heavily exploited by humans in the past but did not go extinction, which suggest that human exploitation may not be the sole reason for tortoise extinction (Steele and Klein, 2005; Stiner et al., 1999). However, the aforementioned exploitations were associated with medium sized tortoises and did lead to a decrease in body size over time (Steele and Klein, 2005; Stiner et al., 1999). Considering that large tortoises yield more nutritional value and are more likely to be collected by human (Rhodin et al., 2015), the extirpation of giant tortoises might be attributable to humans, possibly in conjunction with climate change (Cione et al., 2003).

Giant tortoises seem to occupy only a small temperature range, as they are in danger of overheating (Schleich, 1981; Swingland and Lessells, 1979), but also seem to be unable to cope with cold winters (Hibbard, 1960). In the timescale analyses a drop in body size at the Miocene/Pliocene border is visible, where climate started to cool down and lead to a change in vegetation cover shifting towards more open habitats (Domingo et al., 2009). When giant tortoises feel temperatures get too hot, they will move into the shade, but a change in vegetation may have robbed them of suitable hiding places (Cheke et al., 2016; Hunter et al., 2013; Lujan et al., 2014; Schleich, 1981; Sturbaum, 1982). This may have contributed to their extinction in some places, for example on the Aldabra Atoll many tortoises have been observed to die from heat exposure (Swingland and Frazier, 1979; Swingland and Lessells, 1979).

5.5 Conclusion

The results of my study show that modern Testudinidae are significantly smaller than fossil testudinids and reach larger sizes on inslands compared to the mainlands. Additionally, the evolutionary mode that best describes body size evolution in testudinids is stasis. However, for continental taxa, which have descreased in body size over time due to extinction of all giant contintental testudinids, an unbiased random walk has been identified as evolutionary mode. The significant size difference between modern and fossil tortoises on a global scale and within-lineage tendencies on the species level are not reflected as a trend in overall testudinid body size, which may be due to the wide-spread distribution of testudinids comprising different ecological conditions. Discrepancies between continental and insular habitat may contribute to a stationary evolutionary trajectory. The results suggest that the extinction of giant continental fossil tortoises seems to drive evolutionary patterns of continental and insular species. Loss of biodiversity is not reflected in these patterns, if the size range does not change significantly. Possible reasons for the extinction of giant tortoises are complex and require further investigation. On the one hand, direct and indirect anthropogenic influence was massive and may have affected tortoises in the same way as the mammalian megafauna (Barnosky, 2004; Sandom et al., 2014). On the other hand, giant tortoises seem to have a narrow optimal temperature range and climatic fluctuations might have affected tortoise populations (Cione et al., 2003). This study could certainly benefit from further sampling, ideally by directly measuring fossil specimens from museum collections. With a larger data set, smaller-scale analyses could be conducted, for example for separate continents or individual lineages. Phylogenetically informed analysis is necessary to ultimately conclude about the evolution of testudinid body size. However, phylogeny of this clade is not well resolved and currently under heavy revision (De Lapparent De Broin et al., 2006). The obtained results are therefore less accurate, but still reliable because they are free of potentially false phylogenetic model constructions.

6 References

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Appendix A Geographical and stratigraphic distribution of body size data

Body size data was available from all four continents, were testudinidae occur, and over a time period of 20 mya (Fig. S1, Table 1).

–> samples all over the world and over the whole time period with more or less equally distributed sample sizes (over time bins, continents are uneven –> see SAC)

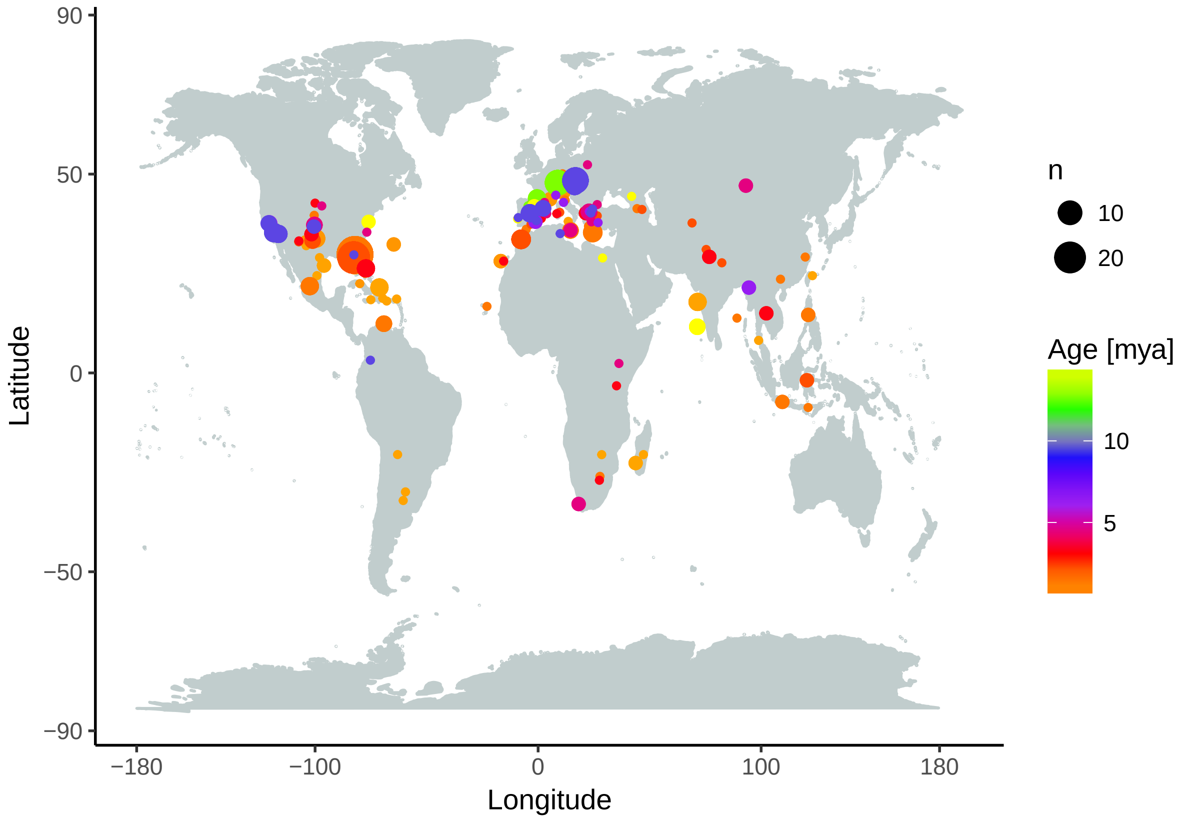
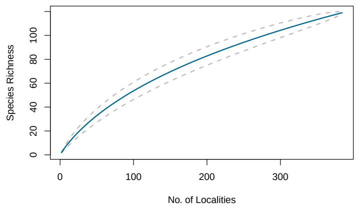
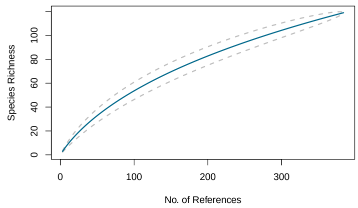


Figure S1: Map displaying all localities for which body size data for testudinids was available in the literature. Size of points denotes sample size, color denotes approximate age.

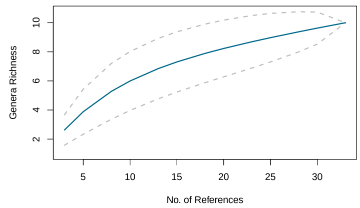
Appendix B Sampling accumulation curves



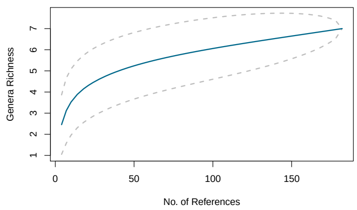
(a) Species per locality



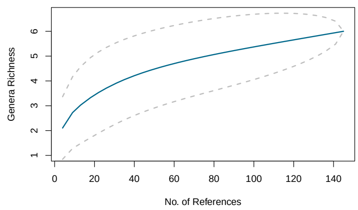
(b) Species per reference



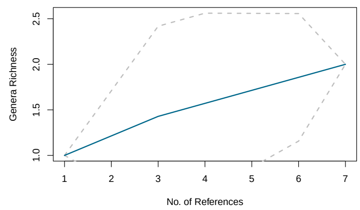
(c) Africa



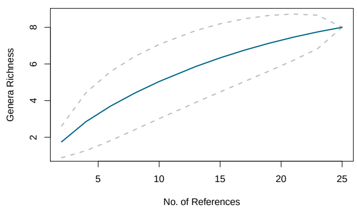
(d) America



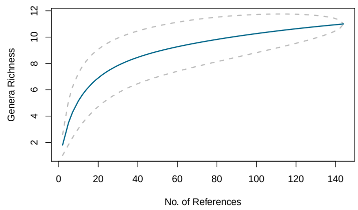
(e) North America



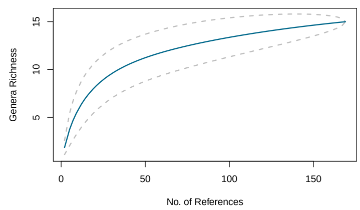
(f) South America



(g) Asia



(h) Europe

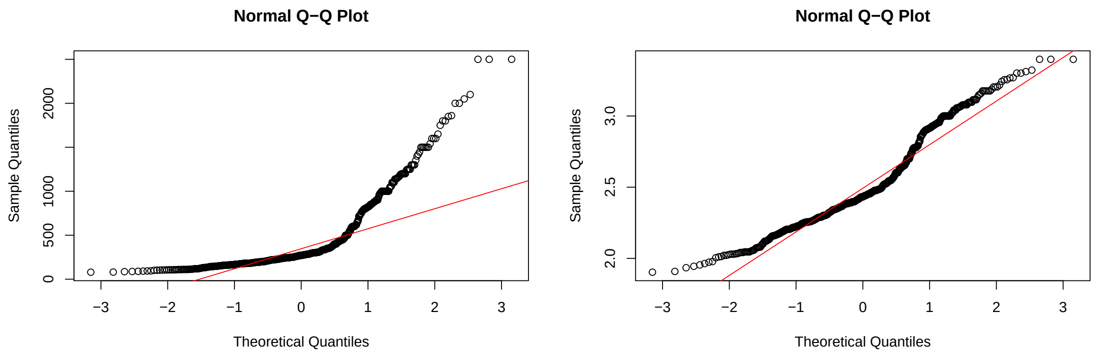


(i) Eurasia

Figure S2: Sampling accumulation curves: (a) - (b) Species are not sufficiently sampled, regardless of sampling unit. (c) - (i) Sampling Accumulation Curves on generic level per continent. Only Europe (h) and Eurasia (i) are sufficiently sampled. Dashed lines represent the confidence interval.

Appendix C Data structure

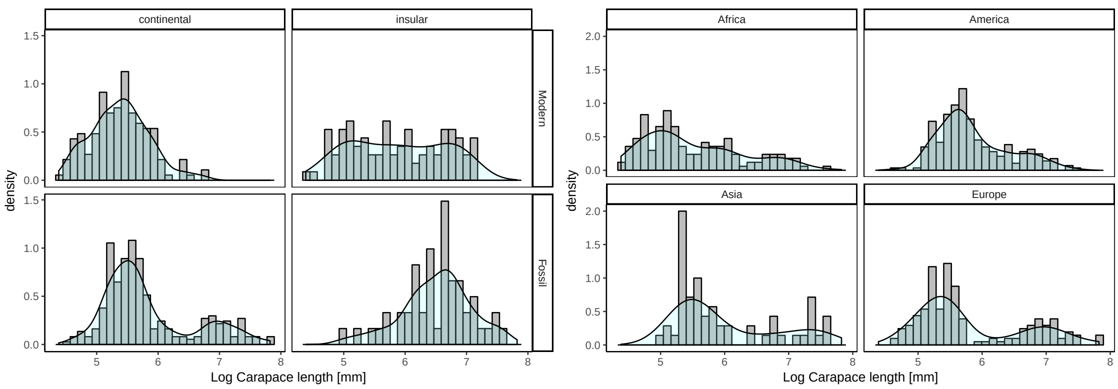
Normality test



(a) Raw data (b) Logtransformed data

Figure S3: Visual test for normal distribution. In case of normally distributed data, the black circles should follow the red line, which is not the case for either raw data (a) nor logtransformed data (b). Therefore, data is assumed to not be normally distributed and nonparametric test are used for all statistical analyses.

Body size distribution for subgroups

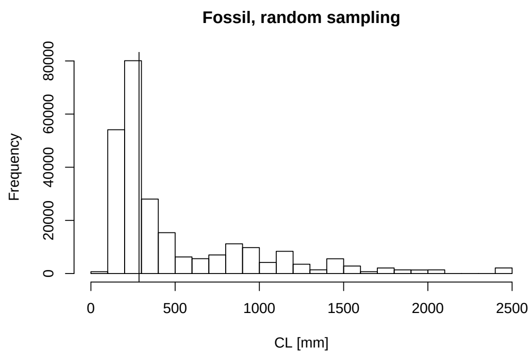


(a) Comparison of carapace length of modern and fossil continental/insular Testudinidae

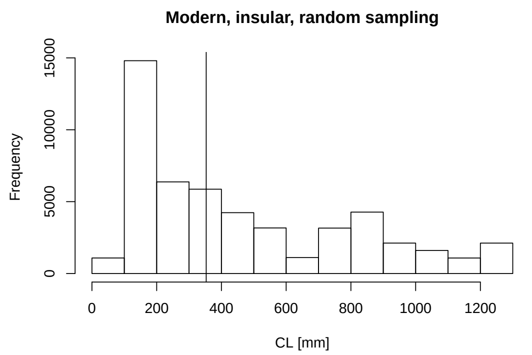
(b) Comparison of carapace length among continents

Figure S4: Body size distribution of subgroups. (a) Comparison of body size in modern continental and modern insular as well as fossil continental and fossil insular testudinids. Fossil continental testudinids reflect the bimodal distribution of the complete dataset, but large testudinids are missing in modern continental testudinids. Fossil insular testudinids are strongly left-skewed, whereas modern insular testudinids show a rather flat distribution. (b) Comparison of carapace length among continents. All continents roughly reflect the bimodal distribution of the complete dataset.

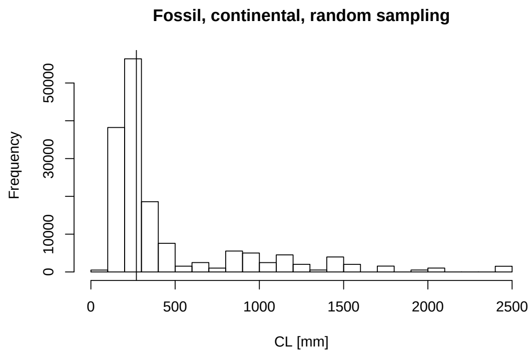
Appendix D Random Sampling



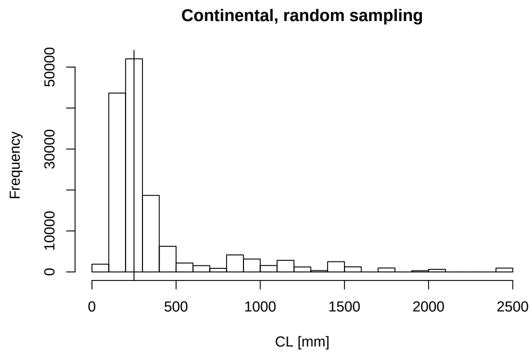
(a) Fossil



(b) Modern insular

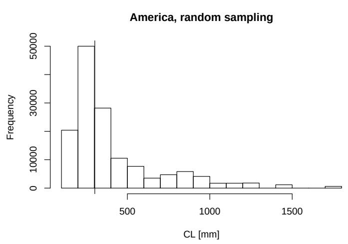


(c) Fossil continental

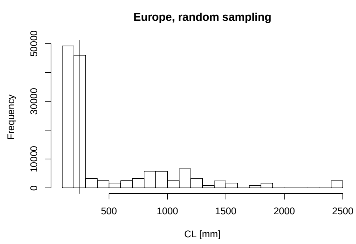


(d) Continental

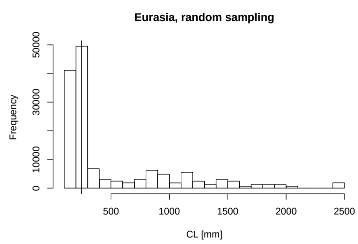
Figure S5: Random sampling for several subgroups. This was done to be able to do pair-wise comparisons of subgroups. Subsamples of the size of the respective larger sample were taken (1000 repeats). For (a), (c), and (d) the random sample reflects the real sample, for (b) this is not the case.



(a) America



(b) Europe



(c) Eurasia

Figure S6: Random sampling for different continents. All random samples reflect the real sample.

Appendix E paleoTS

Europe, genera, continental

Table S1: PaleoTS object of continental testudinids in Europe. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Lower Pliocene and Lower Pleistocene.

tt	nn	mm	vv
0.00585	2	149.5381	3450.8267
0.06885	1	187.0000	0.0000
0.45350	2	205.4750	198.0050
1.29350	2	204.9292	23.1767
2.19700	1	1420.0000	0.0000
3.09400	1	232.5000	0.0000
4.46600	3	1475.6667	57926.3333
6.28900	2	663.3750	473607.7812
9.42700	6	800.0508	263434.3893
12.71400	5	653.9625	351634.5281
14.89500	5	772.0000	223154.3750
19.50000	5	533.8533	183706.6821

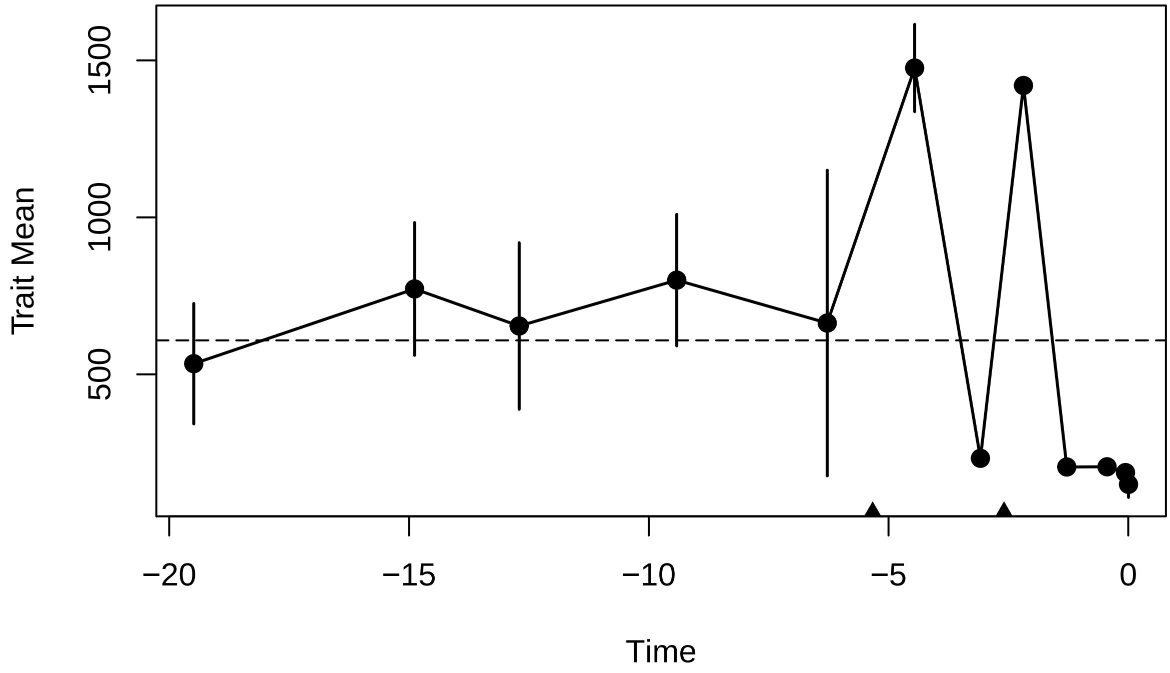


Figure S7: Evolutionary trajectory of Testudinidae body size (Trait Mean) on mainland Europe over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size seems to remain largely unchanged during the Miocene, then fluctuate strongly during the Pliocene and drop sharply in the Pleistocene.

Table S2: Model-fitting results for continental testudinids in Europe. Stasis is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-87.93137	2	181.3627	0.009
URW	-92.56882	1	187.5821	0.000
Stasis	-83.21073	2	171.9215	0.991

Europe, genera, insular

Table S3: PaleoTS object of insular testudinids in Europe. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Upper Miocene.

tt	nn	mm	vv
0.00585	1	187.5077	0.00
0.06885	2	831.5000	684.50
0.45350	1	722.5000	0.00
1.29350	4	835.0833	168423.36
2.19700	2	1005.0000	1462050.00
3.09400	3	451.6667	40558.33
4.46600	2	826.1667	15196.06
6.28900	1	1850.0000	0.00

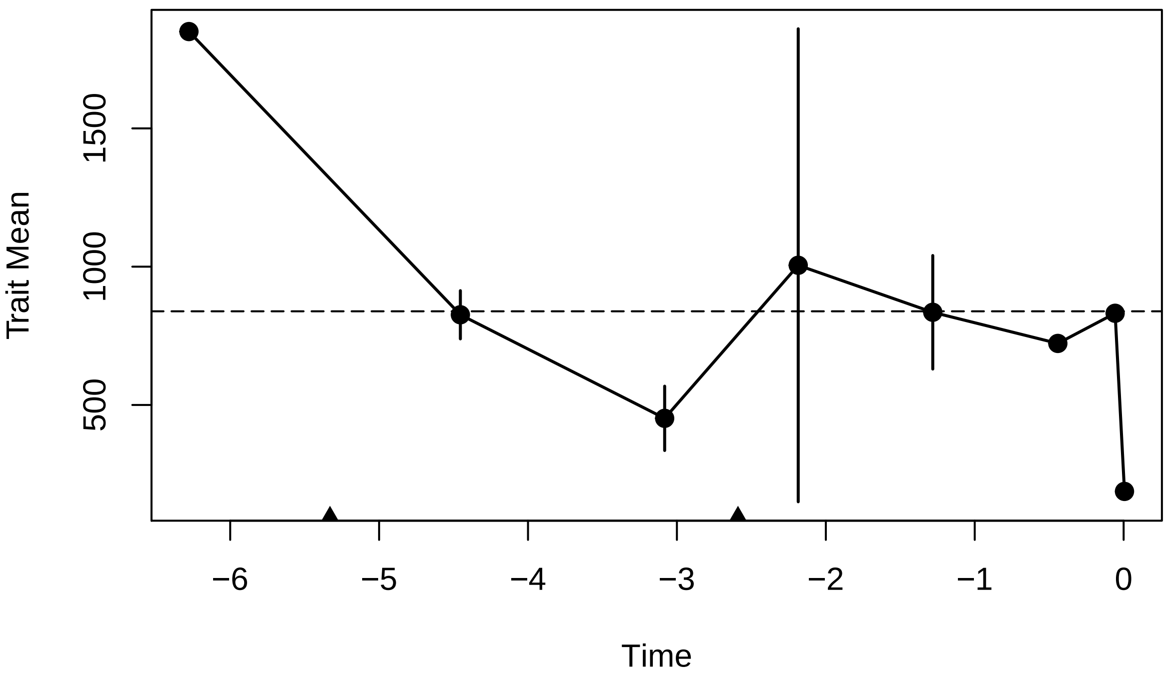


Figure S8: Evolutionary trajectory of Testudinidae body size (Trait Mean) on European islands over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size decreases starting from the Upper Miocene, increases slightly during the Pleistocene and then drops sharply during the Holocene.

Table S4: Model-fitting results for insular testudinids in Europe. Stasis is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-67.12192	2	141.2438	0.000
URW	-57.51634	1	117.8327	0.074
Stasis	-52.89638	2	112.7928	0.926

Eurasia, genera, continental

Table S5: PaleoTS object of continental testudinids in Eurasia. Mean Age [mya] (tt), sample size [individuals] (nn), mean carapace lengths [mm] (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Upper Miocene and throughout the Pliocene.

tt	nn	mm	vv
0.00585	6	210.6223	10502.932
0.06885	2	228.5000	3444.500
0.45350	2	205.4750	198.005
1.29350	4	595.5388	191487.404
2.19700	4	1044.5833	442006.250
3.09400	3	1110.8333	581102.083
4.46600	4	1159.0000	439728.667
6.28900	3	1092.2500	788605.188
9.42700	6	800.0508	263434.389
12.71400	5	653.9625	351634.528
14.89500	5	772.0000	223154.375
19.50000	5	513.8533	162399.349

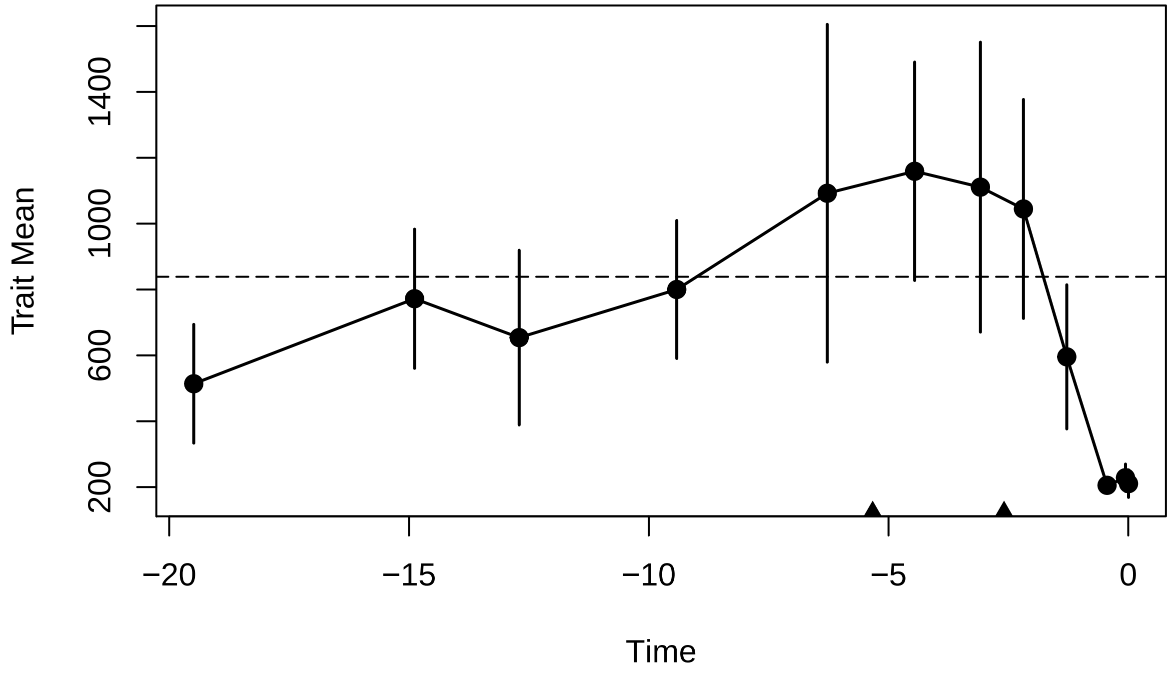


Figure S9: Evolutionary trajectory of Testudinidae body size (Trait Mean) on mainland Eurasia over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size seems to constantly increase during the Miocene, peak during the Pliocene and then steadilydecline during the Pleistocene.

Table S6: Model-fitting results for continental testudinids in Eurasia. URW is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-74.89025	2	155.2805	0.211
URW	-75.10165	1	152.6477	0.787
Stasis	-79.85118	2	165.2024	0.001

Eurasia, genera, insular

Table S7: PaleoTS object of insular testudinids in Eurasia. Mean Age (tt), sample size (nn), mean carapace lengths (mm) and variance (vv) are shown. Largest mean carapace length occurs in the Upper Miocene.

tt	nn	mm	vv
0.00585	4	272.9348	14139.94
0.06885	2	831.5000	684.50
0.45350	1	722.5000	0.00
1.29350	5	876.4427	134870.49
2.19700	3	1178.3333	821158.33
3.09400	3	451.6667	40558.33
4.46600	2	826.1667	15196.06
6.28900	1	1850.0000	0.00

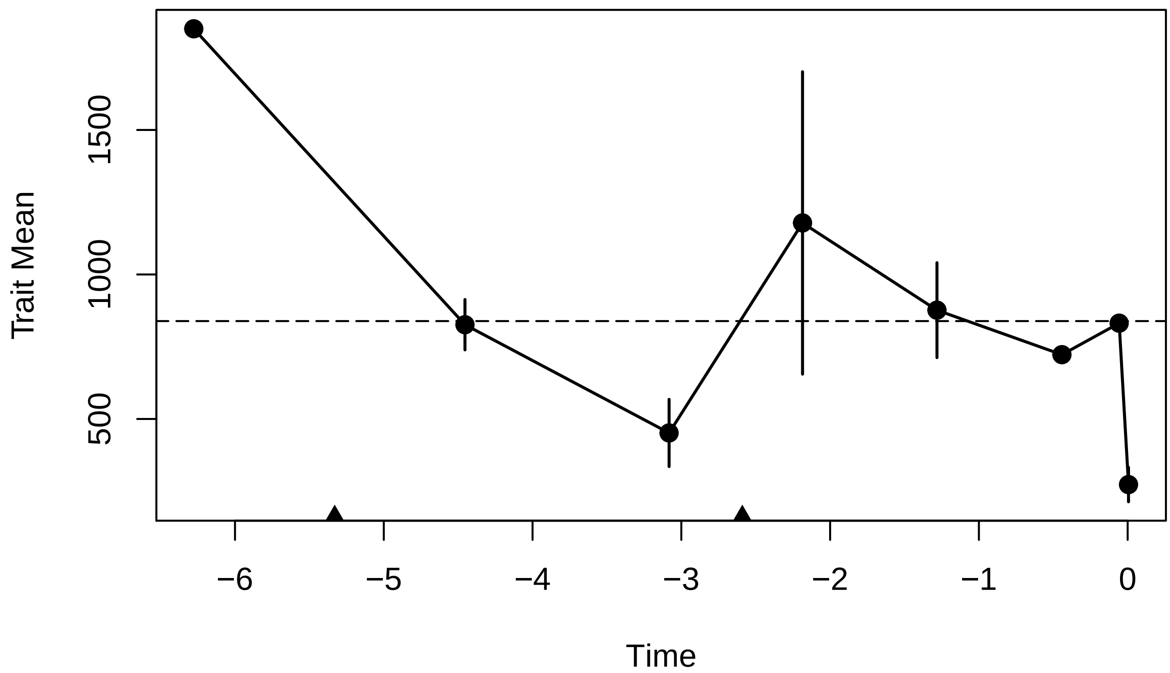


Figure S10: Evolutionary trajectory of Testudinidae body size (Trait Mean) on Eurasian islands over time. Bars respresent standard errors of mean. The dashed line depicts the mean carapace length averaged across all time bins. The triangles indicate the Pleistocene/Pliocene and Pliocene/Miocene borders, respectively. Body size decreases starting from the Upper Miocene, peaks shortly during the Lower Pleistocene and then drops sharply during the Holocene.

Table S8: Model-fitting results for insular testudinids in Eurasia. Stasis is the best supported model.

	logL	K	AICc	Akaike.wt
GRW	-56.16352	2	119.3270	0.027
URW	-63.16971	1	129.1394	0.000
Stasis	-52.56060	2	112.1212	0.973

Appendix F Tables

Table S9: Mean carapace lengths [mm] and number of species (n) per genus and stratigraphic stage.

Stage	Genus	n	$\bar{x}$ CL
Modern	*Aldabrachelys*	12	974.5833
Modern	*Astrochelys*	14	366.2143
Modern	*Centrochelys*	3	493.3333
Modern	*Chelonoidis*	45	531.5178
Modern	*Chersina*	15	176.2667
Modern	*Cylindraspis*	5	724.0000
Modern	*Geochelone*	8	252.1250
Modern	*Gopherus*	23	302.4839
Modern	*Hesperotestudo*	1	250.0000
Modern	*Homopus*	7	139.2857
Modern	*Indotestudo*	16	242.9875
Modern	*Kinixys*	15	213.0667
Modern	*Malacochersus*	2	166.5000
Modern	*Manouria*	9	380.7778
Modern	*Psammobates*	17	113.4118
Modern	*Pyxis*	16	124.1875
Modern	*Stigmochelys*	6	405.3333
Modern	*Testudo*	39	197.5436
Upper Pleistocene	*Centrochelys*	1	850.0000
Upper Pleistocene	*Chelonoidis*	11	693.1818
Upper Pleistocene	*Eurotestudo*	1	187.0000
Upper Pleistocene	*gen. indet.*	1	813.0000
Upper Pleistocene	*Geochelone*	2	475.0000
Upper Pleistocene	*Gopherus*	22	294.1545
Upper Pleistocene	*Hesperotestudo*	10	468.2760
Upper Pleistocene	*Indotestudo*	1	270.0000

Table S9 – *continued from previous page*

Stage	Genus	n	$\bar{x}$ CL
Middle Pleistocene	*Centrochelys*	4	722.5000
Middle Pleistocene	*Chelonoidis*	1	1139.0000
Middle Pleistocene	*Eurotestudo*	4	195.5250
Middle Pleistocene	*Geochelone*	1	170.0000
Middle Pleistocene	*Gopherus*	33	307.0721
Middle Pleistocene	*Hesperotestudo*	5	882.0000
Middle Pleistocene	*Testudo*	5	198.7400
Lower Pleistocene	*Centrochelys*	4	762.5000
Lower Pleistocene	*Cheirogaster*	2	857.0000
Lower Pleistocene	*Chelonoidis*	3	716.6667
Lower Pleistocene	*Eurotestudo*	4	201.5250
Lower Pleistocene	*gen. indet.*	1	900.0000
Lower Pleistocene	*Geochelone*	1	340.0000
Lower Pleistocene	*Gopherus*	13	316.8077
Lower Pleistocene	*Hesperotestudo*	16	323.0562
Lower Pleistocene	*Megalochelys*	5	1041.8800
Lower Pleistocene	*Psammobates*	1	107.8000
Lower Pleistocene	*Testudo*	6	259.1667
Lower Pleistocene	*Titanochelon*	1	1300.0000
Gelasian	*Centrochelys*	1	2050.0000
Gelasian	*Eurotestudo*	1	150.0000
Gelasian	*Gopherus*	15	185.7467
Gelasian	*Hesperotestudo*	2	1000.0000
Gelasian	*Manouria*	1	900.0000
Gelasian	*Megalochelys*	3	1683.3333
Gelasian	*Testudo*	6	166.0000
Gelasian	*Titanochelon*	2	1640.0000
Piacencian	*Aldabrachelys*	3	1333.3333
Piacencian	*Centrochelys*	1	610.0000

Table S9 – *continued from previous page*

Stage	Genus	n	$\bar{x}$ CL
Piacencian	*Chelonoidis*	4	442.7500
Piacencian	*Gopherus*	1	885.5000
Piacencian	*Hesperotestudo*	5	211.1600
Piacencian	*Homopus*	1	90.0000
Piacencian	*Megalochelys*	2	1600.0000
Piacencian	*Testudo*	3	230.0000
Piacencian	*Titanochelon*	1	520.0000
Zanclean	*Caudochelys*	2	805.5000
Zanclean	*Centrochelys*	3	913.3333
Zanclean	*Cheirogaster*	1	739.0000
Zanclean	*Ergilemys*	2	209.0000
Zanclean	*Geochelone*	6	741.0000
Zanclean	*Hesperotestudo*	1	195.8000
Zanclean	*Testudo*	5	1377.0000
Zanclean	*Titanochelon*	6	1300.0000
Messinian	*Hesperotestudo*	2	941.0000
Messinian	*Megalochelys*	2	1950.0000
Messinian	*Testudo*	4	176.7500
Messinian	*Titanochelon*	2	1500.0000
Tortonian	*"Hadrianus"*	1	1000.0000
Tortonian	*Cheirogaster*	3	1288.3333
Tortonian	*gen. indet.*	3	660.0000
Tortonian	*Geochelone*	3	741.3333
Tortonian	*Gopherus*	6	354.0000
Tortonian	*Hesperotestudo*	4	439.9750
Tortonian	*Paleotestudo*	3	233.6667
Tortonian	*Testudo*	20	218.3050
Tortonian	*Titanochelon*	2	1400.0000
Serravallian	*Cheirogaster*	2	1250.0000

Table S9 – *continued from previous page*

Stage	Genus	n	$\bar{x}$ CL
Serravallian	*gen. indet.*	1	270.0000
Serravallian	*Gopherus*	1	500.0000
Serravallian	*Paleotestudo*	19	206.5789
Serravallian	*Testudo*	3	190.2333
Serravallian	*Titanochelon*	1	1353.0000
Langhian	*Caudochelys*	1	339.9000
Langhian	*Chelonoidis*	3	553.3333
Langhian	*Ergilemys*	1	1000.0000
Langhian	*gen. indet.*	1	1000.0000
Langhian	*Paleotestudo*	2	272.5000
Langhian	*Testudo*	2	337.5000
Langhian	*Titanochelon*	4	1312.5000
Burdigalian/Aquitanian	*Caudochelys*	1	334.0000
Burdigalian/Aquitanian	*gen. indet.*	1	270.0000
Burdigalian/Aquitanian	*Geochelone*	4	652.5000
Burdigalian/Aquitanian	*Impregnochelys*	1	620.0000
Burdigalian/Aquitanian	*Mesocherus*	5	180.0000
Burdigalian/Aquitanian	*Namibchersus*	9	518.1111
Burdigalian/Aquitanian	*Paleotestudo*	2	146.1500
Burdigalian/Aquitanian	*Testudo*	6	252.1167
Burdigalian/Aquitanian	*Titanochelon*	1	1001.0000

Table S10: Mean carapace lengths [mm] and number of species (n) per genus summarised for the complete data set.

Genus	n	$\bar{x}$ CL
“Hadrianus”	1	1000.0000
Aldabrachelys	15	1046.3333
Astrochelys	14	366.2143
Caudochelys	4	571.2250

Table S10 – *continued from previous page*

Genus	n	$\bar{x}$ CL
Centrochelys	17	804.1176
Cheirogaster	8	1102.2500
Chelonoidis	67	571.0940
Chersina	15	176.2667
Cylindraspis	5	724.0000
Ergilemys	3	472.6667
Eurotestudo	10	192.5200
gen. indet.	8	654.1250
Geochelone	25	510.2800
Gopherus	114	298.0361
Hesperotestudo	46	465.3296
Homopus	8	133.1250
Impregnochelys	1	620.0000
Indotestudo	17	244.5765
Kinixys	15	213.0667
Malacochersus	2	166.5000
Manouria	10	432.7000
Megalochelys	12	1446.6167
Mesocherus	5	180.0000
Namibchersus	9	518.1111
Paleotestudo	26	210.1269
Psammobates	18	113.1000
Pyxis	16	124.1875
Stigmochelys	6	405.3333
Testudo	99	269.2465
Titanochelon	20	1315.2000

Table S11: Descriptive statistics of carapace length for the entire data set (all) as well as different subgroups, i. e. per time bin, all fossil testudinids, continental and insular data both in general and for modern and fossil testudinids separately and, finally, per continent. The table contains sample size (n), minimum (min), maximum (max), variance (s^2), mean ($\bar{x}$), log mean ($log(\bar{x})$), median ($\tilde{x}$), log median ($log(\tilde{x})$), skewness ($skew$), log skewness ($log(skew)$), kurtosis ($kurt$) and log kurtosis ($log(kurt)$) of carapace length.

n	min	max	s^2	$\bar{x}$	$log(\bar{x})$	$\tilde{x}$	$log(\tilde{x})$	$skew$	$log(skew)$	$kurt$	$log(kurt)$	Subgroup
616	80.00	2500	164537.80	437.2	2.5	270.5	2.4	2.14	0.69	8.00	2.73	all
253	80.00	1300	67485.50	330.3	2.4	242.0	2.4	1.83	0.58	5.87	2.69	Modern
49	102.44	1250	69690.66	445.9	2.6	334.7	2.5	1.20	0.24	3.61	2.56	Upper Pleistocene
53	132.00	1800	97910.83	387.1	2.5	292.9	2.5	3.03	1.52	12.24	5.55	Middle Pleistocene
57	107.80	2000	161948.82	463.5	2.5	263.0	2.4	1.74	0.73	5.76	2.40	Lower Pleistocene
31	118.90	2050	411224.51	555.2	2.5	194.9	2.3	1.31	0.93	3.12	2.11	Gelasian
21	90.00	1600	270535.82	610.6	2.6	428.0	2.6	1.00	0.14	2.50	1.99	Piacencian
26	176.00	2500	476162.71	955.2	2.9	857.5	2.9	1.11	-0.40	3.56	2.30	Zanclean
10	140.00	2100	602611.21	948.9	2.8	916.0	2.9	0.26	-0.22	1.49	1.29	Messinian
45	107.00	1540	175470.12	462.7	2.5	250.0	2.4	1.49	0.81	3.74	2.54	Tortonian
27	111.00	1500	126060.40	337.7	2.4	220.0	2.3	2.49	1.77	7.77	5.30	Serravallian
14	270.00	1600	230451.33	747.9	2.8	700.0	2.8	0.30	0.03	1.55	1.18	Langhian
30	113.00	1100	76288.76	406.8	2.5	302.4	2.5	1.27	0.45	3.45	2.26	Burdigalian/Aquitanian
363	90.00	2500	219004.66	511.7	2.6	285.6	2.5	1.83	0.68	6.11	2.42	Fossil
469	81.00	2500	157808.79	392.9	2.5	250.0	2.4	2.65	1.07	10.57	3.74	continental
147	80.00	2000	160834.35	578.5	2.6	500.0	2.7	1.02	-0.27	3.95	2.05	insular

Table S11 – *continued from previous page*

n	min	max	s^2	$\bar{x}$	$log(\bar{x})$	$\tilde{x}$	$log(\tilde{x})$	$skew$	$log(skew)$	$kurt$	$log(kurt)$	Subgroup
157	81.00	830	17009.02	244.0	2.3	221.0	2.3	1.92	0.29	8.09	2.98	modern continental
96	80.00	1300	118641.09	471.5	2.6	353.0	2.5	0.82	0.01	2.47	1.77	modern insular
312	90.00	2500	212116.79	467.9	2.5	270.0	2.4	2.11	0.96	7.25	2.96	fossil continental
51	150.00	2000	180825.40	780.0	2.8	750.0	2.9	1.11	-0.40	4.02	3.18	fossil insular
142	80.00	2050	112417.26	347.7	2.4	193.5	2.3	2.10	0.68	7.97	2.48	Africa
242	102.44	1800	82209.71	415.0	2.5	302.2	2.5	1.92	0.75	6.79	2.91	America
59	150.00	2100	323123.20	585.5	2.6	280.0	2.4	1.43	0.85	3.61	2.24	Asia
173	107.00	2500	254222.84	491.2	2.5	245.0	2.4	1.86	0.81	6.30	2.34	Europe

Table S12: Body size data set of fossil testudinids. Contains information on locality, taxonomy (Genus and Species name), carapace length [mm], age and geographic distribution. Additionaly, it is stated whether carapace length was directly measured (m: exact measurements provided in reference, mf: measured from scaled figure, mo: estimated by original authors) or estimated (e: estimated from fragmentary carapace/plastron, ev: estimated from verbal description, ep: estimated from plastron length, ef: estimated from femur length, eh: estimated from humerus length, ec: estimated from claw phalanges). Further, it is stated on which continent the fossil record was recovered and whether it was continental (n: no) or insular (y: yes). (The references from which the data were obtained can be found in the table on the supplementary CD.)

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
1	Laetoli, Tanzania	Aldabrachelys	“Aldabrachelys” laetoliensis	1000.00	mo	Piacencian	2.70300	n	Africa
2	Sal Island	Centrochelys	Centrochelys atlantica	400.00	mo	Lower Pleistocene	1.30000	y	Africa
3	Ahl al Oughlam (near Casablanca)	Centrochelys	Centrochelys marocana	2050.00	mo	Gelasian	2.50000	n	Africa
4	Kanapoi	Geochelone	Geochelone crassa	865.00	mf	Zanclean	4.14500	n	Africa
5	Djebel Krechem	Geochelone	Geochelone sp.	1446.00	eh	Tortonian	8.47600	n	Africa
6	Pellatal Phosphate Member, Varswater Formation, E Quarry Langebaanweg	Geochelone	Geochelone stromeri	350.00	m	Zanclean	4.46600	n	Africa
7	Pellatal Phosphate Member, Varswater Formation, E Quarry Langebaanweg	Geochelone	Geochelone stromeri	425.00	m	Zanclean	4.46600	n	Africa
8	South Africa	Homopus	Homopus fenestratus	90.00	mo	Piacencian	3.05650	n	Africa
9	Rusinga Island, Lake Victoria, Kenya	Impregnochelys	Impregnochelys pachytectis	620.00	m	Burdigalian/Aquitanian	19.50000	n	Africa
10	Arrisdrift	Mesocherus	Mesocherus orangeus	160.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
11	Arrisdrift	Mesocherus	Mesocherus orangeus	180.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
12	Arrisdrift	Mesocherus	Mesocherus orangeus	180.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
13	Arrisdrift	Mesocherus	Mesocherus orangeus	180.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
14	Arrisdrift	Mesocherus	Mesocherus orangeus	180.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
15	Arrisdrift	Mesocherus	Mesocherus orangeus	180.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
16	Arrisdrift	Mesocherus	Mesocherus orangeus	200.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
17	Arrisdrift	Namibchersus	Namibchersus aff. namaquensis	1100.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
18	Arrisdrift	Namibchersus	Namibchersus aff. namaquensis	440.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
19	Arrisdrift	Namibchersus	Namibchersus aff. namaquensis	550.00	mo	Burdigalian/Aquitanian	17.25000	n	Africa
20	Auchas	Namibchersus	Namibchersus namaquensis	254.00	m	Burdigalian/Aquitanian	18.00000	n	Africa
21	Elisabethfeld (= Elisabeth Bay) area, northern Sperrgebiet	Namibchersus	Namibchersus namaquensis	264.00	m	Burdigalian/Aquitanian	19.50000	n	Africa
22	Elisabethfeld (= Elisabeth Bay) area, northern Sperrgebiet	Namibchersus	Namibchersus namaquensis	300.00	m	Burdigalian/Aquitanian	19.50000	n	Africa
23	Auchas	Namibchersus	Namibchersus namaquensis	470.00	m	Burdigalian/Aquitanian	18.00000	n	Africa
24	Auchas	Namibchersus	Namibchersus namaquensis	470.00	m	Burdigalian/Aquitanian	18.00000	n	Africa
25	Auchas	Namibchersus	Namibchersus namaquensis	815.00	m	Burdigalian/Aquitanian	18.00000	n	Africa
26	Drimolon, Sterkfontein, Krugersdorp District, Gauteng Province	Psammobates	Psammobates antiquorum	107.80	m	Lower Pleistocene	1.80000	n	Africa
27	Ahl al Oughlam (near Casablanca)	Testudo	Testudo aff. kenitrensis	142.00	mf	Gelasian	2.50000	n	Africa
28	Kénitra, Guilloux quarry, near Rabat	Testudo	Testudo kenitrensis	132.00	mo	Middle Pleistocene	0.45350	n	Africa
29	Ahl al Oughlam (near Casablanca)	Testudo	Testudo oughlamensis	120.00	mo	Gelasian	2.50000	n	Africa

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
30	Ahl al Oughlam (near Casablanca)	Testudo	Testudo sp.	184.00	mf	Gelasian	2.50000	n	Africa
31	Ahl al Oughlam (near Casablanca)	Testudo	Testudo sp.	200.00	mf	Gelasian	2.50000	n	Africa
32	Tha Chang area, Chaloem Pra Kiat district, Nakhon Ratchasima Province	Aldabrachelys	Aldabrachelys ? sp.	1500.00	mo	Piacencian	3.00000	n	Asia
33	Tha Chang area, Chaloem Pra Kiat district, Nakhon Ratchasima Province	Aldabrachelys	Aldabrachelys ? sp.	1500.00	mo	Piacencian	3.00000	n	Asia
34	Tha Chang area, Chaloem Pra Kiat district, Nakhon Ratchasima Province	Aldabrachelys	Aldabrachelys ? sp.	1500.00	mo	Piacencian	3.00000	n	Asia
35	Tha Chang area, Chaloem Pra Kiat district, Nakhon Ratchasima Province	Aldabrachelys	Aldabrachelys ? sp.	1500.00	mo	Piacencian	3.00000	n	Asia
36	Altan-Teli main fossiliferous bed (Dzereg valley)	Ergilemys	Ergilemys oskarkuhni	198.00	m	Zanclean	3.95000	n	Asia
37	Altan-Teli main fossiliferous bed (Dzereg valley)	Ergilemys	Ergilemys oskarkuhni	220.00	m	Zanclean	3.95000	n	Asia
38	Guangxi	gen.	gen. indet.	900.00	mo	Lower Pleistocene	1.68450	n	Asia
39	Ghaba	Geochelone	Geochelone sp.	800.00	ev	Burdigalian/Aquitanian	16.50000	n	Asia
40	Lang Rongrien Rockshelter, Krabi, Thailand	Indotestudo	Indotestudo elongata	270.00	m	Upper Pleistocene	0.03700	n	Asia
41	Punjab	Manouria	Manouria punjabiensis	900.00	mo	Gelasian	2.19050	n	Asia
42	Sulawesi (Celebes), Indonesia	Megalochelys	Megalochelys atlas	1400.00	mo	Gelasian	2.00000	y	Asia
43	Northwest of Naipli	Megalochelys	Megalochelys atlas	1600.00	mo	Piacencian	3.09400	n	Asia
44	Northwest of Naipli	Megalochelys	Megalochelys atlas	1600.00	mo	Piacencian	3.09400	n	Asia
45	Northwest of Naipli	Megalochelys	Megalochelys atlas	1600.00	mo	Piacencian	3.09400	n	Asia
46	Northwest of Naipli	Megalochelys	Megalochelys atlas	1600.00	mo	Piacencian	3.09400	n	Asia
47	Sulawesi (Celebes), Indonesia	Megalochelys	Megalochelys atlas	1650.00	mo	Gelasian	2.00000	y	Asia
48	Pauk Twonship	Megalochelys	Megalochelys atlas	1800.00	m	Messinian	5.42300	n	Asia
49	Siwalik	Megalochelys	Megalochelys atlas	2000.00	mo	Gelasian	2.19050	n	Asia
50	Pauk Twonship	Megalochelys	Megalochelys atlas	2100.00	mo	Messinian	5.42300	n	Asia
51	Tres Hermanas, Manila, Luzon	Megalochelys	Megalochelys sondaari	1000.00	ec	Lower Pleistocene	1.35000	y	Asia
52	Tres Hermanas, Manila, Luzon	Megalochelys	Megalochelys sondaari	818.00	ec	Lower Pleistocene	1.35000	y	Asia
53	Flores	Megalochelys	Megalochelys sp.	1200.00	ev	Lower Pleistocene	0.90000	y	Asia
54	Bumiayu, Java Island	Megalochelys	Megalochelys sp.	191.40	m	Lower Pleistocene	1.68450	y	Asia
55	Java Island	Megalochelys	Megalochelys sp.	2000.00	m	Lower Pleistocene	1.68450	y	Asia
56	Zhejiang	Testudo	Testudo changshanesis	330.00	mo	Lower Pleistocene	1.68450	n	Asia
57	Khatlon	Testudo	Testudo ranovi	200.00	mo	Gelasian	2.19050	n	Asia
58	Gerogia (Caucasus)	Testudo	Testudo transcaucasia	150.00	mo	Gelasian	2.19050	n	Asia
59	Sawmill Sink, Abaco	Chelonoidis	Chelonoidis alburyorum	424.00	m	Piacencian	3.20150	y	America
60	Sawmill Sink, Abaco	Chelonoidis	Chelonoidis alburyorum	428.00	m	Piacencian	3.20150	y	America
61	Sawmill Sink, Abaco	Chelonoidis	Chelonoidis alburyorum	453.00	m	Piacencian	3.20150	y	America
62	Sawmill Sink, Abaco	Chelonoidis	Chelonoidis alburyorum	466.00	m	Piacencian	3.20150	y	America
63	Santa Clara	Chelonoidis	Chelonoidis cubensis	1139.00	ef	Middle Pleistocene	0.39350	y	America
64	Cueva del Papayo, Pedernales	Chelonoidis	Chelonoidis marcanoi	530.00	eh	Upper Pleistocene	0.06900	y	America
65	Cueva del Papayo, Pedernales	Chelonoidis	Chelonoidis marcanoi	614.00	eh	Upper Pleistocene	0.06900	y	America
66	Cueva del Papayo, Pedernales	Chelonoidis	Chelonoidis marcanoi	767.00	eh	Upper Pleistocene	0.06900	y	America

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
67	Cueva del Papayo, Pedernales	Chelonoidis	Chelonoidis marcanoi	778.00	eh	Upper Pleistocene	0.06900	y	America
68	Mona Island	Chelonoidis	Chelonoidis monensis	500.00	m	Upper Pleistocene	0.06450	y	America
69	Sombrero Island	Chelonoidis	Chelonoidis sombrerensis	990.00	m	Upper Pleistocene	0.06900	y	America
70	Navassa Island	Chelonoidis	Chelonoidis sp.	400.00	mo	Upper Pleistocene	0.06900	y	America
71	San Pedro, Curaçao	Chelonoidis	Chelonoidis sp.	600.00	mo	Lower Pleistocene	1.35700	y	America
72	Bayaguana, Los Haitises, San Cristobal	Chelonoidis	Chelonoidis sp.	600.00	mo	Upper Pleistocene	0.06900	y	America
73	San Pedro, Curaçao	Chelonoidis	Chelonoidis sp.	750.00	mo	Lower Pleistocene	1.35700	y	America
74	San Pedro, Curaçao	Chelonoidis	Chelonoidis sp.	800.00	mo	Lower Pleistocene	1.35700	y	America
75	Cedazo local fauna, Aguascalientes, Mexico	Geochelone	Geochelone sp.	340.00	mo	Lower Pleistocene	1.05000	n	America
76	Cedazo local fauna, Aguascalientes, Mexico	Gopherus	Gopherus berlandieri	195.00	m	Lower Pleistocene	1.05000	n	America
77	Cedazo local fauna, Aguascalientes, Mexico	Gopherus	Gopherus berlandieri	256.30	m	Lower Pleistocene	1.05000	n	America
78	Cedazo local fauna, Aguascalientes, Mexico	Gopherus	Gopherus flavomarginatus	450.00	m	Lower Pleistocene	1.05000	n	America
79	Smith's Parrish, No. 3Verdmont Valley Close	Hesperotestudo	Hesperotestudo bermudae	270.00	m	Middle Pleistocene	0.31000	y	America
80	Smith's Parrish, No. 3Verdmont Valley Close	Hesperotestudo	Hesperotestudo bermudae	500.00	m	Middle Pleistocene	0.31000	y	America
81	Río Tomayate, Apopa Municipality	Hesperotestudo	Hesperotestudo sp.	1500.00	mo	Lower Pleistocene	0.96600	n	America
82	Belomechetskaya	Ergilemys	Ergilemys sp.	1000.00	m	Langhian	14.00000	n	Europe
83	Dmanisi	Testudo	Testudo graeca	195.00	mf	Lower Pleistocene	1.77000	n	Europe
84	Prottes	"Hadrianus"	"Hadrianus sp."	1000.00	m	Tortonian	8.30000	n	Europe
85	Adeje, Tenerife	Centrochelys	Centrochelys burchardi	500.00	mo	Middle Pleistocene	0.43500	y	Europe
86	Callao de Fañabé, Tenerife	Centrochelys	Centrochelys burchardi	650.00	mo	Middle Pleistocene	0.43500	y	Europe
87	Adeje, Tenerife	Centrochelys	Centrochelys burchardi	800.00	m	Middle Pleistocene	0.43500	y	Europe
88	Callao de Fañabé, Tenerife	Centrochelys	Centrochelys burchardi	940.00	mo	Middle Pleistocene	0.43500	y	Europe
89	Corrida, Malta	Centrochelys	Centrochelys robusta	1100.00	mo	Zanclean	4.91700	y	Europe
90	Ghar Dalam	Centrochelys	Centrochelys robusta	1200.00	ev	Lower Pleistocene	1.30000	y	Europe
91	Ghar Dalam	Centrochelys	Centrochelys robusta	600.00	ev	Lower Pleistocene	1.30000	y	Europe
92	Mnaidra Gap, Malta	Centrochelys	Centrochelys robusta	790.00	ef	Zanclean	4.91700	y	Europe
93	Corrida, Malta	Centrochelys	Centrochelys robusta	850.00	mo	Zanclean	4.91700	y	Europe
94	Zebbug and Gahr Dalam Cave deposits	Centrochelys	Centrochelys robusta	850.00	mo	Upper Pleistocene	0.06600	y	Europe
95	Ghar Dalam	Centrochelys	Centrochelys robusta	850.00	ev	Lower Pleistocene	1.30000	y	Europe
96	Barranco de las Ballenas, Las Palmas, Gran Canaria	Centrochelys	Centrochelys vulcanica	610.00	mo	Piacencian	3.09400	y	Europe
97	Pujo d'es Fum, Formentera, Balearic Islands	Cheirogaster	Cheirogaster cf. gymnesica	789.00	mo	Lower Pleistocene	1.80000	y	Europe
98	Punta Nati near Ciutadella, Minorca	Cheirogaster	Cheirogaster gymnesica	739.00	ef	Zanclean	4.45000	y	Europe
99	Hostalets de Piérola, Barcelone province, Cataluña, Vallés-Penedés basin	Cheirogaster	Cheirogaster richardi	1155.00	mo	Tortonian	10.40000	n	Europe
100	La Ciesma 1, Aragón	Cheirogaster	Cheirogaster sp.	1000.00	mo	Serravallian	12.20000	n	Europe
101	El Lugarejo (Arévalo), Ávilla, Castilla	Cheirogaster	Cheirogaster sp.	1170.00	m	Tortonian	10.25000	n	Europe
102	Chañe, Segovia	Cheirogaster	Cheirogaster sp.	1500.00	e	Serravallian	13.80000	n	Europe
103	Crevillente 2	Cheirogaster	Cheirogaster sp.	1540.00	ef	Tortonian	8.30000	n	Europe

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
104	Rock-Cavities, Gibraltar Peninsula	Cheirogaster	Cheirogaster sp.	925.00	ef	Lower Pleistocene	0.96500	y	Europe
105	Soave, Zoppega 2 cave, Verona	Eurotestudo	Eurotestudo aff. hermanni	179.30	mf	Middle Pleistocene	0.74000	n	Europe
106	Soave, Zoppega 2 cave, Verona	Eurotestudo	Eurotestudo aff. hermanni	194.70	mf	Middle Pleistocene	0.74000	n	Europe
107	Monte Tuttavista VII mustelide, Sardinia	Eurotestudo	Eurotestudo cf. hermanni	150.00	mo	Gelasian	2.00000	y	Europe
108	Le Ville, Upper Valdarno	Eurotestudo	Eurotestudo globosa	263.00	m	Lower Pleistocene	1.80000	n	Europe
109	Cueva de la Victoria-1 (CV-1), Carthagène, Murcia	Eurotestudo	Eurotestudo hermanni	126.00	mf	Lower Pleistocene	1.15000	n	Europe
110	Saint-Estève-Janson, l'Escale Cave (Bouches du Rhône)	Eurotestudo	Eurotestudo hermanni	170.50	mf	Middle Pleistocene	0.60000	n	Europe
111	Cova del Rinoceront, eastern Garraf Massif, Can'Aymerich quarry, Castelldefls	Eurotestudo	Eurotestudo hermanni	187.00	mf	Upper Pleistocene	0.11050	n	Europe
112	Saint-Estève-Janson, l'Escale Cave (Bouches du Rhône)	Eurotestudo	Eurotestudo hermanni	237.60	mf	Middle Pleistocene	0.60000	n	Europe
113	Sierra de Quibas, Abanilla, Murcia	Eurotestudo	Eurotestudo hermanni	284.00	mf	Lower Pleistocene	1.35000	n	Europe
114	Tarazona de Aragón	gen.	gen. indet.	1000.00	mo	Langhian	14.70000	n	Europe
115	La Ciesma 1, Aragón	gen.	gen. indet.	270.00	mo	Serravallian	12.20000	n	Europe
116	Monteagudo, Aragón	gen.	gen. indet.	270.00	mo	Burdigalian/Aquitanian	16.40000	n	Europe
117	Kohfidisch	gen.	gen. indet.	440.00	m	Tortonian	8.75000	n	Europe
118	Kohfidisch	gen.	gen. indet.	660.00	m	Tortonian	8.75000	n	Europe
119	Zubbio di Cozzo San Pietro	gen.	gen. indet.	813.00	ef	Upper Pleistocene	0.01250	y	Europe
120	Kohfidisch	gen.	gen. indet.	880.00	m	Tortonian	8.75000	n	Europe
121	Jambol	Geochelone	Geochelone s. l.	1750.00	mo	Zanclean	4.46600	n	Europe
122	Kirchdorf an der Iller	Geochelone	Geochelone sp.	1000.00	m	Burdigalian/Aquitanian	16.65000	n	Europe
123	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	145.00	mf	Serravallian	13.00000	n	Europe
124	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	152.00	m	Serravallian	13.00000	n	Europe
125	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	159.50	m	Serravallian	13.00000	n	Europe
126	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	180.00	m	Serravallian	13.00000	n	Europe
127	Gammelsdorf	Paleotestudo	Paleotestudo antiqua	183.70	m	Serravallian	12.15000	n	Europe
128	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	185.00	mf	Serravallian	13.00000	n	Europe
129	Sansan, Gers (lake)	Paleotestudo	Paleotestudo antiqua	191.00	mf	Serravallian	13.60000	n	Europe
130	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	195.00	m	Serravallian	13.00000	n	Europe
131	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	195.00	mf	Serravallian	13.00000	n	Europe
132	Gammelsdorf	Paleotestudo	Paleotestudo antiqua	203.00	m	Serravallian	12.15000	n	Europe
133	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	206.00	mf	Serravallian	13.00000	n	Europe
134	Sansan, Gers (lake)	Paleotestudo	Paleotestudo antiqua	213.00	mf	Serravallian	13.60000	n	Europe
135	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	220.00	mf	Serravallian	13.00000	n	Europe
136	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	229.00	mf	Serravallian	13.00000	n	Europe
137	Sansan, Gers (lake)	Paleotestudo	Paleotestudo antiqua	234.00	mf	Serravallian	13.60000	n	Europe
138	Hohenhöwen, Engen, Hegau, southwestern Germany	Paleotestudo	Paleotestudo antiqua	240.00	m	Serravallian	13.00000	n	Europe
139	Sansan, Gers (lake)	Paleotestudo	Paleotestudo antiqua	240.00	mf	Serravallian	13.60000	n	Europe
140	Barajas, Madrid	Paleotestudo	Paleotestudo antiqua	275.00	mf	Langhian	15.00000	n	Europe

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
141	Illescas, Toledo	Paleotestudo	Paleotestudo antiqua	283.80	mf	Serravallian	12.50000	n	Europe
142	Can Mas near El Papiol, Barcelone province, Cataluña, Vallés-Penedés basin	Paleotestudo	Paleotestudo cf. antiqua	113.00	mf	Burdigalian/Aquitanian	17.30000	n	Europe
143	El Buste, Aragón	Paleotestudo	Paleotestudo cf. sp.	270.00	mo	Serravallian	12.40000	n	Europe
144	Tarazona de Aragón	Paleotestudo	Paleotestudo cf. sp.	270.00	mo	Langhian	14.70000	n	Europe
145	Cerro de los Batallones, Madrid	Paleotestudo	Paleotestudo sp.	170.00	mf	Tortonian	9.50000	n	Europe
146	Teiritzberg (T1 = 001/D/C), Korneuburg Basin, Lower Austria	Paleotestudo	Paleotestudo sp.	179.30	m	Burdigalian/Aquitanian	16.55000	n	Europe
147	Cerro de los Batallones, Madrid	Paleotestudo	Paleotestudo sp.	261.00	mf	Tortonian	9.50000	n	Europe
148	Cerro de los Batallones, Madrid	Paleotestudo	Paleotestudo sp.	270.00	mf	Tortonian	9.50000	n	Europe
149	Torrente Melacce, Cinigiano (GR)	Testudo	Testudo amiatae	140.00	mo	Messinian	5.81500	n	Europe
150	Milia, Grevena, W Macedonia	Testudo	Testudo brevitesta	165.00	mf	Piacencian	2.60000	n	Europe
151	Milia, Grevena, W Macedonia	Testudo	Testudo brevitesta	300.00	mf	Piacencian	2.60000	n	Europe
152	Kohfidisch	Testudo	Testudo burgenlandica	112.00	m	Tortonian	8.75000	n	Europe
153	Kohfidisch	Testudo	Testudo burgenlandica	275.00	m	Tortonian	8.75000	n	Europe
154	Sant Quirze de Terrassa/de Galliners (del Vallès), Barcelona	Testudo	Testudo catalaunica	107.00	m	Tortonian	11.50000	n	Europe
155	Castell de Barbera	Testudo	Testudo catalaunica	165.00	m	Tortonian	11.50000	n	Europe
156	Sant Quirze de Terrassa/de Galliners (del Vallès), Barcelona	Testudo	Testudo catalaunica	175.00	m	Tortonian	11.50000	n	Europe
157	Sant Quirze de Terrassa/de Galliners (del Vallès), Barcelona	Testudo	Testudo catalaunica	181.00	m	Tortonian	11.50000	n	Europe
158	Abocador de Can Mata (els Hostalets de Pierola)(ACM/BDA), Vallés-Penedés basin, Cataluña	Testudo	Testudo catalaunica	232.00	m	Serravallian	12.35000	n	Europe
159	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Testudo	Testudo cf. graeca	185.00	m	Zanclean	3.90000	n	Europe
160	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
161	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
162	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
163	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
164	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
165	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
166	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
167	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
168	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
169	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
170	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
171	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
172	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
173	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
174	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
175	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
176	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
177	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
178	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
179	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
180	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
181	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
182	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
183	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
184	Prottes	Testudo	Testudo cf. promarginata	250.00	m	Tortonian	8.30000	n	Europe
185	Pylea, eastern part of Thessaloniki, western Chalkidiki peninsula	Testudo	Testudo graeca	167.00	m	Messinian	5.50000	n	Europe
186	Allatini, eastern part of Thessaloniki, western Chalkidiki peninsula	Testudo	Testudo graeca	200.00	mf	Messinian	5.50000	n	Europe
187	Platania, Drama basin	Testudo	Testudo graeca	210.00	mf	Tortonian	8.45000	n	Europe
188	Sima del Elefante TE14, Sierra de Atapuerca, Burgos	Eurotestudo	Testudo hermanni	133.10	mf	Lower Pleistocene	1.22000	n	Europe
189	Obermaintor, Ebensfeld (Lichtenfels), Franken	Testudo	Testudo hermanni	220.00	mf	Lower Pleistocene	1.30000	n	Europe
190	Leithagebirge between Au and Loretto	Testudo	Testudo kalksburgensis	225.00	mo	Burdigalian/Aquitanian	18.00000	n	Europe
191	Eggenburg-Schindergraben, Lower Austria	Testudo	Testudo kalksburgensis	230.00	m	Burdigalian/Aquitanian	19.96500	n	Europe
192	Wien-Kalksburg	Testudo	Testudo kalksburgensis	275.00	m	Langhian	14.50000	n	Europe
193	Cova de Gràcia, Park Güell, Barcelona	Testudo	Testudo lunellensis	176.00	mo	Middle Pleistocene	0.45350	n	Europe
194	Caverna de Gràcia, Güell park, Barcelona	Testudo	Testudo lunellensis	194.00	mf	Middle Pleistocene	0.45000	n	Europe
195	Cova de Gràcia, Park Güell, Barcelona	Testudo	Testudo lunellensis	231.00	ev	Middle Pleistocene	0.45350	n	Europe
196	Caverna de Gràcia, Güell park, Barcelona	Testudo	Testudo lunellensis	260.70	mf	Middle Pleistocene	0.45000	n	Europe
197	Lakonia	Testudo	Testudo marginata	210.00	m	Lower Pleistocene	1.72000	n	Europe
198	Zourida-Höhle	Testudo	Testudo marginata	290.00	m	Lower Pleistocene	1.30000	y	Europe
199	Gerani-Höhle an der Nordküste Kretamin der Nähe von Rethymnon	Testudo	Testudo marginata	310.00	m	Lower Pleistocene	1.30000	y	Europe
200	Capo Mannu near San Vero Milis, base of D4 dune, Sardinia	Testudo	Testudo pecorinii	225.00	m	Piacencian	3.09400	y	Europe
201	Saint-Gérand-le-Puy, Allier	Testudo	Testudo promarginata	230.00	mf	Burdigalian/Aquitanian	21.50000	n	Europe
202	Saint-Gérand-le-Puy, Allier	Testudo	Testudo promarginata	304.70	mf	Burdigalian/Aquitanian	21.50000	n	Europe
203	Neuville-aux-Bois, Loiret	Testudo	Testudo promarginata	310.00	mf	Burdigalian/Aquitanian	18.00000	n	Europe
204	Sandelzhausen	Testudo	Testudo rectogularis	213.00	mo	Burdigalian/Aquitanian	16.37000	n	Europe
205	Nikiti 2, Chalkidiki, Macedonia	Testudo	Testudo s. s.	189.00	m	Tortonian	8.00000	n	Europe
206	Liossati, Kiourka	Testudo	Testudo sp.	1200.00	mf	Zanclean	3.96000	n	Europe
207	Santa-Vittoria d'Alba	Testudo	Testudo sp.	200.00	mf	Messinian	6.16500	n	Europe
208	Holzmannsdorfberg bei St. Marein	Testudo	Testudo sp.	232.10	m	Tortonian	10.75000	n	Europe
209	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
210	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
211	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
212	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
213	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
214	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
215	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
216	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
217	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
218	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
219	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
220	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
221	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
222	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
223	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
224	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
225	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
226	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
227	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
228	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
229	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
230	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
231	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
232	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
233	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
234	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
235	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
236	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
237	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
238	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
239	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
240	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
241	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
242	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
243	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
244	Prottes	Testudo	Testudo sp.	245.00	m	Tortonian	8.30000	n	Europe
245	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Testudo	Testudo sp.	2500.00	mf	Zanclean	3.90000	n	Europe
246	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Testudo	Testudo sp.	2500.00	mf	Zanclean	3.90000	n	Europe
247	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Testudo	Testudo sp.	2500.00	mf	Zanclean	3.90000	n	Europe
248	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Testudo	Testudo sp.	2500.00	mf	Zanclean	3.90000	n	Europe
249	W??e 1	Testudo	Testudo sp.	500.00	mo	Zanclean	3.90000	n	Europe
250	Altenstadt, 7 km S Illertissen	Testudo	Testudo steinheimensis	111.00	m	Serravallian	12.15000	n	Europe
251	Steinheim a. Albuch	Testudo	Testudo steinheimensis	227.70	mf	Serravallian	13.00000	n	Europe

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
252	Lesbos Island, F-Site	Titanochelon	Titanochelon aff. schafferi	1860.00	m	Gelasian	2.00000	y	Europe
253	Epanomi (EPN II), western Chalkidiki Peninsula, Thessaloniki area	Titanochelon	Titanochelon bacharidisi	1164.00	m	Zanclean	3.95000	n	Europe
254	Epanomi (EPN I), western Chalkidiki Peninsula, Thessaloniki area	Titanochelon	Titanochelon bacharidisi	1196.00	m	Zanclean	3.95000	n	Europe
255	Nea Michaniona, western Chalkidiki Peninsula, Thessaloniki area	Titanochelon	Titanochelon bacharidisi	900.00	mo	Zanclean	3.95000	n	Europe
256	Nea Kallikratia, western Chalkidiki Peninsula, Thessaloniki area	Titanochelon	Titanochelon bacharidisi	900.00	mo	Zanclean	3.95000	n	Europe
257	Nea Michaniona, western Chalkidiki Peninsula, Thessaloniki area	Titanochelon	Titanochelon bacharidisi	900.00	mo	Zanclean	3.95000	n	Europe
258	Nea Kallikratia, western Chalkidiki Peninsula, Thessaloniki area	Titanochelon	Titanochelon bacharidisi	900.00	mo	Zanclean	3.95000	n	Europe
259	Vallecas, Madrid	Titanochelon	Titanochelon bolivari	1100.00	mo	Langhian	15.00000	n	Europe
260	Puerto de la Cadena, Murcia	Titanochelon	Titanochelon bolivari	1150.00	m	Messinian	6.28900	n	Europe
261	Alcalá de Henares, Cerro del Viso (Barranco de los Mártires y Santos de la Humosa), Madrid	Titanochelon	Titanochelon bolivari	1250.00	mo	Langhian	15.00000	n	Europe
262	Cerro de los Batallones, Madrid	Titanochelon	Titanochelon bolivari	1300.00	mf	Tortonian	9.50000	n	Europe
263	Cerro del Otero, Palencia	Titanochelon	Titanochelon bolivari	1353.00	mo	Serravallian	12.50000	n	Europe
264	Charneco do Lumiar	Titanochelon	Titanochelon cf. bolivari	1300.00	ev	Langhian	14.89500	n	Europe
265	Aveiras de Baixo, Azambuja	Titanochelon	Titanochelon cf. bolivari	1500.00	mf	Tortonian	9.43300	n	Europe
266	Quinta da Farinheira	Titanochelon	Titanochelon cf. bolivari	1600.00	ef	Langhian	14.89500	n	Europe
267	Sandelzhausen unterer Geröllmergel (B)	Titanochelon	Titanochelon cf. perpiniana	1001.00	mo	Burdigalian/Aquitanian	16.37000	n	Europe
268	Cala Es Pous near Ciutadella, Minorca	Titanochelon	Titanochelon gymnesica	1300.00	ef	Lower Pleistocene	1.30000	y	Europe
269	Serrat-d'en-Vacquer near Perpignan, Pyrénées-Orientales	Titanochelon	Titanochelon perpiniana	1140.00	m	Zanclean	3.90000	n	Europe
270	Samos 1	Titanochelon	Titanochelon schafferi	1850.00	m	Messinian	6.25000	y	Europe
271	Pikermi	Titanochelon	Titanochelon schafferi	2500.00	mo	Zanclean	4.46600	n	Europe
272	Fonelas P-1, Guadix Basin	Titanochelon	Titanochelon sp.	1420.00	mo	Gelasian	1.85000	n	Europe
273	Cova de Ca Na Reia, Eivissa, Ibiza	Titanochelon	Titanochelon sp.	520.00	mo	Piacencian	2.60000	y	Europe
274	Plum Point, Calvert County, Maryland	Caudochelys	Caudochelys ducateli	339.90	m	Langhian	15.00000	n	America
275	Rexroad local fauna (Fox Canyon locality 3), Meade County, Kansas	Caudochelys	Caudochelys rexroadensis	781.00	m	Zanclean	4.55000	n	America
276	Rexroad local fauna (Fox Canyon locality 3), Meade County, Kansas	Caudochelys	Caudochelys rexroadensis	830.00	m	Zanclean	4.55000	n	America
277	Garvin Gullv, 2 mi. north of Navasota, Jl J . Grimes County, Texas, Garvin Gullv local fauna	Caudochelys	Caudochelys williamsi	334.00	m	Burdigalian/Aquitanian	17.75000	n	America
278	Gilliland local fauna, Burnett Ranch, 7 miles W of Vera, Knox County, Texas	Geochelone	Geochelone sp.	170.00	mf	Middle Pleistocene	0.70000	n	America
279	Santee, Knox County, Nebraska	Geochelone	Geochelone sp.	176.00	e	Zanclean	5.00000	n	America
280	Orange Lake 2 miles south, Marion County, Florida	Geochelone	Geochelone sp.	350.00	ef	Upper Pleistocene	0.06900	n	America
281	Ricardo Fauna, Mojave Desert, Kern County, California	Geochelone	Geochelone sp.	500.00	m	Tortonian	10.10000	n	America
282	Banana Hole, New Providence Island	Geochelone	Geochelone sp.	600.00	mo	Upper Pleistocene	0.01250	y	America
283	Lee Creek Mine, Yorktown Sample, Beaufort County, North Carolina	Geochelone	Geochelone sp.	880.00	m	Zanclean	4.50000	n	America
284	Thomas Farm Local Fauna, Gilchrist County, Florida	Geochelone	Geochelone tedwhitei	370.00	m	Burdigalian/Aquitanian	18.50000	n	America
285	Thomas Farm Local Fauna, Gilchrist County, Florida	Geochelone	Geochelone tedwhitei	440.00	m	Burdigalian/Aquitanian	18.50000	n	America
286	Ricardo Fauna, Mojave Desert, Kern County, California	Gopherus	Gopherus ? sp.	500.00	m	Tortonian	10.10000	n	America
287	Iron Canyon Fauna, Mojave Desert, Kern County, California	Gopherus	Gopherus ? sp.	500.00	m	Serravallian	11.85000	n	America
288	Sabertooth Camel Maze, Dry Cave (UTEP 5), Eddy County, New Mexico	Gopherus	Gopherus agassizi	252.00	m	Upper Pleistocene	0.02550	n	America

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	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
289	Pecos River near Melena and Acme, 10-15 km NE Roswell, Chaves County, New Mexico	Gopherus	Gopherus agassizi	445.00	mo	Middle Pleistocene	0.15600	n	America
290	North Cita Canyon (Middle Stratum), Randall County, Texas	Gopherus	Gopherus canyonensis	885.50	m	Piacencian	2.70000	n	America
291	Texas	Gopherus	Gopherus laticaudatus	375.00	mo	Middle Pleistocene	0.39635	n	America
292	Barstow Beds, San Bernardino County, California	Gopherus	Gopherus mohavetus	202.00	m	Tortonian	8.47600	n	America
293	Cache Peak fauna, Tehachapi Mountains, Kern County, California	Gopherus	Gopherus mohavetus	315.00	m	Tortonian	8.47600	n	America
294	Barstow Beds, San Bernardino County, California	Gopherus	Gopherus mohavetus	334.50	m	Tortonian	8.47600	n	America
295	Barstow Beds, San Bernardino County, California	Gopherus	Gopherus mohavetus	360.00	m	Tortonian	8.47600	n	America
296	Barstow Beds, San Bernardino County, California	Gopherus	Gopherus mohavetus	412.50	m	Tortonian	8.47600	n	America
297	Texas	Gopherus	Gopherus pertenuis	1050.00	mo	Lower Pleistocene	1.68450	n	America
298	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	102.44	mo	Upper Pleistocene	0.06900	n	America
299	Reddick IA+B, Marion County, Florida	Gopherus	Gopherus polyphemus	155.50	mo	Upper Pleistocene	0.06900	n	America
300	Leisey Shell Pit 1A, Hillsborough County, Florida	Gopherus	Gopherus polyphemus	217.90	mo	Lower Pleistocene	1.20000	n	America
301	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	239.80	mo	Middle Pleistocene	0.25000	n	America
302	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	252.56	mo	Upper Pleistocene	0.06900	n	America
303	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	253.70	mo	Middle Pleistocene	0.25000	n	America
304	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	256.44	mo	Middle Pleistocene	0.25000	n	America
305	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	257.80	mo	Middle Pleistocene	0.25000	n	America
306	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	258.30	mo	Upper Pleistocene	0.06900	n	America
307	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	260.11	mo	Upper Pleistocene	0.06900	n	America
308	Coleman 2A	Gopherus	Gopherus polyphemus	260.50	mo	Middle Pleistocene	0.40000	n	America
309	Coleman 2A	Gopherus	Gopherus polyphemus	260.51	mo	Middle Pleistocene	0.40000	n	America
310	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	267.00	mo	Middle Pleistocene	0.25000	n	America
311	Leisey Shell Pit 1A, Hillsborough County, Florida	Gopherus	Gopherus polyphemus	268.90	mo	Lower Pleistocene	1.20000	n	America
312	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	272.48	mo	Middle Pleistocene	0.25000	n	America
313	Coleman 2A	Gopherus	Gopherus polyphemus	272.57	mo	Middle Pleistocene	0.40000	n	America
314	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	273.24	mo	Upper Pleistocene	0.06900	n	America
315	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	274.30	mo	Middle Pleistocene	0.25000	n	America
316	Leisey Shell Pit 1A, Hillsborough County, Florida	Gopherus	Gopherus polyphemus	276.60	mo	Lower Pleistocene	1.20000	n	America
317	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	278.00	mo	Upper Pleistocene	0.06900	n	America
318	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	279.94	mo	Upper Pleistocene	0.06900	n	America
319	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	283.00	mo	Middle Pleistocene	0.25000	n	America
320	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	283.41	mo	Middle Pleistocene	0.25000	n	America
321	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	284.90	mo	Upper Pleistocene	0.06900	n	America
322	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	285.20	mo	Middle Pleistocene	0.25000	n	America
323	Coleman 2A	Gopherus	Gopherus polyphemus	285.60	mo	Middle Pleistocene	0.40000	n	America
324	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	292.00	mo	Middle Pleistocene	0.25000	n	America
325	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	292.94	mo	Middle Pleistocene	0.25000	n	America

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
326	Coleman 2A	Gopherus	Gopherus polyphemus	293.00	mo	Middle Pleistocene	0.40000	n	America
327	Coleman 2A	Gopherus	Gopherus polyphemus	293.57	mo	Middle Pleistocene	0.40000	n	America
328	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	294.16	mo	Upper Pleistocene	0.06900	n	America
329	Coleman 2A	Gopherus	Gopherus polyphemus	295.90	mo	Middle Pleistocene	0.40000	n	America
330	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	301.97	mo	Upper Pleistocene	0.06900	n	America
331	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	302.40	mo	Upper Pleistocene	0.06900	n	America
332	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	302.40	mo	Middle Pleistocene	0.25000	n	America
333	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	304.20	mo	Upper Pleistocene	0.06900	n	America
334	Coleman 2A	Gopherus	Gopherus polyphemus	304.70	mo	Middle Pleistocene	0.40000	n	America
335	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	306.00	mo	Middle Pleistocene	0.25000	n	America
336	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	306.00	mo	Middle Pleistocene	0.25000	n	America
337	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	306.00	mo	Middle Pleistocene	0.25000	n	America
338	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	306.00	mo	Middle Pleistocene	0.25000	n	America
339	Coleman 2A	Gopherus	Gopherus polyphemus	308.20	mo	Middle Pleistocene	0.40000	n	America
340	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	314.60	mo	Middle Pleistocene	0.25000	n	America
341	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	322.63	mo	Middle Pleistocene	0.25000	n	America
342	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	324.00	mo	Upper Pleistocene	0.06900	n	America
343	Reddick IA+B, Marion County, Florida	Gopherus	Gopherus polyphemus	327.60	mo	Upper Pleistocene	0.06900	n	America
344	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	334.70	mo	Upper Pleistocene	0.06900	n	America
345	Haile, Alachua County, Florida	Gopherus	Gopherus polyphemus	337.30	mo	Middle Pleistocene	0.25000	n	America
346	Coleman 2A	Gopherus	Gopherus polyphemus	348.70	mo	Middle Pleistocene	0.40000	n	America
347	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	350.00	mo	Upper Pleistocene	0.06900	n	America
348	Coleman 2A	Gopherus	Gopherus polyphemus	350.83	mo	Middle Pleistocene	0.40000	n	America
349	Little Salt Spring, Florida	Gopherus	Gopherus polyphemus	352.00	mo	Upper Pleistocene	0.01200	n	America
350	Coleman 2A	Gopherus	Gopherus polyphemus	353.30	mo	Middle Pleistocene	0.40000	n	America
351	Reddick IA+B, Marion County, Florida	Gopherus	Gopherus polyphemus	391.90	mo	Upper Pleistocene	0.06900	n	America
352	Surprise Cave, Alachua, Florida	Gopherus	Gopherus polyphemus	431.48	mo	Upper Pleistocene	0.06900	n	America
353	Gilliland local fauna, Burnett Ranch, 7 miles W of Vera, Knox County, Texas	Gopherus	Gopherus polyphemus	539.00	mf	Middle Pleistocene	0.70000	n	America
354	Melbourne, Brevard County, Florida	Gopherus	Gopherus praecedens	360.00	mo	Upper Pleistocene	0.06900	n	America
355	Inglis 1A, Florida	Gopherus	Gopherus sp.	118.90	mo	Gelasian	1.90000	n	America
356	Inglis 1A, Florida	Gopherus	Gopherus sp.	143.90	mo	Gelasian	1.90000	n	America
357	Inglis 1A, Florida	Gopherus	Gopherus sp.	163.50	mo	Gelasian	1.90000	n	America
358	Inglis 1A, Florida	Gopherus	Gopherus sp.	180.90	mo	Gelasian	1.90000	n	America
359	Inglis 1A, Florida	Gopherus	Gopherus sp.	181.00	mo	Gelasian	1.90000	n	America
360	Inglis 1A, Florida	Gopherus	Gopherus sp.	181.00	mo	Gelasian	1.90000	n	America
361	Inglis 1A, Florida	Gopherus	Gopherus sp.	181.00	mo	Gelasian	1.90000	n	America
362	Inglis 1A, Florida	Gopherus	Gopherus sp.	181.00	mo	Gelasian	1.90000	n	America

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
363	Inglis 1A, Florida	Gopherus	Gopherus sp.	182.30	mo	Gelasian	1.90000	n	America
364	Inglis 1A, Florida	Gopherus	Gopherus sp.	188.30	mo	Gelasian	1.90000	n	America
365	Inglis 1A, Florida	Gopherus	Gopherus sp.	188.70	mo	Gelasian	1.90000	n	America
366	Inglis 1A, Florida	Gopherus	Gopherus sp.	193.30	mo	Gelasian	1.90000	n	America
367	Inglis 1A, Florida	Gopherus	Gopherus sp.	194.90	mo	Gelasian	1.90000	n	America
368	Inglis 1C, Florida	Gopherus	Gopherus sp.	202.80	mo	Lower Pleistocene	1.80000	n	America
369	Inglis 1A, Florida	Gopherus	Gopherus sp.	204.40	mo	Gelasian	1.90000	n	America
370	Inglis 1A, Florida	Gopherus	Gopherus sp.	209.60	mo	Gelasian	1.90000	n	America
371	Inglis 1A, Florida	Gopherus	Gopherus sp.	218.80	mo	Gelasian	1.90000	n	America
372	Inglis 1C, Florida	Gopherus	Gopherus sp.	224.10	mo	Lower Pleistocene	1.80000	n	America
373	Inglis 1C, Florida	Gopherus	Gopherus sp.	230.10	mo	Lower Pleistocene	1.80000	n	America
374	Inglis 1A, Florida	Gopherus	Gopherus sp.	236.70	mo	Gelasian	1.90000	n	America
375	Inglis 1C, Florida	Gopherus	Gopherus sp.	241.90	mo	Lower Pleistocene	1.80000	n	America
376	Inglis 1C, Florida	Gopherus	Gopherus sp.	245.40	mo	Lower Pleistocene	1.80000	n	America
377	Inglis 1C, Florida	Gopherus	Gopherus sp.	259.50	mo	Lower Pleistocene	1.80000	n	America
378	McGehee Farm near Newberry, Alachua County, Florida	Hesperotestudo	Hesperotestudo alleni	240.90	m	Tortonian	10.95000	n	America
379	Texas	Hesperotestudo	Hesperotestudo campester	1000.00	mo	Gelasian	2.19050	n	America
380	Little Salt Spring, Florida	Hesperotestudo	Hesperotestudo crassiscutata	1250.00	ev	Upper Pleistocene	0.01200	n	America
381	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	168.00	m	Lower Pleistocene	1.30000	n	America
382	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	180.00	m	Lower Pleistocene	1.30000	n	America
383	Reddick IA+B, Marion County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	180.40	m	Upper Pleistocene	0.06900	n	America
384	Little Salt Spring, Florida	Hesperotestudo	Hesperotestudo crassiscutata	188.00	mo	Upper Pleistocene	0.01200	n	America
385	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	192.00	m	Lower Pleistocene	1.30000	n	America
386	Reddick IA+B, Marion County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	282.70	m	Upper Pleistocene	0.06900	n	America
387	Reddick IA+B, Marion County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	284.90	m	Upper Pleistocene	0.06900	n	America
388	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	327.00	m	Lower Pleistocene	1.30000	n	America
389	Little Salt Spring, Florida	Hesperotestudo	Hesperotestudo crassiscutata	425.00	mo	Upper Pleistocene	0.01200	n	America
390	Leisey Shell Pit 1A, Hillsborough County, Florida	Hesperotestudo	Hesperotestudo crassiscutata	561.00	m	Lower Pleistocene	1.25000	n	America
391	Cragin Quarry Local Fauna, Meade County, Kansas	Hesperotestudo	Hesperotestudo equicomes	340.00	ev	Middle Pleistocene	0.30000	n	America
392	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	212.00	m	Lower Pleistocene	1.30000	n	America
393	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	216.00	m	Lower Pleistocene	1.30000	n	America
394	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	224.00	m	Lower Pleistocene	1.30000	n	America
395	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	228.00	m	Lower Pleistocene	1.30000	n	America
396	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	231.00	m	Lower Pleistocene	1.30000	n	America
397	Arredondo IIA, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	232.76	m	Upper Pleistocene	0.06900	n	America
398	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	241.00	m	Lower Pleistocene	1.30000	n	America
399	Haile, Alachua County, Florida	Hesperotestudo	Hesperotestudo incisa	290.40	m	Lower Pleistocene	1.30000	n	America

Table S12 – *continued from previous page*

	Locality	Genus	Taxon	CL	estimated	Stages	Age	Insular	Continent
400	Cita Canyon, UCMP V-3721, Harrell Ranch, Randall County, Texas	Hesperotestudo	Hesperotestudo johnstoni	235.00	m	Piacencian	3.35000	n	America
401	Leisey Shell Pit 1A, Hillsborough County, Florida	Hesperotestudo	Hesperotestudo mlynarskii	165.00	m	Lower Pleistocene	1.25000	n	America
402	Leisey Shell Pit 2, Hillsborough County, Florida	Hesperotestudo	Hesperotestudo mlynarskii	203.50	m	Lower Pleistocene	1.25000	n	America
403	Sand Draw local fauna, Brown County, Nebraska	Hesperotestudo	Hesperotestudo oelrichi	283.80	m	Piacencian	3.00000	n	America
404	UCMP V71137, Turlock Lake 10, Stanislaus County, California	Hesperotestudo	Hesperotestudo orthopygia	1200.00	mo	Messinian	5.50000	n	America
405	UCMP V81248, Turlock Lake 11, Stanislaus County, California	Hesperotestudo	Hesperotestudo orthopygia	682.00	mo	Messinian	5.50000	n	America
406	Buis Ranch Local Fauna, Beaver County, Oklahoma	Hesperotestudo	Hesperotestudo riggsi	159.50	mo	Tortonian	7.60000	n	America
407	Buis Ranch Local Fauna, Beaver County, Oklahoma	Hesperotestudo	Hesperotestudo riggsi	159.50	mo	Tortonian	7.60000	n	America
408	Buis Ranch Local Fauna, Beaver County, Oklahoma	Hesperotestudo	Hesperotestudo riggsi	159.50	mo	Tortonian	7.60000	n	America
409	Buis Ranch Local Fauna, Beaver County, Oklahoma	Hesperotestudo	Hesperotestudo riggsi	159.50	mo	Tortonian	7.60000	n	America
410	Sawrock Canyon local fauna, Seward County, Kansas	Hesperotestudo	Hesperotestudo riggsi	176.00	m	Piacencian	3.00000	n	America
411	Sawrock Canyon local fauna, Seward County, Kansas	Hesperotestudo	Hesperotestudo riggsi	185.00	m	Piacencian	3.00000	n	America
412	Rexroad local fauna (Fox Canyon locality 3), Meade County, Kansas	Hesperotestudo	Hesperotestudo riggsi	195.80	m	Zanclean	4.55000	n	America
413	Caballo Local Fauna, Palomas Basin, Sierra County, New Mexico	Hesperotestudo	Hesperotestudo sp.	1000.00	mo	Gelasian	2.00000	n	America
414	UCMP V-3952, Ingram Creek site 8, Stanislaus County, California	Hesperotestudo	Hesperotestudo sp.	1200.00	ev	Tortonian	9.50000	n	America
415	Gilliland local fauna, Burnett Ranch, 7 miles W of Vera, Knox County, Texas	Hesperotestudo	Hesperotestudo sp.	1500.00	mo	Middle Pleistocene	0.70000	n	America
416	Cuchillo Negro Creek Local Fauna, Engle Basin, Sierra County, New Mexico	Hesperotestudo	Hesperotestudo sp.	176.00	mf	Piacencian	3.10000	n	America
417	Gilliland local fauna, Burnett Ranch, 7 miles W of Vera, Knox County, Texas	Hesperotestudo	Hesperotestudo sp.	1800.00	mo	Middle Pleistocene	0.70000	n	America
418	Ingleside Local Fauna, San Patricio County, Texas	Hesperotestudo	Hesperotestudo sp.	639.00	m	Upper Pleistocene	0.06000	n	America
419	Ingleside Local Fauna, San Patricio County, Texas	Hesperotestudo	Hesperotestudo sp.	974.00	ep	Upper Pleistocene	0.06000	n	America
420	Kansas	Hesperotestudo	Hesperotestudo turgida	230.00	mo	Lower Pleistocene	1.68450	n	America
421	Friesenhahn Cave, Bexar County, Texas	Hesperotestudo	Hesperotestudo wilsoni	226.00	m	Upper Pleistocene	0.01800	n	America
422	Atascosa county, Texas	Testudo	Testudo sp.	400.00	mo	Langhian	14.18100	n	America
423	Libertador San Martín north bank Ensenada stream, 15 km E Diamante, Entre Rios Province	Chelonoidis	Chelonoidis denticulata	616.00	m	Upper Pleistocene	0.12000	n	America
424	Arroyo Toropí, Corrientes	Chelonoidis	Chelonoidis lutzae	830.00	m	Upper Pleistocene	0.03850	n	America
425	Quebrada de Ñuapua, Chuquisaca department	Chelonoidis	Chelonoidis sp.	1000.00	mo	Upper Pleistocene	0.06900	n	America
426	Beautiful Bone, Alta Guajira Peninsula, Cocinetas basin	Chelonoidis	Chelonoidis sp.	1060.00	ec	Langhian	15.90000	n	America
427	Beautiful Bone, Alta Guajira Peninsula, Cocinetas basin	Chelonoidis	Chelonoidis sp.	300.00	mo	Langhian	15.90000	n	America
428	Beautiful Bone, Alta Guajira Peninsula, Cocinetas basin	Chelonoidis	Chelonoidis sp.	300.00	mo	Langhian	15.90000	n	America
429	Beautiful Bone, Alta Guajira Peninsula, Cocinetas basin	Chelonoidis	Chelonoidis sp.	300.00	mo	Langhian	15.90000	n	America
430	Beautiful Bone, Alta Guajira Peninsula, Cocinetas basin	Chelonoidis	Chelonoidis sp.	300.00	mo	Langhian	15.90000	n	America
431	San Nicolas, UCMP locality V4536	Geochelone	Geochelone hesterna	278.00	m	Tortonian	8.50000	n	America

Table S13: Body size data set of extant testudinid. Contains information on Genus and Taxon names, collection numbers (Coll.-Nr.) and shell measurements (SCL: straight carapace length, CCL: curved carapace length, SCW: straight carapace width, CCW: curved carapace width, CH: carapace height, PL: plastron length (greatest), PW: plastron width (greatest). Further, it is stated on which continent the fossil record was recovered and whether it was continental (n: no) or insular (y: yes). (The references from which the data were obtained can be found in the table on the supplementary CD.)

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continents
1	Kinixys	Kinixys belliana	ZMB 37388	162.0	16.20	22.5	15.5	21.5	164.0	12.6	n	Africa
2	Aldabrachelys	Aldabrachelys gigantea	ZMB 51996	770.0	77.00	106.0	52.0	112.0	NA	NA	y	Africa
3	Astrochelys	Astrochelys yniphora	-	426.0	42.60	NA	NA	NA	NA	NA	y	Africa
4	Centrochelys	Centrochelys sulcata	ZMB 63203	215.0	21.50	29.5	16.5	27.0	214.0	14.8	n	Africa
5	Malacochersus	Malacochersus tornieri	ZMB 63174	153.0	15.30	17.0	10.5	14.0	149.0	9.8	n	Africa
6	Astrochelys	Astrochelys radiata	-	395.0	39.50	NA	NA	NA	NA	NA	y	Africa
7	Pyxis	Pyxis arachnoides	ZMB 37616	110.0	11.00	15.0	8.0	14.0	75.0	7.6	y	Africa
8	Kinixys	Kinixys homeana	ZMB 17747	193.0	19.30	25.0	14.0	21.0	175.0	11.8	n	Africa
9	Aldabrachelys	Aldabrachelys gigantea	ZMB 47494	870.0	87.00	116.0	57.0	110.0	NA	NA	y	Africa
10	Psammobates	Psammobates tentorius	ZMB 28782	111.0	11.10	15.0	8.5	14.0	95.0	7.9	n	Africa
11	Psammobates	Psammobates oculifer	ZMB 25439	119.0	11.90	17.0	9.0	14.5	99.0	8.4	n	Africa
12	Psammobates	Psammobates oculifer	ZMB 37472	107.0	10.70	15.0	8.4	13.5	106.0	8	n	Africa
13	Astrochelys	Astrochelys yniphora	-	307.0	30.70	NA	NA	NA	NA	NA	y	Africa
14	Homopus	Homopus aerolatus	ZMB 229	88.0	8.80	10.5	6.9	9.0	78.0	6.1	n	Africa
15	Homopus	Homopus signatus	ZMB 63173	94.0	9.40	12.5	7.7	11.0	82.0	5.6	n	Africa
16	Kinixys	Kinixys belliana	ZMB 63191	194.0	19.40	25.5	12.5	19.0	173.0	12	n	Africa
17	Astrochelys	Astrochelys radiata	-	285.0	28.50	NA	NA	NA	NA	NA	y	Africa
18	Kinixys	Kinixys belliana	ZMB 63192	174.0	17.40	24.5	11.5	20.5	143.0	11.1	n	Africa
19	Kinixys	Kinixys belliana	ZMB 63193	157.0	15.70	21.0	9.9	16.5	141.0	9.4	n	Africa
20	Aldabrachelys	Aldabrachelys gigantea	ZMB 37545	810.0	81.00	110.0	52.0	NA	NA	NA	y	Africa
21	Chersina	Chersina angulata	ZMB 49400	162.0	16.20	21.5	10.9	17.5	170.0	9.2	n	Africa
22	Chersina	Chersina angulata	ZMB 63181	170.0	17.00	23.0	11.4	19.0	169.0	10	n	Africa
23	Chersina	Chersina angulata	ZMB 63183	120.0	12.00	17.0	8.6	15.5	118.0	7.3	n	Africa

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
24	Chersina	Chersina angulata	ZMB 63182	136.0	13.60	18.0	9.9	16.0	138.0	8	n	Africa
25	Kinixys	Kinixys erosa	ZMB 63190	164.0	16.40	21.0	11.2	16.5	163.0	10.6	n	Africa
26	Centrochelys	Centrochelys sulcata	ZMB 37387	435.0	43.50	54.0	29.9	53.0	405.0	29.1	n	Africa
27	Indotestudo	Indotestudo travancorica	ZMB 37717	224.0	22.40	28.0	15.2	23.0	200.0	15.4	n	Africa
28	Stigmochelys	Stigmochelys pardalis	ZMB 37344	405.0	40.50	55.0	27.0	50.5	350.0	24.3	n	Africa
29	Stigmochelys	Stigmochelys pardalis	ZMB 63235	315.0	31.50	43.5	23.4	39.0	298.0	22.1	n	Africa
30	Stigmochelys	Stigmochelys pardalis	ZMB 37495	297.0	29.70	41.5	21.4	36.0	271.0	19.2	n	Africa
31	Stigmochelys	Stigmochelys pardalis	ZMB 42400	345.0	34.50	46.5	24.0	40.0	285.0	21.3	n	Africa
32	Stigmochelys	Stigmochelys pardalis	ZMB 63232	350.0	35.00	46.0	23.9	45.0	303.0	21.1	n	Africa
33	Psammobates	Psammobates geometricus	ZMB 192	92.0	9.20	13.5	7.1	13.0	68.0	6.3	n	Africa
34	Chersina	Chersina angulata	-	181.9	18.19	NA	NA	NA	NA	NA	y	Africa
35	Aldabrachelys	Aldabrachelys gigantea	ZMB 47443	800.0	80.00	105.0	51.5	105.0	NA	NA	y	Africa
36	Astrochelys	Astrochelys yniphora	-	415.0	41.50	NA	NA	NA	NA	NA	y	Africa
37	Astrochelys	Astrochelys yniphora	-	370.0	37.00	NA	NA	NA	NA	NA	y	Africa
38	Aldabrachelys	Aldabrachelys gigantea	ZMB 51995	1030.0	103.00	138.0	NA	NA	NA	NA	y	Africa
39	Aldabrachelys	Aldabrachelys gigantea	ZMB ???	720.0	72.00	105.5	55.0	117.0	NA	NA	y	Africa
40	Cylindraspis	Cylindraspis triserrata	-	1100.0	110.00	NA	NA	NA	NA	NA	y	Africa
41	Cylindraspis	Cylindraspis vosmaeri	-	500.0	50.00	NA	NA	NA	NA	NA	y	Africa
42	Astrochelys	Astrochelys radiata	-	334.0	33.40	NA	NA	NA	NA	NA	y	Africa
43	Astrochelys	Astrochelys radiata	-	305.0	30.50	NA	NA	NA	NA	NA	y	Africa
44	Centrochelys	Centrochelys sulcata	-	830.0	83.00	NA	NA	NA	NA	NA	n	Africa
45	Psammobates	Psammobates geometricus	ZMB 186	105.0	10.50	13.5	7.4	13.0	90.0	6.9	n	Africa
46	Astrochelys	Astrochelys radiata	-	242.0	24.20	NA	NA	NA	NA	NA	y	Africa
47	Psammobates	Psammobates tentorius	ZMB 37627	116.0	11.60	15.0	9.4	14.5	117.0	8.9	y	Africa
48	Psammobates	Psammobates tentorius	ZMB 50571	95.0	9.50	12.0	7.3	12.0	79.0	7	n	Africa
49	Psammobates	Psammobates tentorius	ZMB 14766	81.0	8.10	10.5	6.8	10.0	67.0	5.9	n	Africa
50	Pyxis	Pyxis planicauda	-	114.0	11.40	NA	NA	NA	NA	NA	y	Africa

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
51	Pyxis	Pyxis planicauda	-	134.0	13.40	NA	NA	NA	NA	NA	y	Africa
52	Pyxis	Pyxis planicauda	-	120.0	12.00	NA	NA	NA	NA	NA	y	Africa
53	Psammobates	Psammobates oculifer	ZMB 16399	111.0	11.10	16.0	8.8	14.0	108.0	7.9	n	Africa
54	Psammobates	Psammobates oculifer	ZMB 14772	101.0	10.10	15.0	8.0	14.0	98.0	7.3	n	Africa
55	Psammobates	Psammobates oculifer	ZMB 24261	103.0	10.30	14.0	8.2	13.5	100.0	7.8	n	Africa
56	Psammobates	Psammobates oculifer	ZMB 37623	105.0	10.50	14.5	7.9	13.5	93.0	7.4	n	Africa
57	Kinixys	Kinixys belliana	ZMB 37489	180.0	18.00	24.0	12.0	20.5	176.0	11.8	n	Africa
58	Pyxis	Pyxis planicauda	-	160.0	16.00	NA	NA	NA	NA	NA	y	Africa
59	Psammobates	Psammobates geometricus	ZMB 50568	107.0	10.70	15.0	7.9	14.5	79.0	7.3	n	Africa
60	Aldabrachelys	Aldabrachelys gigantea	-	875.0	87.50	NA	NA	NA	NA	NA	y	Africa
61	Aldabrachelys	Aldabrachelys gigantea	-	1190.0	119.00	NA	NA	NA	NA	NA	y	Africa
62	Chersina	Chersina angulata	-	202.0	20.20	NA	NA	NA	NA	NA	n	Africa
63	Chersina	Chersina angulata	-	351.0	35.10	NA	NA	NA	NA	NA	y	Africa
64	Astrochelys	Astrochelys yniphora	-	446.0	44.60	NA	NA	NA	NA	NA	y	Africa
65	Chersina	Chersina angulata	ZMB 37393	160.0	16.00	20.0	10.0	17.5	158.0	9.2	n	Africa
66	Kinixys	Kinixys erosa	ZMB 50198	271.0	27.10	31.5	18.5	26.0	231.0	15.9	n	Africa
67	Chersina	Chersina angulata	ZMB 37392	181.0	18.10	22.5	11.6	19.0	177.0	9.7	n	Africa
68	Psammobates	Psammobates oculifer	-	147.0	14.70	NA	NA	NA	NA	NA	n	Africa
69	Psammobates	Psammobates tentorius	-	145.0	14.50	NA	NA	NA	NA	NA	n	Africa
70	Pyxis	Pyxis arachnoides	-	150.0	15.00	NA	NA	NA	NA	NA	y	Africa
71	Psammobates	Psammobates geometricus	ZMB 185	118.0	11.80	18.0	9.1	16.5	112.0	8.2	n	Africa
72	Stigmochelys	Stigmochelys pardalis	-	720.0	72.00	NA	NA	NA	NA	NA	n	Africa
73	Chersina	Chersina angulata	-	179.3	17.93	NA	NA	NA	NA	NA	n	Africa
74	Astrochelys	Astrochelys radiata	-	355.0	35.50	NA	NA	NA	NA	NA	y	Africa
75	Pyxis	Pyxis planicauda	-	126.0	12.60	NA	NA	NA	NA	NA	y	Africa
76	Testudo	Testudo kleinmanni	-	144.0	14.40	NA	NA	NA	NA	NA	n	Africa
77	Cylindraspis	Cylindraspis indica	-	600.0	60.00	NA	NA	NA	NA	NA	y	Africa

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
78	Astrochelys	Astrochelys yniphora	-	361.0	36.10	NA	NA	NA	NA	NA	y	Africa
79	Astrochelys	Astrochelys yniphora	-	486.0	48.60	NA	NA	NA	NA	NA	y	Africa
80	Pyxis	Pyxis planicauda	-	148.0	14.80	NA	NA	NA	NA	NA	y	Africa
81	Pyxis	Pyxis arachnoides	-	111.0	11.10	NA	NA	NA	NA	NA	y	Africa
82	Pyxis	Pyxis arachnoides	-	110.0	11.00	NA	NA	NA	NA	NA	y	Africa
83	Pyxis	Pyxis arachnoides	-	80.0	8.00	NA	NA	NA	NA	NA	y	Africa
84	Kinixys	Kinixys lobatsiana	-	200.0	20.00	NA	NA	NA	NA	NA	n	Africa
85	Pyxis	Pyxis arachnoides	-	86.0	8.60	NA	NA	NA	NA	NA	y	Africa
86	Pyxis	Pyxis arachnoides	-	154.0	15.40	NA	NA	NA	NA	NA	y	Africa
87	Kinixys	Kinixys homeana	-	223.0	22.30	NA	NA	NA	NA	NA	n	Africa
88	Homopus	Homopus femoralis	-	168.0	16.80	NA	NA	NA	NA	NA	n	Africa
89	Pyxis	Pyxis planicauda	-	132.0	13.20	NA	NA	NA	NA	NA	y	Africa
90	Homopus	Homopus aerolatus	-	300.0	30.00	NA	NA	NA	NA	NA	n	Africa
91	Homopus	Homopus boulengeri	-	110.0	11.00	NA	NA	NA	NA	NA	n	Africa
92	Kinixys	Kinixys erosa	-	400.0	40.00	NA	NA	NA	NA	NA	n	Africa
93	Chersina	Chersina angulata	ZMB 37479	148.0	14.80	20.0	10.1	17.0	142.0	9.5	n	Africa
94	Psammobates	Psammobates geometricus	-	165.0	16.50	NA	NA	NA	NA	NA	n	Africa
95	Homopus	Homopus solus	-	109.0	10.90	NA	NA	NA	NA	NA	n	Africa
96	Malacochersus	Malacochersus tornieri	-	180.0	18.00	NA	NA	NA	NA	NA	n	Africa
97	Chersina	Chersina angulata	-	153.5	15.35	NA	NA	NA	NA	NA	n	Africa
98	Pyxis	Pyxis arachnoides	-	144.0	14.40	NA	NA	NA	NA	NA	y	Africa
99	Kinixys	Kinixys belliana	-	230.0	23.00	NA	NA	NA	NA	NA	n	Africa
100	Aldabrachelys	Aldabrachelys gigantea	-	1140.0	114.00	NA	NA	NA	NA	NA	y	Africa
101	Astrochelys	Astrochelys radiata	-	400.0	40.00	NA	NA	NA	NA	NA	y	Africa
102	Chersina	Chersina angulata	-	166.4	16.64	NA	NA	NA	NA	NA	n	Africa
103	Chersina	Chersina angulata	-	171.6	17.16	NA	NA	NA	NA	NA	y	Africa
104	Cylindraspis	Cylindraspis peltastes	-	420.0	42.00	NA	NA	NA	NA	NA	y	Africa

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
105	Chersina	Chersina angulata	-	161.3	16.13	NA	NA	NA	NA	NA	y	Africa
106	Homopus	Homopus signatus	-	106.0	10.60	NA	NA	NA	NA	NA	n	Africa
107	Kinixys	Kinixys spekii	-	220.0	22.00	NA	NA	NA	NA	NA	n	Africa
108	Cylindraspis	Cylindraspis inepta	-	1000.0	100.00	NA	NA	NA	NA	NA	y	Africa
109	Kinixys	Kinixys natalensis	-	160.0	16.00	NA	NA	NA	NA	NA	n	Africa
110	Geochelone	Geochelone elegans	ZMB 63222	208.0	20.80	29.5	14.6	28.5	199.0	13.3	n	Asia
111	Geochelone	Geochelone elegans	ZMB 37523	245.0	24.50	32.0	16.6	32.0	228.0	14.6	n	Asia
112	Geochelone	Geochelone elegans	ZMB 63220	221.0	22.10	32.0	16.0	31.0	179.0	13.5	n	Asia
113	Geochelone	Geochelone elegans	ZMB 63221	220.0	22.00	31.0	15.4	27.0	209.0	14	y	Asia
114	Geochelone	Geochelone elegans	ZMB 63218	221.0	22.10	31.5	15.1	30.0	203.0	13.7	n	Asia
115	Geochelone	Geochelone platynota	ZMB 6096	222.0	22.20	29.5	15.1	27.0	NA	MA	n	Asia
116	Manouria	Manouria emys	-	600.0	60.00	NA	NA	NA	NA	NA	n	Asia
117	Indotestudo	Indotestudo forstenii	-	202.0	20.20	NA	NA	NA	NA	NA	y	Asia
118	Indotestudo	Indotestudo travancorica	-	249.7	24.97	NA	NA	NA	NA	NA	n	Asia
119	Indotestudo	Indotestudo forstenii	-	309.0	30.90	NA	NA	NA	NA	NA	y	Asia
120	Indotestudo	Indotestudo elongata	-	360.0	36.00	NA	NA	NA	NA	NA	n	Asia
121	Indotestudo	Indotestudo forstenii	-	199.0	19.90	NA	NA	NA	NA	NA	y	Asia
122	Indotestudo	Indotestudo elongata	-	244.2	24.42	NA	NA	NA	NA	NA	n	Asia
123	Indotestudo	Indotestudo travancorica	-	244.2	24.42	NA	NA	NA	NA	NA	n	Asia
124	Manouria	Manouria impressa	ZMB 63172	165.0	16.50	20.0	12.9	18.0	157.0	10.5	n	Asia
125	Indotestudo	Indotestudo elongata	ZMB 50492	276.0	27.60	33.0	19.4	28.5	246.0	17.1	n	Asia
126	Indotestudo	Indotestudo elongata	ZMB 63175	235.0	23.50	30.5	16.0	29.5	202.0	14.4	n	Asia
127	Indotestudo	Indotestudo elongata	ZMB 4174	208.0	20.80	26.0	13.4	20.0	180.0	11.6	n	Asia
128	Indotestudo	Indotestudo elongata	ZMB 6106	166.0	16.60	21.0	11.3	18.0	151.0	11.3	n	Asia
129	Manouria	Manouria emys	-	600.0	60.00	NA	NA	NA	NA	NA	n	Asia
130	Testudo	Testudo graeca	-	250.0	25.00	NA	NA	NA	NA	NA	n	Asia
131	Testudo	Testudo graeca	-	280.0	28.00	NA	NA	NA	NA	NA	y	Asia

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
132	Manouria	Manouria emys	ZMB 49049	212.0	21.20	26.5	16.5	25.0	NA	NA	n	Asia
133	Manouria	Manouria emys	ZMB 37350	445.0	44.50	52.0	32.0	50.0	455.0	29.8	n	Asia
134	Manouria	Manouria emys	ZMB 37342	330.0	33.00	40.5	26.7	37.0	330.0	23.4	n	Asia
135	Indotestudo	Indotestudo travancorica	-	331.0	33.10	NA	NA	NA	NA	NA	n	Asia
136	Indotestudo	Indotestudo travancorica	-	219.6	21.96	NA	NA	NA	NA	NA	n	Asia
137	Indotestudo	Indotestudo forstenii	-	200.5	20.05	NA	NA	NA	NA	NA	y	Asia
138	Testudo	Testudo horsfieldii	-	280.0	28.00	NA	NA	NA	NA	NA	n	Asia
139	Manouria	Manouria impressa	-	350.0	35.00	NA	NA	NA	NA	NA	n	Asia
140	Geochelone	Geochelone elegans	-	380.0	38.00	NA	NA	NA	NA	NA	n	Asia
141	Manouria	Manouria impressa	-	275.0	27.50	NA	NA	NA	NA	NA	n	Asia
142	Indotestudo	Indotestudo elongata	-	219.6	21.96	NA	NA	NA	NA	NA	n	Asia
143	Geochelone	Geochelone platynota	-	300.0	30.00	NA	NA	NA	NA	NA	n	Asia
144	Testudo	Testudo graeca	-	300.0	30.00	NA	NA	NA	NA	NA	n	Asia
145	Gopherus	Gopherus flavomarginatus	-	400.0	40.00	NA	NA	NA	NA	NA	n	America
146	Gopherus	Gopherus morafkai	-	299.0	29.90	NA	NA	NA	NA	NA	n	America
147	Gopherus	Gopherus berlandieri	-	240.0	24.00	NA	NA	NA	NA	NA	n	America
148	Testudo	Testudo horsfieldii	ZMB 63259	111.0	11.10	14.0	10.0	15.0	108.0	9.5	n	Europe
149	Pyxis	Pyxis arachnoides	ZMB 37615	108.0	10.80	15.0	7.9	13.0	96.0	7.1	n	Europe
150	Testudo	Testudo marginata	-	241.7	24.17	NA	NA	NA	NA	NA	n	Europe
151	Testudo	Testudo horsfieldii	ZMB 63258	123.0	12.30	14.5	10.9	15.0	121.0	9.8	n	Europe
152	Testudo	Testudo hermanni	-	183.3	18.33	NA	NA	NA	NA	NA	y	Europe
153	Testudo	Testudo hermanni	-	176.9	17.69	NA	NA	NA	NA	NA	n	Europe
154	Testudo	Testudo horsfieldii	ZMB 63257	114.0	11.40	14.5	10.2	14.0	110.0	9.9	n	Europe
155	Testudo	Testudo marginata	-	246.7	24.67	NA	NA	NA	NA	NA	n	Europe
156	Testudo	Testudo hermanni	-	196.0	19.60	NA	NA	NA	NA	NA	n	Europe
157	Testudo	Testudo hermanni	-	143.5	14.35	NA	NA	NA	NA	NA	y	Europe
158	Testudo	Testudo graeca	-	194.6	19.46	NA	NA	NA	NA	NA	n	Europe

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
159	Testudo	Testudo hermanni	-	200.0	20.00	NA	NA	NA	NA	NA	y	Europe
160	Testudo	Testudo hermanni	-	250.0	25.00	NA	NA	NA	NA	NA	n	Europe
161	Testudo	Testudo marginata	-	246.0	24.60	NA	NA	NA	NA	NA	n	Europe
162	Testudo	Testudo marginata	-	242.5	24.25	NA	NA	NA	NA	NA	y	Europe
163	Testudo	Testudo marginata	-	246.0	24.60	NA	NA	NA	NA	NA	n	Europe
164	Testudo	Testudo hermanni	-	147.0	14.70	NA	NA	NA	NA	NA	n	Europe
165	Testudo	Testudo marginata	-	290.0	29.00	NA	NA	NA	NA	NA	n	Europe
166	Testudo	Testudo marginata	-	250.0	25.00	NA	NA	NA	NA	NA	y	Europe
167	Testudo	Testudo hermanni	-	145.9	14.59	NA	NA	NA	NA	NA	y	Europe
168	Testudo	Testudo graeca	-	178.2	17.82	NA	NA	NA	NA	NA	n	Europe
169	Testudo	Testudo marginata	-	400.0	40.00	NA	NA	NA	NA	NA	n	Europe
170	Testudo	Testudo horsfieldii	ZMB 63255	136.0	13.60	18.0	13.0	16.5	129.0	12.2	n	Europe
171	Testudo	Testudo horsfieldii	ZMB 63256	132.0	13.20	17.0	12.4	17.0	133.0	11.3	n	Europe
172	Testudo	Testudo hermanni	-	168.3	16.83	NA	NA	NA	NA	NA	y	Europe
173	Testudo	Testudo hermanni	-	160.0	16.00	NA	NA	NA	NA	NA	y	Europe
174	Testudo	Testudo hermanni	-	154.0	15.40	NA	NA	NA	NA	NA	n	Europe
175	Testudo	Testudo hermanni	-	138.5	13.85	NA	NA	NA	NA	NA	n	Europe
176	Testudo	Testudo hermanni	-	173.0	17.30	NA	NA	NA	NA	NA	y	Europe
177	Testudo	Testudo marginata	-	242.5	24.25	NA	NA	NA	NA	NA	y	Europe
178	Testudo	Testudo hermanni	-	195.0	19.50	NA	NA	NA	NA	NA	y	Europe
179	Testudo	Testudo hermanni	-	157.0	15.70	NA	NA	NA	NA	NA	y	Europe
180	Testudo	Testudo hermanni	-	176.6	17.66	NA	NA	NA	NA	NA	y	Europe
181	Testudo	Testudo hermanni	-	130.0	13.00	NA	NA	NA	NA	NA	n	Europe
182	Testudo	Testudo hermanni	-	161.0	16.10	NA	NA	NA	NA	NA	n	Europe
183	Gopherus	Gopherus polyphemus	-	300.0	30.00	NA	NA	NA	NA	NA	y	America
184	Gopherus	Gopherus sp.	MVZ 210020	NA	NA	NA	NA	NA	219.6	NA	n	America
185	Gopherus	Gopherus sp.	MVZ 210003	NA	NA	NA	NA	NA	192.1	NA	n	America

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
186	Gopherus	Gopherus polyphemus	-	268.8	26.88	NA	NA	NA	NA	NA	y	America
187	Gopherus	Gopherus sp.	MVZ 120004	NA	NA	NA	NA	NA	196.7	NA	n	America
188	Gopherus	Gopherus sp.	MVZ 210009	NA	NA	NA	NA	NA	232.8	NA	n	America
189	Gopherus	Gopherus sp.	MVZ 210010	NA	NA	NA	NA	NA	240.1	NA	n	America
190	Gopherus	Gopherus agassizii	-	400.0	40.00	NA	NA	NA	NA	NA	n	America
191	Gopherus	Gopherus flavomarginatus	KU 39415	303.0	30.30	NA	23.2	NA	NA	NA	n	America
192	Gopherus	Gopherus polyphemus	-	308.0	30.80	NA	NA	NA	NA	NA	n	America
193	Gopherus	Gopherus polyphemus	-	303.0	30.30	NA	NA	NA	NA	NA	y	America
194	Gopherus	Gopherus polyphemus	-	387.0	38.70	NA	NA	NA	NA	NA	n	America
195	Gopherus	Gopherus polyphemus	-	342.0	34.20	NA	NA	NA	NA	NA	n	America
196	Gopherus	Gopherus flavomarginatus	USNM 61253	222.0	22.20	NA	16.6	NA	212.0	NA	n	America
197	Gopherus	Gopherus flavomarginatus	USNM 61254	371.0	37.10	NA	29.2	NA	358.0	NA	n	America
198	Gopherus	Gopherus polyphemus	-	238.9	23.89	NA	NA	NA	NA	NA	n	America
199	Gopherus	Gopherus flavomarginatus	USNM 60976	246.0	24.60	NA	21.2	NA	252.0	NA	n	America
200	Gopherus	Gopherus flavomarginatus	IU 42953	281.0	28.10	NA	22.0	NA	NA	NA	n	America
201	Gopherus	Gopherus flavomarginatus	IU 42954	278.0	27.80	NA	21.4	NA	NA	NA	n	America
202	Chelonoidis	Chelonoidis nigra	USNM 51069	588.0	58.80	68.3	44.5	NA	506.0	NA	y	America
203	Chelonoidis	Chelonoidis nigra	USNM1 102904	610.0	61.00	67.5	44.4	NA	515.0	NA	y	America
204	Chelonoidis	Chelonoidis carbonaria	-	593.0	59.30	NA	NA	NA	NA	NA	n	America
205	Chelonoidis	Chelonoidis abingdonii	-	980.0	98.00	NA	NA	NA	NA	NA	y	America
206	Chelonoidis	Chelonoidis denticulata	-	333.4	33.34	NA	NA	NA	NA	NA	n	America
207	Chelonoidis	Chelonoidis chilensis	UF33604	169.0	16.90	21.5	13.2	NA	161.0	NA	n	America
208	Chelonoidis	Chelonoidis chilensis	UF33618	186.0	18.60	25.0	14.7	NA	169.0	NA	n	America
209	Chelonoidis	Chelonoidis nigra	-	717.0	71.70	NA	NA	NA	NA	NA	y	America
210	Chelonoidis	Chelonoidis chilensis	UF33617	169.0	16.90	22.8	14.6	NA	162.0	NA	n	America
211	Chelonoidis	Chelonoidis carbonaria	UF27384	242.0	24.20	31.7	15.5	NA	219.0	NA	n	America
212	Chelonoidis	Chelonoidis carbonaria	UF33597	253.0	25.30	31.7	15.3	NA	215.0	NA	n	America

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
213	Chelonoidis	Chelonoidis nigra	USNM1 222494	595.0	59.50	68.0	43.6	NA	533.0	NA	y	America
214	Chelonoidis	Chelonoidis carbonaria	-	333.4	33.34	NA	NA	NA	NA	NA	n	America
215	Chelonoidis	Chelonoidis carbonaria	UF5259	226.0	22.60	28.7	12.9	NA	198.0	NA	n	America
216	Chelonoidis	Chelonoidis becki	-	1050.0	105.00	NA	NA	NA	NA	NA	y	America
217	Chelonoidis	Chelonoidis denticulata	UF33661	333.0	33.30	38.0	21.4	NA	305.0	NA	n	America
218	Chelonoidis	Chelonoidis denticulata	UF61931	317.0	31.70	41.2	18.5	NA	291.0	NA	n	America
219	Chelonoidis	Chelonoidis denticulata	UF33670	365.0	36.50	47.0	22.0	NA	326.0	NA	n	America
220	Chelonoidis	Chelonoidis chilensis	UF33603	183.0	18.30	23.4	14.5	NA	166.0	NA	n	America
221	Chelonoidis	Chelonoidis nigra	-	731.3	73.13	NA	NA	NA	NA	NA	y	America
222	Chelonoidis	Chelonoidis chilensis	-	200.0	20.00	NA	NA	NA	NA	NA	n	America
223	Chelonoidis	Chelonoidis carbonaria	UF48278	247.0	24.70	33.9	15.5	NA	214.0	NA	n	America
224	Chelonoidis	Chelonoidis carbonaria	-	296.5	29.65	NA	NA	NA	NA	NA	n	America
225	Chelonoidis	Chelonoidis carbonaria	-	290.0	29.00	NA	NA	NA	NA	NA	y	America
226	Chelonoidis	Chelonoidis carbonaria	UF33596	189.0	18.90	24.7	12.1	NA	174.0	NA	n	America
227	Chelonoidis	Chelonoidis nigra	-	745.7	74.57	NA	NA	NA	NA	NA	y	America
228	Chelonoidis	Chelonoidis chathamensis	-	890.0	89.00	NA	NA	NA	NA	NA	y	America
229	Chelonoidis	Chelonoidis denticulata	UF19242	466.0	46.60	59.7	26.5	NA	410.0	NA	n	America
230	Chelonoidis	Chelonoidis denticulata	UF23231	377.0	37.70	47.1	23.8	NA	334.0	NA	n	America
231	Chelonoidis	Chelonoidis denticulata	-	820.0	82.00	NA	NA	NA	NA	NA	n	America
232	Chelonoidis	Chelonoidis duncanensis	-	840.0	84.00	NA	NA	NA	NA	NA	y	America
233	Chelonoidis	Chelonoidis chilensis	-	222.0	22.20	NA	NA	NA	NA	NA	n	America
234	Chelonoidis	Chelonoidis chilensis	UF33600	157.0	15.70	20.8	11.9	NA	145.0	NA	n	America
235	Chelonoidis	Chelonoidis phantastica	-	860.0	86.00	NA	NA	NA	NA	NA	y	America
236	Chelonoidis	Chelonoidis vicina	-	1250.0	125.00	NA	NA	NA	NA	NA	y	America
237	Chelonoidis	Chelonoidis hoodensis	-	813.0	81.30	NA	NA	NA	NA	NA	y	America
238	Chelonoidis	Chelonoidis nigra	-	1300.0	130.00	NA	NA	NA	NA	NA	y	America
239	Chelonoidis	Chelonoidis darwini	-	965.0	96.50	NA	NA	NA	NA	NA	y	America

Table S13 – *continued from previous page*

	Genus	Taxon	Coll.-Nr.	SCL	CCL	SCW	CCW	CH	PL	PW	Insular	Continent
240	Chelonoidis	Chelonoidis chilensis	-	450.0	45.00	NA	NA	NA	NA	NA	n	America

Table S14: Fossil occurences of testudinids as provided in the FosFarBase. Contains information on locality, exact coordinates, age, genus and taxon names plus author.

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
1	Kabyle 2 km N, Yambol Region	Bulgaria	42.54720	26.48430	0.0020	Testudo	Testudo sp.	Linnaeus, 1758
2	El Harhoura 2 (Temara)	Morocco	33.95220	-6.92590	0.0050	Testudo	Testudo graeca	Linnaeus, 1758
3	El Harhoura 2 (Temara)	Morocco	33.95220	-6.92590	0.0050	Testudo	Testudo sp.	Linnaeus, 1758
4	Guenfouda Cave (Ghar Zebouj, ??????), Jerada Province	Morocco	34.43300	-2.00000	0.0060	Testudo	Testudo sp.	Linnaeus, 1758
5	Brown Sand Wedge Local Fauna, Roosevelt County, New Mexico	USA	34.00000	-103.50000	0.0060	Hesperotestudo	Hesperotestudo wilsoni	(Milstead, 1956)
6	Blackwater Loc. No. 1, Roosevelt County, New Mexico	USA	34.00000	-103.50000	0.0110	Hesperotstudo	Hesperotestudo cf. wilsoni	(Milstead, 1956)
7	Robledo Cave, west side of the Robledo Mountains, Doña Ana County, New Mexico	USA	33.00000	-106.50000	0.0110	Gopherus	Gopherus agassizi	(Cooper, 1861)
8	Domebo Local Fauna, Caddo County, Oklahoma	USA	36.00000	-100.00000	0.0110	Hesperotestudo	Hesperotestudo wilsoni	(Milstead, 1956)
9	Salt Creek, 4.7 mi S and 5.7 mi. W Orla, Reeves County, Texas	USA	31.78000	-103.99000	0.0130	Gopherus	Gopherus cf. sp.	Rafinesque, 1832
10	Schulze Cave Fauna, Edwards County, Texas	USA	30.30000	-99.90000	0.0150	Hesperotestudo	Hesperotestudo cf. wilsoni	(Milstead, 1956)
11	U-Bar Cave Late Wiskonsin, Hidalgo County, New Mexico	USA	31.60000	-108.40000	0.0175	Geochelone	Geochelone cf. sp.	Rafinesque, 1832
12	Friesenhahn Cave, Bexar County, Texas	USA	29.00000	-98.00000	0.0180	Hesperotestudo	Hesperotestudo wilsoni	(Milstead, 1956)
13	Gorham's cave IIIb, Gibraltar Peninsula	England	36.12030	-5.34190	0.0200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
14	Gruta do Caldeirão, Tomar	Portugal	39.60070	-8.41380	0.0200	Testudo	Testudo sp.	Linnaeus, 1758
15	Gruta do Escoural, Évora	Portugal	38.57000	-7.91000	0.0200	Eurotestudo	Eurotestudo cf. hermanni	(Gmelin, 1789)
16	Sims Bayou Local Fauna, Harris County, Texas	USA	29.00000	-95.00000	0.0200	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
17	Shelter Cave (LACM 1010, UTEP 30), Doña Ana County, New Mexico	USA	33.00000	-106.50000	0.0215	Gopherus	Gopherus agassizi	(Cooper, 1861)
18	Rancho La Brea, California	USA	34.05220	-118.24300	0.0240	Gopherus	Gopherus ? sp.	Rafinesque, 1832
19	Sabertooth Camel Maze, Dry Cave (UTEP 5), Eddy County, New Mexico	USA	32.00000	-104.00000	0.0255	Gopherus	Gopherus agassizi	(Cooper, 1861)
20	Sabertooth Camel Maze, Dry Cave (UTEP 5), Eddy County, New Mexico	USA	32.00000	-104.00000	0.0255	Hesperotestudo	Hesperotestudo wilsoni	(Milstead, 1956)
21	Gruta Nova da Columbeira, Bombarral	Portugal	39.30510	-9.19530	0.0275	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
22	Clear Creek Local Fauna, Denton County, Texas	USA	33.20000	-97.10000	0.0280	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
23	Lewisville Site, Denton County, Texas	USA	33.00000	-97.00000	0.0280	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
24	Moore Pit, Dallas County, Texas	USA	32.70000	-96.70000	0.0290	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
25	Gruta da Figueira Brava, Arrábida	Portugal	38.56800	-9.14800	0.0300	Eurotestudo	Eurotestudo cf. hermanni	(Gmelin, 1789)
26	U-Bar Cave Mid Wiskonsin, Hidalgo County, New Mexico	USA	31.60000	-108.40000	0.0315	Geochelone	Geochelone cf. sp.	Rafinesque, 1832
27	Gorham's cave IV, Gibraltar Peninsula	England	36.12040	-5.34200	0.0330	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
28	Room of the Vanishing Floor, Dry Cave (UTEP 26, 27), Eddy County, New Mexico	USA	32.00000	-104.00000	0.0335	Gopherus	Gopherus agassizi	(Cooper, 1861)
29	Pendejo Cave, Rough Canyon on Fort Bliss land, Otero County, New Mexico	USA	32.41670	-105.91670	0.0350	Gopherus	Gopherus agassizi	(Cooper, 1861)
30	Megenity Peccary Cave, Crawford County, Indiana	USA	38.33000	-86.55000	0.0370	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
31	Easley Ranch Local Fauna, Foard County, Texas	USA	34.00000	-99.00000	0.0550	Geochelone	Geochelone sp.	Fitzinger, 1835
32	Easley Ranch Local Fauna, Foard County, Texas	USA	34.00000	-99.00000	0.0550	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
33	Vero Beach, Indian River County, Florida	USA	27.60000	-80.40000	0.0560	Gopherus	Gopherus polyphemus	(Daudin, 1803)
34	Vero Beach, Indian River County, Florida	USA	27.60000	-80.40000	0.0560	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
35	Ingleside Local Fauna, San Patricio County, Texas	USA	27.00000	-96.00000	0.0600	Hesperotestudo	Hesperotestudo sp.	Williams, 1950

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
36	Ingleside Local Fauna, San Patricio County, Texas	USA	27.00000	-96.00000	0.0600	Gopherus	Gopherus sp.	Rafinesque, 1832
37	Zebbug and Gahr Dalam Cave deposits	Malta	35.88970	14.44250	0.0660	Testudo	Testudo graeca	Linnaeus, 1758
38	Šandalja near Pula	Croatia	44.86830	13.84800	0.0685	Testudo	Testudo graeca	Boulenger, 1891
39	Bate Cave, Rethymnon	Greece	35.36470	24.47140	0.0685	Testudo	Testudo marginata	Schoepff, 1792
40	Süttö Upper Pleistocene strata, Gerecse Mountains	Hungary	47.75000	18.45000	0.0685	Testudo	Testudo graeca	Linnaeus, 1758
41	Sternatia, Lecce	Italy	40.38330	18.18330	0.0685	Testudo	Testudo sp.	Linnaeus, 1758
42	Torre del Pagliaccetto, Rome	Italy	41.90000	12.48330	0.0685	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
43	Crevene Stijena Cave, Petrovica	Serbia	43.11280	19.33030	0.0685	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
44	Crevene Stijena Cave, Petrovica	Serbia	43.11280	19.33030	0.0685	Testudo	Testudo graeca	Linnaeus, 1758
45	Crevene Stijena Cave, Petrovica	Serbia	43.11280	19.33030	0.0685	Testudo	Testudo sp.	Linnaeus, 1758
46	Cueva del Boquete de Zafarraya, Sierra de Alhama, Málaga	Spain	36.96670	-4.13330	0.0685	Testudo	Testudo sp.	Linnaeus, 1758
47	Cueva Horá (Darro, Granada)	Spain	37.35000	-3.30000	0.0685	Eurotestudo	Eurotestudo cf. hermanni	(Gmelin, 1789)
48	Hortus Cave, Valflaunès, Herault	France	43.79980	3.87460	0.0685	Testudo	Testudo sp.	Linnaeus, 1758
49	Arredondo IIA, Alachua County, Florida	USA	29.60000	-82.40000	0.0690	Hesperotestudo	Hesperotestudo incisa	(Hay, 1916)
50	Orange Lake 2 miles south, Marion County, Florida	USA	29.40000	-82.20000	0.0690	Geochelone	Geochelone sp.	Fitzinger, 1835
51	Reddick IA+B, Marion County, Florida	USA	29.10000	-82.30000	0.0690	Gopherus	Gopherus polyphemus	(Daudin, 1803)
52	Reddick IA+B, Marion County, Florida	USA	29.10000	-82.30000	0.0690	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
53	Sabertooth Cave, Lecanto 2A, Citrus County, Florida	USA	28.80000	-82.20000	0.0690	Gopherus	Gopherus polyphemus	(Daudin, 1803)
54	Arredondo IIA, Alachua County, Florida	USA	29.60000	-82.40000	0.0690	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
55	Melbourne, Brevard County, Florida	USA	28.10000	-80.60000	0.0690	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
56	Cueva del Camino Secteur Central, Pinilla del Valle, Madrid	Spain	40.92540	-3.80630	0.0910	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
57	Cueva del Camino Secteur Nord, Pinilla del Valle, Madrid	Spain	40.92540	-3.80630	0.0920	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
58	Hopwood Farm Site, near Fillmore, Montgomery County, Illinois	USA	39.13000	-89.28000	0.1000	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
59	Peace Creek, Florida	USA	26.91730	-82.14260	0.1000	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
60	El Harhoura 1 (Temara)	Morocco	33.95000	-6.93330	0.1050	Testudo	Testudo graeca	Linnaeus, 1758
61	Cova del Rinoceront, eastern Garraf Massif, Castelldelfs	Spain	41.27360	1.96090	0.1105	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
62	Libertador San Martín north bank Ensenada stream, Entre Rios Province	Argentina	-32.08760	-60.48630	0.1200	Chelonoidis	Chelonoidis denticulata	Linnaeus 1766 (p. 325)
63	Mealhada, Coimbra	Portugal	40.37810	-8.45210	0.1200	Testudo	Testudo sp.	Linnaeus, 1758
64	Vanguard Cave, Gibraltar Peninsula	England	36.12030	-5.34190	0.1200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
65	San Vito Lo Capo K22, Sicily	Italy	38.20000	12.75000	0.1500	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
66	Pecos River near Melena and Acme, Chaves County, New Mexico	USA	33.47000	-104.53000	0.1560	Gopherus	Gopherus agassizi	(Cooper, 1861)
67	Slaughter Canyon Cave, Eddy County, New Mexico	USA	32.00000	-104.00000	0.2090	Gopherus	Gopherus agassizi	(Cooper, 1861)
68	Sima del Elefante TE18+TE19, Sierra de Atapuerca, Burgos	Spain	42.33000	-3.51000	0.2500	Testudo	Testudo sp.	Linnaeus, 1758
69	Dry Cave Fauna, Eddy County, New Mexico	USA	32.40000	-104.50000	0.2900	Gopherus	Gopherus agassizi	(Cooper, 1861)
70	Dry Cave Fauna, Eddy County, New Mexico	USA	32.40000	-104.50000	0.2900	Hesperotestudo	Hesperotestudo wilsoni	(Milstead, 1956)
71	Cragin Quarry Local Fauna, Meade County, Kansas	USA	37.22420	-100.41760	0.3000	Hesperotestudo	Hesperotestudo equicomes	(Hay, 1917)
72	Butler Spring XI Ranch (KU Locality 7), Meade County, Kansas	USA	37.00000	-100.00000	0.3000	Gopherus	Gopherus sp.	Rafinesque, 1832

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
73	Butler Spring XI Ranch (UM-K2-62), Meade County, Kansas	USA	37.00000	-100.00000	0.3000	Gopherus	Gopherus sp.	Rafinesque, 1832
74	Butler Spring XI Ranch (UM-K3-59), Meade County, Kansas	USA	37.00000	-100.00000	0.3000	Geochelone	Geochelone sp.	Fitzinger, 1835
75	Butler Spring XI Ranch (UM-K3-59), Meade County, Kansas	USA	37.00000	-100.00000	0.3000	Gopherus	Gopherus sp.	Rafinesque, 1832
76	Nye Sink Local Fauna, Beaver County, Oklahoma	USA	36.00000	-100.00000	0.3000	Gopherus	Gopherus sp.	Rafinesque, 1832
77	Qesem Cave ~12 km east of Tel Aviv, western slopes Samaria hills	Israel	32.11000	34.98000	0.3100	Testudo	Testudo graeca	Linnaeus, 1758
78	Lunel-Viel, Mas des Caves (Hérault)	France	43.68330	4.13330	0.3200	Eurotestudo	Eurotestudo aff. hermanni	(Gmelin, 1789)
79	Caprine, Rome	Italy	41.90000	12.48330	0.3550	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
80	Palombara Marcellina, Rome	Italy	41.90000	12.48330	0.3550	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
81	Tarquina, Rome	Italy	41.90000	12.48330	0.3550	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
82	Angus Local Fauna (UNSM No-101), Nuckolls County, Nebraska	USA	40.00000	-98.00000	0.4000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
83	Berends Local Biota, Beaver County, Oklahoma	USA	36.00000	-100.00000	0.4000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
84	Kanopolis Local Fauna, Ellsworth County, Kansas	USA	38.00000	-98.00000	0.4000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
85	Stazione Ferroviaria, Comiso (RG), Sicily	Italy	36.93330	14.60000	0.4130	gen.	gen. Indet.	Gray, 1825
86	Contrada Annunziata, Ragusa (RG), Sicily	Italy	36.91670	14.73330	0.4135	Testudo	Testudo sp.	Linnaeus, 1758
87	Contrada Castellazzo, Vittoria (RG), Sicily	Italy	36.95000	14.53330	0.4135	gen.	gen. Indet.	Gray, 1825
88	Marjan	Croatia	44.87360	15.27690	0.4135	Testudo	Testudo sp.	Linnaeus, 1758
89	Spinagallo Cave, Siracusa, Sicily	Italy	37.06670	15.30000	0.4135	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
90	Abime de la Fage, Correze	France	45.36670	1.88330	0.4135	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
91	Caverna de Gràcia, Güell park, Barcelona	Spain	41.40000	2.15000	0.4500	Testudo	Testudo lunellensis	Almera &Bofill, 1903
92	Caverna de Gràcia, Güell park, Barcelona	Spain	41.40000	2.15000	0.4500	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
93	Caverna de Gràcia, Güell park, Barcelona	Spain	41.40000	2.15000	0.4500	Eurotestudo	Eurotestudo pyrenaica	(Depéret & Connezan, 1890)
94	Riparo di Visogliano (TS)	Italy	45.78000	13.65000	0.4500	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
95	Kénitra, Guilloux quarry, near Rabat	Morocco	34.30000	-6.60000	0.4535	Testudo	Testudo kenitrensis	Gmira, 1993
96	Cova de Gràcia, Park Güell, Barcelona	Spain	41.41360	2.15280	0.4535	Testudo	Testudo lunellensis	Almera &Bofill, 1903
97	Raebia, Atambua area, Timor	Indonesia	-9.10000	124.90000	0.4535	Geochelone	Geochelone sp.	Fitzinger, 1835
98	Alcamo travertini (TP)	Italy	37.98330	12.96670	0.5900	gen.	gen. Indet.	Gray, 1825
99	Grotta Marasà (PA)	Italy	38.00000	13.00000	0.5900	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
100	Saint-Estève-Janson, l'Escale Cave (Bouches du Rhône)	France	43.68330	5.38330	0.6000	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
101	Arkalon Local Fauna, Seward County, Kansas	USA	37.00000	-100.00000	0.6000	Gopherus	Gopherus	Rafinesque, 1832
102	Arkalon Local Fauna, Seward County, Kansas	USA	37.00000	-100.00000	0.6000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
103	Valdemino Cave, 20-24 (Borgio Verezzi, Liguria)	Italy	44.16330	12.45230	0.7000	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
104	Gilliland local fauna, Burnett Ranch, 7 miles W of Vera, Knox County, Texas	USA	33.80000	-99.50000	0.7000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
105	Soave, Zoppega 2 cave, Verona	Italy	45.42000	11.25000	0.7400	Eurotestudo	Eurotestudo aff. hermanni	(Gmelin, 1789)
106	Valle de Fontechevade, Charente	France	45.68070	0.48000	0.8250	Testudo	Testudo graeca	Linnaeus, 1758
107	Monsummano	Italy	43.86670	10.81670	0.8250	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
108	Loreto di Venosa, Potenza	Italy	40.63330	15.80000	0.8835	Eurotestudo	Eurotestudo cf. hermanni	(Gmelin, 1789)
109	Rock-Cavities, Gibraltar Peninsula	England	36.12030	-5.34190	0.9650	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
110	Wolo Sege, Flores	Indonesia	-8.69060	121.09970	1.0200	Colossochelys	Colossochelys sp.	Falconer & Cautley, 1844
111	Cedazo local fauna, Aguascalientes, Mexico	Mexico	21.82401	-102.36874	1.0500	Gopherus	Gopherus pargensis	Mooser, 1980
112	Cueva de la Victoria-1 (CV-1), Carthagène, Murcia	Spain	37.61670	-0.86670	1.1500	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
113	Cava Dell'Erba Apricena, Foggia	Italy	41.45000	15.56670	1.1700	Eurotestudo	Eurotestudo ex. gr. hermanni	(Gmelin, 1789)
114	Cava Pirro Apricena, Foggia	Italy	41.45000	15.56670	1.1700	Eurotestudo	Eurotestudo ex. gr. hermanni	(Gmelin, 1789)
115	Sima del Elefante TE14, Sierra de Atapuerca, Burgos	Spain	42.33000	-3.51000	1.2200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
116	Sima del Elefante TE11, Sierra de Atapuerca, Burgos	Spain	42.33000	-3.51000	1.2200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
117	Sima del Elefante TE12, Sierra de Atapuerca, Burgos	Spain	42.33000	-3.51000	1.2200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
118	Sima del Elefante TE13, Sierra de Atapuerca, Burgos	Spain	42.33000	-3.51000	1.2200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
119	Sima del Elefante TE9, Sierra de Atapuerca, Burgos	Spain	42.33000	-3.51000	1.2200	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
120	Leisey Shell Pit 1A, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
121	Leisey Shell Pit 1A, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Hesperotestudo	Hesperotestudo mlynarskii	(Auffenberg, 1998)
122	Leisey Shell Pit 2, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Hesperotestudo	Hesperotestudo mlynarskii	(Auffenberg, 1998)
123	Leisey Shell Pit 1A, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Gopherus	Gopherus polyphemus	(Daudin, 1803)
124	Leisey Shell Pit 2, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
125	Leisey Shell Pit 3, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
126	Leisey Shell Pit 3A, Hillsborough County, Florida	USA	27.70000	-82.50000	1.2500	Hesperotestudo	Hesperotestudo crassiscutata	(Leidy, 1889)
127	Casimba de Jatibonica, Santa Clara Province	Cuba	21.95000	-79.17000	1.3000	Testudo	Testudo cubensis	Leidy, 1868
128	Tangi Talo, Dhozo Dhalu, Flores	Indonesia	-8.70000	121.10000	1.3000	Geochelone	Geochelone sp.	Fitzinger, 1835
129	Barranco León 5 (BL-5=Capa D), Dépression de Guadix-Baza, Grenade	Spain	37.50000	-3.00000	1.3000	Testudo	Testudo sp.	Linnaeus, 1758
130	Chapepote spring at Banos de Ciego Montero, Santa Clara Province	Cuba	22.34000	-80.40000	1.3005	Testudo	Testudo cubensis	Leidy, 1869
131	Hato Nuevo, Matanzas Province	Cuba	23.05000	-81.50000	1.3015	Testudo	Testudo cubensis	Leidy, 1870
132	Mesilla Basin Fauna C, Doña Ana County, New Mexico	USA	33.00000	-106.50000	1.3500	Gopherus	Gopherus sp.	Rafinesque, 1832
133	Mesilla Basin Fauna C, Doña Ana County, New Mexico	USA	33.00000	-106.50000	1.3500	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
134	Sierra de Quibas, Abanilla, Murcia	Spain	38.30000	-1.05000	1.3500	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
135	Gervasio 5 (FG)	Italy	41.80000	15.40000	1.4000	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
136	El Paso, eastern side of the Franklin Mountains and along the Rio Grande, Texas	USA	31.76000	-106.49000	1.4000	Gopherus	Gopherus ? sp.	Rafinesque, 1832
137	Tijeras Arroyo, Bernalillo County, New Mexico	USA	35.01670	-106.61670	1.4000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
138	Pirro Nord (Cava dell'Erba, Cava Pirro); Apricena, Apulia Italy	Italy	41.80190	15.38470	1.5000	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
139	La Union, Doña Ana County, New Mexico	USA	32.00000	-106.70000	1.7000	Gopherus	Gopherus cf. sp.	Rafinesque, 1832
140	La Union, Doña Ana County, New Mexico	USA	32.00000	-106.70000	1.7000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
141	Pearson Mesa near Virden, Hidalgo County, New Mexico	USA	31.50000	-108.50000	1.7000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
142	Lakonia	Greece	36.90000	22.60000	1.7200	Testudo	Testudo marginata	Schoepff, 1792
143	Dmanisi	Georgia	41.32000	44.35000	1.7700	Testudo	Testudo graeca	Linnaeus, 1758
144	Figline, Upper Valdarno	Italy	43.61670	11.46670	1.8000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
145	Il Tasso, S. Giovanni (AR), Upper Valdarno	Italy	43.00000	11.00000	1.8000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
146	Le Mignaie, Upper Valdarno	Italy	43.00000	11.00000	1.8000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
147	Le Ville, Upper Valdarno	Italy	43.48330	12.08330	1.8000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
148	L'Inferno, Upper Valdarno	Italy	43.00000	11.00000	1.8000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
149	Montecarlo, Upper Valdarno	Italy	42.86670	10.68330	1.8000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
150	Kisláng, Fejer	Hungary	47.00000	18.40000	1.9000	Testudo	Testudo sp.	Linnaeus, 1758
151	Montoussé 5, Hautes Pyrenees	France	43.06670	0.41670	1.9500	Eurotestudo	Eurotestudo cf. hermanni	(Gmelin, 1789)
152	Monte Tuttavista VII mustelide, Sardinia	Italy	40.38330	9.70000	2.0000	Eurotestudo	Eurotestudo cf. hermanni	(Gmelin, 1789)
153	White Rock local fauna, Republic County, Kansas	USA	39.90000	-97.70000	2.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
154	Lesbos Island, F-Site	Greece	39.50000	26.50000	2.0000	Titanochelon	Titanochelon aff. schafferi	(Szalai, 1931)
155	Big Springs Gravel Pit (UNSM Ap-103), Antelope County, Nebraska	USA	42.40000	-98.20000	2.0000	Hesperotestudo	Hesperotestudo oelrichi	Holman, 1972
156	Caballo Local Fauna, Palomas Basin, Sierra County, New Mexico	USA	32.97000	-107.31000	2.0000	Gopherus	Gopherus sp.	Rafinesque, 1832
157	Caballo Local Fauna, Palomas Basin, Sierra County, New Mexico	USA	32.97000	-107.31000	2.0000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
158	Capo Mannu near San Vero Milis, base of D4 dune, Sardinia	Italy	40.04090	8.38450	2.1970	Testudo	Testudo pecorinii	Delfino, 2008 (p.123-126, figs.5-6)
159	Kelatchay (Dushak)	Turkmenistan	37.80000	58.50000	2.2000	Agrionemys	Agrionemys horsfieldii	(Gray, 1844)
160	Varshets 6 km NNE, Michajlovrad Province	Bulgaria	43.21670	23.28330	2.2500	Testudo	Testudo sp.	Linnaeus, 1758
161	MacAsphalt Shell Pit, Sarasota County, Florida	USA	27.40000	-82.50000	2.2500	Geochelone	Geochelone sp.	Fitzinger, 1835
162	St. Petersburg Times Site, Pinellas County, Florida	USA	27.80000	-82.70000	2.2500	Geochelone	Geochelone sp.	Fitzinger, 1835
163	Ahl al Oughlam (near Casablanca)	Morocco	33.59310	-7.61640	2.5000	Testudo	Testudo aff. kenitrensis	Gmira, 1993
164	Ahl al Oughlam (near Casablanca)	Morocco	33.59310	-7.61640	2.5000	Testudo	Testudo sp.	Linnaeus, 1758
165	Ahl al Oughlam (near Casablanca)	Morocco	33.59310	-7.61640	2.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
166	Cova de Ca Na Reia, Eivissa, Ibiza	Spain	38.90910	1.42670	2.6000	Titanochelon	Titanochelon cf. gymneisucs	(Bate, 1914)
167	Es Pujol d'es Fum, Formentera	Spain	38.72350	1.45520	2.6000	Titanochelon	Titanochelon cf. gymnesicus	(Bate, 1914)
168	Kryshanovka 1	Ukraine	46.56000	30.79170	2.6000	Testudo	Testudo sp.	Linnaeus, 1758
169	Milia, Grevena, W Macedonia	Greece	40.17910	21.47560	2.6000	Testudo	Testudo brevitesta	Vlachos & Tsoukala, 2016
170	Milia, Grevena, W Macedonia	Greece	40.17910	21.47560	2.6000	Titanochelon	Titanochelon sp.	Pérez-Garcia & Vlachos, 2014
171	North Cita Canyon (Middle Stratum), Randall County, Texas	USA	34.90000	-101.60000	2.7000	Gopherus	Gopherus canyonensis	(Johnston, 1937)
172	Novaya Etulia 2	Moldova	45.52000	28.44000	2.8000	Testudo	Testudo cernovi	Khozatskiy, 1948
173	Palomas Creek Fauna, Palomas Basin, Sierra County, New Mexico	USA	33.05000	-107.30000	2.8000	Gopherus	Gopherus sp.	Rafinesque, 1832
174	Tha Chang area, Chaloem Pra Kiat district, Nakhon Ratchasima Province	Thailand	14.98740	102.33520	3.0000	Aldabrachelys	Aldabrachelys ? sp.	Loveridge & Williams, 1975
175	Sand Draw local fauna, Brown County, Nebraska	USA	42.70000	-100.00000	3.0000	Hesperotestudo	Hesperotestudo oelrichi	Holman, 1972
176	Sawrock Canyon local fauna, Seward County, Kansas	USA	37.00000	-100.00000	3.0000	Hesperotestudo	Hesperotestudo riggsi	(Hibbard, 1944)
177	Sand Draw local fauna, Brown County, Nebraska	USA	42.70000	-100.00000	3.0000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
178	Sand Draw local fauna, Brown County, Nebraska	USA	42.70000	-100.00000	3.0000	Caudochelys	Caudochelys sp.	Auffenberg, 1963
179	UCMP V6327, La Porteria, Kettleman Hills, Kings County, California	USA	35.90000	-119.90000	3.1000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
180	Cuchillo Negro Creek Local Fauna, Engle Basin, Sierra County, New Mexico	USA	33.19500	-107.25700	3.1000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
181	Elephant Butte Lake Fauna, Engle Basin, Sierra County, New Mexico	USA	33.20000	-107.20000	3.1000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
182	Las Higueruelas, Alcolea de Calatrava, Ciudad Real	Spain	38.98830	-4.08570	3.2000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
183	Las Higueruelas, Alcolea de Calatrava, Ciudad Real	Spain	38.98830	-4.08570	3.2000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
184	Las Tunas, Baja California Sur	Mexico	23.18330	-109.18330	3.2500	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
185	Laetoli	Tanzania	-2.99620	35.35240	3.2550	Geochelone	Geochelone laetoliensis	Meylan & Auffenberg, 1987
186	Laetoli	Tanzania	-2.99620	35.35240	3.2550	Stigmochelys	Stigmochelys brachygularis	(Meylan & Auffenberg, 1987)
187	Dikika (DIK-1)	Ethiopia	11.10000	40.60000	3.3300	Centrochelys	Centrochelys sp.	Gray, 1872
188	Cita Canyon, UCMP V-3721, Harrell Ranch, Randall County, Texas	USA	34.90000	-101.60000	3.3500	Hesperotestudo	Hesperotestudo johnstoni	Auffenberg, 1962
189	Cita Canyon, UCMP V-3721, Harrell Ranch, Randall County, Texas	USA	34.90000	-101.60000	3.3500	Gopherus	Gopherus canyonensis	(Johnston, 1937)
190	Liventsovka horizon 5, near Rostov-on-Don	Russia	47.24000	39.71000	3.7000	Testudo	Testudo sp.	Linnaeus, 1758
191	Serrat-d'en-Vacquer near Perpignan, Pyrénées-Orientales	France	42.88000	2.88000	3.9000	Titanochelon	Titanochelon perpiniana	(Depéret, 1885)
192	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Greece	40.50170	22.81770	3.9000	Testudo	Testudo cf. graeca	Linnaeus, 1758
193	Megalo Emvolon 1 (MEV), 20 km SW Thessaloniki	Greece	40.50170	22.81770	3.9000	Testudo	Testudo sp.	Linnaeus, 1758
194	W??e 1	Poland	52.35000	22.15000	3.9000	Testudo	Testudo sp.	Linnaeus, 1758
195	W??e 1	Poland	52.35000	22.15000	3.9000	Eurotestudo	Eurotestudo globosa	(Portis, 1890)
196	W??e 1	Poland	52.35000	22.15000	3.9000	Eurotestudo	Eurotestudo hermanni	(Gmelin, 1789)
197	Perpignan et sa région, Pyrénées-Orientales	France	42.68330	2.88330	3.9000	Eurotestudo	Eurotestudo pyrenaica	(Depéret & Donnezan, 1890)
198	Perpignan et sa région, Pyrénées-Orientales	France	42.68330	2.88330	3.9000	Titanochelon	Titanochelon perpiniana	(Depéret, 1885)
199	Serrat-d'en-Vacquer near Perpignan, Pyrénées-Orientales	France	42.88000	2.88000	3.9000	Eurotestudo	Eurotestudo pyrenaica	(Depéret & Donnezan, 1890)
200	Musaid right bank of Big Salcha River, Vulkaneshty Region	Moldova	45.82060	28.50500	3.9000	Testudo	Testudo sp.	Linnaeus, 1758
201	Novo-Savitzkaya	Moldova	46.80610	29.86860	3.9000	Testudo	Testudo cernovi	Khozatskiy, 1948
202	Ptolemais 6A = Notio 1 (NO 1)	Greece	40.50000	21.75000	3.9400	gen.	gen. indet.	Gray, 1825
203	Ptolemais 6B = Notio 1	Greece	40.50000	21.75000	3.9400	gen.	gen. indet.	Gray, 1825
204	Ptolemais 6C = Notio 1 (NO 1)	Greece	40.50000	21.75000	3.9400	gen.	gen. indet.	Gray, 1825
205	Epanomi (EPN I), western Chalkidiki Peninsula, Thessaloniki area	Greece	40.40460	22.89800	3.9500	Titanochelon	Titanochelon bacharidisi	(Vlachos, Tsoukala & Corsini, 2014)
206	Epanomi (EPN II), western Chalkidiki Peninsula, Thessaloniki area	Greece	40.40460	22.89800	3.9500	Titanochelon	Titanochelon bacharidisi	(Vlachos, Tsoukala & Corsini, 2014)
207	Altan-Teli main fossiliferous bed (Dzereg valley)	Mongolia	47.10000	93.16670	3.9500	Ergilemys	Ergilemys oskarkuhni	M?ynarski(, 1968)
208	Nea Kallikratia, western Chalkidiki Peninsula, Thessaloniki area	Greece	40.31460	23.04620	3.9500	Titanochelon	Titanochelon bacharidisi	(Vlachos, Tsoukala & Corsini, 2014)
209	Nea Michaniona, western Chalkidiki Peninsula, Thessaloniki area	Greece	40.47310	22.83850	3.9500	Titanochelon	Titanochelon bacharidisi	(Vlachos, Tsoukala & Corsini, 2014)
210	Farola Monte Hermoso, 12 km SW Pehuen Có Beach, Buenos Aires Province	Argentina	-39.00830	-61.50280	3.9650	Testudo	Chelonoidis australis	Linnaeus, 1758 (p. 198)
211	Çalta	Turkey	40.25000	32.55000	4.0000	Testudo	Testudo sp.	Linnaeus, 1758
212	El Arquillo 3 (ARQ3)	Spain	40.40000	-1.10000	4.0300	Geochelone	Geochelone sp.	Fitzinger, 1835
213	Kanapoi	Kenya	3.54000	35.87000	4.0700	Geochelone	Geochelone crassa	(Andrews, 1914)
214	Kanapoi	Kenya	3.54000	35.87000	4.0700	Geochelone	Geochelone cf. sp.	Fitzinger, 1835
215	Kanapoi	Kenya	3.54000	35.87000	4.0700	Stigmochelys	Stigmochelys sp.	Gray, 1873
216	Aramis, ARA-VP-6/500, Middle Awash Valley	Ethiopia	9.00000	40.16670	4.4000	Geochelone	Geochelone sp.	Fitzinger, 1835
217	Cala Es Pous near Ciutadella, Minorca	Spain	40.05000	3.82600	4.4500	Titanochelon	Titanochelon gymneisucs	(Bate, 1914)
218	Punta Nati near Ciutadella, Minorca	Spain	40.05060	3.82570	4.4500	Titanochelon	Titanochelon gymnesicus	(Bate, 1914)
219	Jambol, Tenovo or General Insovo sandstone quarries	Bulgaria	42.48000	26.51000	4.4500	Geochelone	Geochelone sp.	Fitzinger, 1835
220	Montpellier, Hérault	France	42.60840	3.87930	4.4500	Testudo	Testudo sp.	Linnaeus, 1758

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
221	Novopetrovka	Ukraine	47.04170	29.86500	4.4500	Testudo	Testudo sp.	Linnaeus, 1758
222	Lee Creek Mine, Yorktown Sample, Beaufort County, North Carolina	USA	35.40000	-76.80000	4.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
223	Rexroad local fauna (Fox Canyon locality 3), Meade County, Kansas	USA	37.20000	-100.30000	4.5500	Caudochelys	Caudochelys rexroadensis	(Oelrich, 1952)
224	Rexroad local fauna (Fox Canyon locality 3), Meade County, Kansas	USA	37.20000	-100.30000	4.5500	Hesperotestudo	Hesperotestudo riggsi	(Hibbard, 1944)
225	Tchelopetchene 1 (sand facies)	Bulgaria	42.73330	23.48330	4.6500	Testudo	Testudo sp.	Linnaus, 1758
226	Nikolskoe	Moldova	46.87550	29.86140	4.7500	Testudo	Testudo sp.	Linnaeus, 1758
227	Yepómera, Chihuahua	Mexico	28.80000	-108.00000	4.7500	Gopherus	Gopherus cf. sp.	Rafinesque, 1832
228	Santee, Knox County, Nebraska	USA	42.00000	-97.00000	5.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
229	Devil's Nest Airstrip, Knox County, Nebraska	USA	42.00000	-97.00000	5.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
230	Devil's Nest Airstrip, Knox County, Nebraska	USA	42.00000	-97.00000	5.0000	Hesperotestudo	Hesperotestudo aff. sp.	Williams, 1950
231	Santee, Knox County, Nebraska	USA	42.00000	-97.00000	5.0000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
232	Devil's Nest Airstrip, Knox County, Nebraska	USA	42.00000	-97.00000	5.0000	Caudochelys	Caudochelys aff. rexroadensis	(Oelrich, 1952)
233	Kuchurgan	Ukraine	46.75000	29.98330	5.0500	Testudo	Testudo cernovi	Khozatskiy, 1948
234	Kuchurgan	Ukraine	46.75000	29.98330	5.0500	Titanochelon	Titanochelon ex. gr. perpiniana	(Depéret, 1885)
235	Osztramos 1C	Hungary	48.52500	20.75830	5.1650	Testudo	Testudo ? sp.	Linnaeus, 1758
236	Polenzo section along Tanaro River, Verduno, Piedmont Italy	Italy	44.68580	7.93140	5.4400	Testudo	Testudo sp.	Linnaeus, 1758
237	UCMP V71137, Turlock Lake 10, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
238	UCMP V81248, Turlock Lake 11, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
239	Allatini, eastern part of Thessaloniki, western Chalkidiki peninsula	Greece	40.58990	22.97160	5.5000	Testudo	Testudo graeca	Linnaeus, 1758
240	Pylea, eastern part of Thessaloniki, western Chalkidiki peninsula	Greece	40.59940	22.98760	5.5000	Testudo	Testudo graeca	Linnaeus, 1758
241	As Sahabi	Libya	30.16670	20.83330	5.5000	Centrochelys	Centrochelys aff. sulcata	(Miller, 1779)
242	UCMP V65711, Turlock Lake General, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
243	UCMP V6878, Turlock Lake, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
244	UCMP V71138, Dallas-Warner Reservoir 1, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
245	UCMP V90007, Turlock Lake 13, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
246	UCMP V90008, Turlock Lake 14, Stanislaus County, California	USA	37.60000	-120.60000	5.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
247	Withlacoochee River Site 4A, Marion County, Florida	USA	28.80000	-82.30000	5.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
248	Chiquimil, Catamarca	Argentina	-28.00000	-66.00000	5.5000	Geochelone	Chelonoidis gallardoi	Rovereto, 1914 (p. 115)
249	Brisghella Cava Monticino	Italy	44.21670	11.76670	5.6650	Testudo	Testudo sp.	Linnaeus, 1758
250	Polgárdi 2	Hungary	47.05000	18.30000	5.7500	Testudo	Testudo sp.	Linnaeus, 1758
251	Venta del Moro (Cabriel Basin)	Spain	39.48330	-1.35000	5.8000	gen.	gen. indet.	Gray, 1825
252	Torrente Melacce, Cinigiano (GR)	Italy	42.88330	11.40000	5.8150	Testudo	Testudo sp.	Linnaeus, 1758
253	Gretoni, Stazione Monte Amiata (SI)	Italy	42.96670	11.55000	5.8150	Testudo	Testudo sp.	Linnaeus, 1758
254	Shkodova Gora	Ukraine	46.46670	30.73330	6.0250	Testudo	Testudo sp.	Linnaeus, 1758
255	Santa-Vittoria d'Alba	Italy	44.70000	7.93330	6.1650	Testudo	Testudo sp.	Linnaeus, 1758
256	Stanianzi	Bulgaria	43.06250	22.92260	6.1650	Testudo	Testudo sp.	Linnaeus, 1758
257	Samos 1	Greece	37.80000	26.90000	6.2500	Titanochelon	Titanochelon schafferi	(Szalai, 1931)

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
258	Tudorovo	Moldova	46.43500	30.04250	6.3000	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
259	Kuyalnik	Ukraine	46.56000	30.74000	6.3000	Testudo	Testudo sp.	Linnaeus, 1758
260	Lukeino	Kenya	0.80000	35.90000	6.3000	gen.	gen. indet.	Gray, 1825
261	Autovía A-30, Murcia	Spain	37.99100	-1.14570	6.3000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
262	Casa Castillo near Jumilla, Murcia	Spain	38.46470	-1.42310	6.3000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
263	Megalo Rema near Paleomilos	Greece	38.45000	22.02000	6.5000	Testudo	Testudo marmorum	Gaudry, 1862
264	Lothagam 1	Kenya	2.88300	36.06600	6.5000	Geochelone	Geochelone cf. sp.	Fitzinger, 1835
265	Lothagam 2	Kenya	2.88300	36.06600	6.5000	Geochelone	Geochelone cf. sp.	Fitzinger, 1835
266	Barranco del Cigarrón (B-Cg1), S El Palmar, Murcia	Spain	37.91510	-1.17080	6.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
267	Hamra	United Arabian Emirates	23.10000	52.52500	7.0000	Centrochelys	Centrochelys aff. sulcata	(Miller, 1779)
268	Jebel Dhannah	United Arabian Emirates	24.15000	52.60000	7.0000	Centrochelys	Centrochelys aff. sulcata	(Miller, 1779)
269	Kihal	United Arabian Emirates	24.12000	52.85000	7.0000	Centrochelys	Centrochelys aff. sulcata	(Miller, 1779)
270	Shuwaihat	United Arabian Emirates	24.10000	52.44000	7.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
271	Azmaka quarry 2.5 km NNE Chirpan	Bulgaria	42.23710	25.33580	7.0000	Testudo	Testudo marmorum	Gaudry, 1862
272	Toros-Menalla, Djurab desert (TM 266)	Chad	16.25000	17.48750	7.0400	gen.	gen. indet.	Gray, 1826
273	Chimishlia	Moldova	46.52000	28.78420	7.0400	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
274	Taraklia	Moldova	46.22000	28.22670	7.0400	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
275	Tardosbánya 3	Hungary	47.66670	18.45000	7.2500	Testudo	Testudo sp.	Linnaeus, 1758
276	Morskaya 2 locality of the Sea of Azov region	Russia	47.28330	39.10000	7.2500	gen.	gen. Indet.	Gray, 1825
277	Novoelizavetovka	Ukraine	47.15000	30.40550	7.3300	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
278	Fosso della Fittaia 2013, Baccinello-Cinigiano Basin, Tuscany	Italy	42.68330	11.33330	7.3500	Testudo	Testudo sp.	Linnaeus, 1758
279	Chobruchi	Moldova	46.60030	29.70830	7.3650	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
280	Cliffs in the Paraná eastern riverside near Paraná, Entre Ríos	Argentina	-31.70000	-60.40000	7.5000	gen.	-	Gray, 1825 (p. 210)
281	Montagne du Lubéron à Cucuron, Vaucluse et Alpes-de-Haute-Provence	France	43.79500	5.45000	7.5000	Testudo	Testudo sp.	Linnaeus, 1758
282	Montagne du Lubéron à Cucuron, Vaucluse et Alpes-de-Haute-Provence	France	43.79500	5.45000	7.5000	Titanochelon	Titanochelon leberonensis	(Depéret, 1890)
283	Kalimantsi 2-4	Bulgaria	41.45750	23.47390	7.6000	Testudo	Testudo cf. antiqua	Bronn, 1831
284	Kalimantsi 2-4	Bulgaria	41.45750	23.47390	7.6000	Testudo	Testudo sp.	Linnaeus, 1758
285	Buis Ranch Local Fauna, Beaver County, Oklahoma	USA	36.80000	-100.50000	7.6000	Hesperotestudo	Hesperotestudo riggsi	(Hibbard, 1944)
286	Salinas Grandes de Hidalgo, Atreucó, La Pampa	Argentina	-37.20000	-63.60000	7.9000	Chelonoidis		Fitzinger, 1835
287	Bajo Giuliani, La Pampa	Argentina	-36.68100	-64.37500	7.9000	Chelonoidis	Chelonoidis sp.	Fitzinger, 1835 (p. 112)
288	Quehué, La Pampa	Argentina	-37.12640	-64.50890	7.9000	Chelonoidis		Fitzinger, 1835
289	Belka	Ukraine	46.89400	30.42000	7.9000	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
290	Rooilepel D. laini level	Namibia	-27.00000	15.50000	8.0000	Namibchersus	Namibchersus sp.	Lapparent de Broin, 2003
291	Aubignas 1+2, Ardèche	France	44.58330	4.61670	8.0250	Testudo	Testudo amberiacensis	Deperet, 1894
292	Yurievka	Ukraine	46.94560	36.27500	8.0750	gen.	gen. indet.	Gray, 1825
293	Novoukrainka 1 (= Budenovka)	Ukraine	46.81500	30.28300	8.1500	Protestudo	Protestudo bessarabica	(Riabinin, 1918)
294	Grebeniki 1	Ukraine	46.89200	29.82500	8.1500	Protestudo	Protestudo bessarabica	(Riabinin, 1918)

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
295	Csákvár, Esterh?y Cave, Fejér Province	Hungary	47.40000	18.45000	8.2000	Protestudo	Protestudo csakvarensis	(Szalai, 1934)
296	Prottes	Austria	48.38960	16.74540	8.3000	Hadrianus	Hadrianus sp.	Cope, 1872
297	Prottes	Austria	48.38960	16.74540	8.3000	Testudo	Testudo cf. promarginata	Reinach, 1900
298	Prottes	Austria	48.38960	16.74540	8.3000	Testudo	Testudo sp.	Linnaeus, 1758
299	Crevillente 2	Spain	38.27000	-0.80000	8.3000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
300	Crevillente 2	Spain	38.27000	-0.80000	8.3000	Testudo	Testudo catalaunica	(Bataller, 1926)
301	Prottes	Austria	48.38960	16.74540	8.3000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
302	Crevillente 2	Spain	38.27000	-0.80000	8.3000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
303	Dorn-Dürkheim, Giloth Quarry, about 25 km S Mainz	Germany	49.76860	8.26970	8.3000	Testudo	Testudo sp.	Linnaeus, 1758
304	Altan-Teli Oshi horizon (Dzereg valley)	Mongolia	47.10000	93.16670	8.3150	Ergilemys	Ergilemys devjaktini	(Khozatskiy & Narmandakh, 1975)
305	Kainary	Moldova	46.67890	29.04610	8.4000	Protestudo	Protestudo sp.	(Chkhikvadze, 1970)
306	San Nicolas, UCMP locality V4536	Colombia	3.20000	-75.20000	8.5000	Geochelone	Geochelone hesterna	Auffenberg, 1971
307	Cava Monticino, near Brisigella, Emilia-Romana	Italy	44.21670	11.76670	8.5000	Testudo	Testudo sp.	Linnaeus, 1758
308	Ambérieu-en-Bugey, Ain	France	45.95000	5.35000	8.5000	Testudo	Testudo amberiacensis	Deperet, 1894
309	Saint-Bauzile, Ardèche	France	44.68050	4.68710	8.5000	Testudo	Testudo sp.	Linnaeus, 1758
310	Dove Spring Fauna, Mojave Desert, Kern County, California	USA	35.30000	-118.50000	8.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
311	Dove Spring Fauna, Mojave Desert, Kern County, California	USA	35.30000	-118.50000	8.5000	Gopherus	Gopherus ? sp.	Rafinesque, 1832
312	Kohfidisch	Austria	47.16670	16.35000	8.7500	gen.	-	Gray, 1825
313	Kohfidisch	Austria	47.16670	16.35000	8.7500	Testudo	Testudo burgenlandica	Bachmayer & Mlynarski, 1983
314	Kohfidisch	Austria	47.16670	16.35000	8.7500	Protestudo	Protestudo csakvarensis	Szalai, 1934)
315	El Hatillo, 1.5 km north of, Falcón State	Venezuela	11.22000	-70.23000	8.8000	gen.	gen. indet.	Gray, 1825
316	Montredon, Aude	France	43.23600	2.38820	8.9500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
317	Udabno	Georgia	41.49220	45.38670	8.9500	Centrochelys	Centrochelys sp.	Gray, 1872
318	Krivoj Rog	Ukraine	47.91670	33.35000	8.9500	Testudo	Testudo ? sp.	Linnaeus, 1758
319	Love Bone Bed along State Road 241 near Archer, Alachua County, Florida	USA	29.60000	-82.50000	9.2500	Geochelone	Geochelone sp.	Fitzinger, 1835
320	Patos (= Acre 6, LACM Locality 4611), Assisbrasil County, Acre	Brazil	-10.90000	-69.90000	9.4300	Chelonoidis	Chelonoidis sp.	Fitzinger, 1835
321	UCMP V-3952, Ingram Creek site 8, Stanislaus County, California	USA	37.60000	-120.80000	9.5000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
322	Kamenica nad Hronom	Slovakia	47.83150	18.72380	9.5000	Testudo	Testudo aff. sp.	Linnaeus, 1758
323	Poc?e?ti right side Ikel River valley	Moldova	47.24500	28.67960	9.5000	Protestudo	Protestudo sp.	Chkhikvadze, 1970
324	Cerro de los Batallones, Madrid	Spain	40.17940	-3.72460	9.5000	Paleotestudo	Paleotestudo sp.	Lapparent de Broin, 2000
325	Cerro de los Batallones, Madrid	Spain	40.17940	-3.72460	9.5000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
326	Varnitza	Moldova	46.86410	29.46920	9.6000	Protestudo	Protestudo moldavica	Chkhikvadze & Lungu, 1979
327	Borský Svätý Jur	Slovakia	48.24000	17.20000	9.6500	Protestudo	Protestudo csakvarensis	(Szalai, 1934)
328	Bushor 1	Moldova	46.92250	28.26830	9.7000	Protestudo	Protestudo csakvarensis	(Szalai, 1934)
329	Kalfa	Moldova	46.90420	29.37530	9.7000	Protestudo	Protestudo csakvarensis	(Szalai, 1934)
330	Lapushna	Moldova	46.88420	28.41190	9.8000	Testudo	Testudo sp.	Linnaeus, 1758
331	Götzendorf	Austria	48.01670	16.58330	9.8600	Testudo	Testudo sp.	Linnaeus, 1758

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
332	Jebel Semama	Tunisia	35.33330	8.83330	10.0000	Testudo	Testudo semenensis	Bergounioux, 1945-1955
333	Sabadell	Spain	41.55000	2.10000	10.0000	Paleotestudo	Paleotestudo ? antiqua	(Bronn, 1831)
334	Saint-Fons, Rhône	France	45.70910	4.85320	10.0000	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
335	WaKeeney Local Fauna (UM-K6-59 on the Lowell Hillman Ranch), Trego County, Kansas	USA	39.10000	-99.80000	10.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
336	WaKeeney Local Fauna (UM-K6-59 on the Lowell Hillman Ranch), Trego County, Kansas	USA	39.10000	-99.80000	10.0000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
337	Ricardo Fauna, Mojave Desert, Kern County, California	USA	35.30000	-118.50000	10.1000	Geochelone	Geochelone sp.	Fitzinger, 1835
338	Ricardo Fauna, Mojave Desert, Kern County, California	USA	35.30000	-118.50000	10.1000	Gopherus	Gopherus ? sp.	Rafinesque, 1832
339	Rudabanya (grey green marl 5C)	Hungary	48.38330	20.63330	10.1000	Testudo	Testudo sp.	Linnaeus, 1758
340	Rudabánya, Borsod-Abaúj-Zemplén Province (all)	Hungary	48.38330	20.63330	10.1000	Testudo	Testudo sp.	Linnaeus, 1758
341	El Lugarejo (Arévalo), Ávilla, Castilla	Spain	41.05600	-4.71690	10.2500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
342	Autovía A6, Arévola, Ávila	Spain	41.05270	-4.70010	10.2500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
343	Tataru?-Brusturi	Romania	47.15000	22.25000	10.2500	Testudo	Testudo sp.	Linnaeus, 1758
344	Arevalillo River (Arévola), Ávila	Spain	40.59350	-5.37790	10.2500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
345	Arévalo, Ávila, Castilla	Spain	41.06670	-4.72500	10.2500	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1917)
346	Höwenegg	Germany	47.90000	8.75000	10.3000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1953
347	Höwenegg	Germany	47.90000	8.75000	10.3000	Testudo	Testudo sp.	Linnaeus, 1758
348	Autovía Orbital de Barcelona B-40 (B40OV/S4K), Vallés-Penedés basin, Cataluña	Spain	41.53310	1.94260	10.3000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
349	Autovía Orbital de Barcelona B-40 (B40OV/S4K), Vallés-Penedés basin, Cataluña	Spain	41.53310	1.94260	10.3000	Testudo	Testudo sp.	Linnaeus, 1758
350	Can Filuà, Santa Perpétua, Vallès Occidental, Barcelona	Spain	41.53330	2.18190	10.3000	Cheirogaster	Cheirogaster richardi	(Bergounioux, 1938)
351	Can Gavarra, Polinyá, Vallès Occidental, Barcelona	Spain	41.55710	2.15780	10.3000	Cheirogaster	Cheirogaster richardi	(Bergounioux, 1938)
352	Can Vinyalets, Barcelona	Spain	41.53320	2.18190	10.3000	Cheirogaster	Cheirogaster richardi	(Bergounioux, 1938)
353	Djebel Krechem el Artsouma	Tunisia	35.50000	9.00000	10.3050	Geochelone	Geochelone sp.	Fitzinger, 1835
354	Vösendorf-Brunn, near Wien	Austria	48.20000	16.36000	10.3500	Testudo	Testudo sp.	Linnaeus, 1758
355	Hostalets de Piérola, Barcelone province, Cataluña, Vallés-Penedés basin	Spain	41.53490	1.76850	10.4000	Cheirogaster	Cheirogaster richardi	(Bergounioux, 1938)
356	Valles de Fuentidueña, Segovia Province	Spain	41.41670	-4.00000	10.4000	Cheirogaster	Cheirgaster sp.	Bergounioux, 1935
357	Valles de Fuentidueña, Segovia Province	Spain	41.41670	-4.00000	10.4000	Testudo	Testudo aff. catalaunica	(Bataller, 1926)
358	Valles de Fuentidueña, Segovia Province	Spain	41.41670	-4.00000	10.4000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
359	Benavente, Zamora	Spain	42.00340	-5.67840	10.5500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
360	Estació Depuradora d'Aigües Residuals Sabadell Riu-Ripoll, Cataluña	Spain	41.55000	2.10000	10.5500	Cheirogaster	Cheirogaster richardi	(Bergounioux, 1938)
361	Hostalets de Piérola Superior, Barcelone province, Cataluña, Vallés-Penedés basin	Spain	41.53490	1.76850	10.5500	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
362	Küçükçekmece	Turkey	40.98330	28.76670	10.6500	Testudo	Testudo cf. sp.	Linnaeus, 1758
363	Ecoparc de Can Mata (els Hostalets de Pierola), Vallés-Penedés basin, Cataluña	Spain	41.53280	1.80320	10.7000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
364	Holzmannsdorfberg bei St. Marein	Austria	47.01670	15.66670	10.7500	Testudo	Testudo sp.	Linnaeus, 1758
365	McGehee Farm near Newberry, Alachua County, Florida	USA	29.70000	-82.60000	10.9500	Hesperotestudo	Hesperotestudo alleni	(Auffenbgerg, 1996)
366	Karingarab D. wardi level	Namibia	-27.00000	15.50000	11.0000	Namibchersus	Namibchersus sp.	Lapparent de Broin, 2003
367	Rooilepel D. wardi level	Namibia	-27.00000	15.50000	11.0000	Namibchersus	Namibchersus sp.	Lapparent de Broin, 2003
368	Hammerschmiede 3	Germany	47.92730	10.59150	11.1000	Testudo	Testudo sp.	Linnaeus, 1758

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
369	Atzelsdorf, 35 km NE Vienna, Lower Austria	Austria	48.51030	16.54420	11.1500	Testudo	Testudo cf. burgenlandica	Bachmayer & Mlynarski (1983)
370	Hammerschmiede 1	Germany	47.92730	10.59150	11.1800	Testudo	Testudo sp.	Linnaeus, 1758
371	Petersbuch 14	Germany	48.97790	11.19090	11.3000	gen.	gen. indet	Gray, 1825
372	Sant Quirze de Terrassa/de Galliners (del Vallès), Barcelona	Spain	41.38330	2.18330	11.3000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
373	Wessington Springs local fauna, Jerauld County, South Dakota	USA	44.10000	-98.60000	11.5000	gen.	gen. indet.	Gray. 1825
374	Gritsev (Khmelnitsk area, Shepetovski district)	Ukraine	49.97500	27.16000	11.5270	Protestudo	Protestudo sp.	Chkhikvadze, 1970
375	Hammerschmiede 5 (HAM 5)	Germany	47.92730	10.59150	11.6200	Testudo	Testudo sp.	Linnaeus, 1758
376	Nombrevilla 2. NOM 2	Spain	41.07000	-1.21000	11.6900	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
377	Iron Canyon Fauna, Mojave Desert, Kern County, California	USA	35.30000	-118.50000	11.8500	Gopherus	Gopherus ? sp.	Rafinesque, 1832
378	Can Mata (els Hostalets de Pierola), Vallés-Penedés basin, Cataluña	Spain	41.51920	1.72830	11.9000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
379	North of Gypsum Plate Pan D. wardi level	Namibia	-27.00000	15.50000	12.0000	Namibchersus	Namibchersus sp.	Lapparent de Broin, 2003
380	Gratkorn, clay pit St. Stefan, Styria	Austria	47.13720	15.34890	12.1000	Testudo	Testudo kalksburgensis	Toula, 1896
381	Gratkorn, clay pit St. Stefan, Styria	Austria	47.13720	15.34890	12.1000	Testudo	Testudo cf. steinheimensis	Staesche, 1931
382	Toril 3A. TOR 3A, near Daroca, Zaragoza province	Spain	41.13330	-1.38330	12.1300	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
383	Toril 3B. TOR 3B, near Daroca, Zaragoza province	Spain	41.13330	-1.38330	12.1400	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
384	Sofca (125) - F 434	Turkey	39.16670	30.18330	12.1500	gen.	gen. indet.	Gray, 1825
385	La Ciesma 1, Aragón	Spain	41.86000	-1.80000	12.2000	gen.	gen. indet.	Gray, 1825
386	La Ciesma 1, Aragón	Spain	41.86000	-1.80000	12.2000	Titanochelon	Titanochelon cf. bolivari	(Hernández Pacheco, 1971)
387	El Buste, Aragón	Spain	41.88600	-1.60290	12.4000	Paleotestudo	Paleotestudo cf. sp.	Lapparent de Broin, 2000
388	Cerro del Otero, Palencia	Spain	42.01010	-4.52870	12.5000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
389	Fuensaldaña, Valladoid	Spain	41.70800	-4.76420	12.5000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
390	Illescas, Toledo	Spain	40.12650	-3.84890	12.5000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
391	Illescas, Toledo	Spain	40.12650	-3.84890	12.5000	Titanochelon	Titanochelon cf. bolivari	(Hernández Pacheco, 1971)
392	La Cistérniga, Valladolid	Spain	41.59730	-4.65490	12.5000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
393	Bois de Fabregues, Aups, Var	France	43.62840	6.22480	12.5000	Cheirogaster	Cheirogaster cf. sp.	Bergounioux, 1935
394	La-Grive-Saint-Alban (M+L7), Isère	France	45.58000	5.26000	12.6000	Testudo	Testudo ex. gr. antiqua	Bronn, 1831
395	Abocador de Can Mata (els Hostalets de Pierola), Cataluña	Spain	41.51920	1.72830	12.7500	Cheirogaster	Cheirogaster df. richardi	(Bergounioux, 1931)
396	Coca cemetery, Segovia	Spain	41.21940	-4.52880	12.8500	Titanochelon	Titanochelon cf. bolivari	(Hernández Pacheco, 1971)
397	Oehningen, oberer Bruch, Schienerberg N Oehningen-Wangen	Germany	47.67600	8.92510	12.8500	Testudo	Testudo scutella	(Meyer, 1845)
398	Valentine Railway Quarry A, UNSM Cr 12, Cherry County, Nebraska	USA	42.80000	-100.80000	12.9000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
399	Valentine Railway Quarry B, UNSM Cr 13, Cherry County, Nebraska	USA	42.80000	-100.80000	12.9000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
400	Fort Niobrara, UCMP V-3218, Cherry County, Nebraska	USA	42.80000	-100.80000	12.9500	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1863)
401	Steinheim a. Albuch	Germany	48.69390	10.06780	13.0000	Testudo	Testudo steinheimensis	Staesche, 1931
402	Hohenhöwen, Engen, Hegau, southwestern Germany	Germany	47.83560	8.74900	13.0000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
403	Steinheim a. Albuch	Germany	48.69390	10.06780	13.0000	Testudo	Testudo sp.	Linnaeus, 1758
404	Myers Farm, Webster County, Nebraska	USA	40.00000	-98.00000	13.1000	Geochelone	Geochelone sp.	Fitzinger, 1835
405	Myers Farm, Webster County, Nebraska	USA	40.00000	-98.00000	13.1000	Hesperotestudo	Hesperotestudo cf. orthopygia	(Cope, 1878)

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
406	DISC Cluster Sites, conglomerate, Fort Polk, Louisiana	USA	31.08030	-93.20120	13.4000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
407	Coca-Villeguillo, Segovia	Spain	41.25000	-4.57750	13.5000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
408	Uitikon-Schlieren, quarry on road, near Zürich	Switzerland	47.38200	8.44730	13.5000	Titanochelon	Titanochelon vitodurana	(Biedermann, 1862)
409	Veltheim-Winterthur	Switzerland	47.51240	8.71700	13.5000	Titanochelon	Titanochelon vitodurana	(Biedermann, 1862)
410	Sansan, Gers (lake)	France	43.90000	-0.50000	13.6000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
411	Petersbuch 31 - oben	Germany	48.97790	11.19090	13.6000	gen.	gen. indet	Gray, 1825
412	Mynsualmas	Kazakhstan	45.90000	55.25000	13.7000	gen.	gen. indet.	Gray, 1825
413	Chañe, Segovia	Spain	41.33890	-4.42500	13.8000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
414	Somosaguas Sur, Madrid Basin	Spain	40.42440	-3.79230	13.9000	gen.	gen. indet.	Gray, 1825
415	Belomechetskaya	Russia	44.40000	41.93330	14.0000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
416	Puente de la Princessa, Madrid	Spain	40.38890	-3.69840	14.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
417	Villalcón, Palencia	Spain	42.29320	-4.85520	14.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
418	Goldberg near Pflaumloch, Nördlinger Ries (without number)	Germany	48.85970	10.47530	14.1500	Testudo	Testudo sp.	Linnaeus, 1758
419	Kirrberg b. Balzhausen - Tongrube	Germany	48.22500	10.50140	14.1500	Geochelone	Geochelone sp.	Fitzinger, 1835
420	Kirrberg b. Balzhausen - Tongrube	Germany	48.22500	10.50140	14.1500	Testudo	Testudo sp.	Linnaeus, 1758
421	Ursberg (nördliche Sandgrube)	Germany	48.26110	10.45170	14.1500	Testudo	Testudo sp.	Linnaeus, 1758
422	Bohlinger Schlucht 6	Germany	47.70600	8.89000	14.3500	gen.	gen. indet	Gray, 1825
423	Wien-Kalksburg	Austria	48.12000	16.26000	14.5000	Testudo	Testudo kalksburgensis	Toula, 1896
424	Egelhoff Ranch Local Fauna, Keya Paha County, Nebraska	USA	42.00000	-100.00000	14.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1863)
425	La Barranca, Zaragoza	Spain	41.60000	-0.90000	14.5000	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
426	Stätzling	Germany	48.40000	10.96670	14.5000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
427	Bonlanden, Illertal	Germany	48.06860	10.07470	14.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
428	Bonlanden, Illertal	Germany	48.06860	10.07470	14.5000	Testudo	Testudo sp.	Linnaeus, 1758
429	Unterzell 1a	Germany	48.38330	11.01670	14.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
430	Norden Bridge Local Fauna, Brown County, Nebraska	USA	42.80000	-100.00000	14.5000	Geochelone	Geochelone nordensis	Holman, 1973
431	Norden Bridge Local Fauna, Brown County, Nebraska	USA	42.80000	-100.00000	14.5000	Hesperotestudo	Hesperotestudo orthopygia	(Cope, 1878)
432	Laimering 3	Germany	48.38960	11.08850	14.6000	Testudo	Testudo sp.	Linnaeus, 1758
433	Ziemetshausen 1e	Germany	48.29390	10.53030	14.6000	Testudo	Testudo sp.	Linnaeus, 1758
434	Tarazona de Aragón	Spain	41.90250	-1.72520	14.7000	gen.	gen. indet.	Gray, 1825
435	Tarazona de Aragón	Spain	41.90250	-1.72520	14.7000	Paleotestudo	Paleotestudo cf. sp.	Lapparent de Broin, 2000
436	Hambach 6C	Germany	50.90000	6.45000	14.7000	Testudo	Testudo sp.	Linnaeus, 1758
437	Georgensgmünd, Reznat-Altmühl-Stausee	Germany	49.19600	11.01000	14.7500	Testudo	Testudo sp.	Linnaeus, 1758
438	Edelbeuren-Schlachtberg	Germany	48.08900	10.02330	14.8000	Testudo	Testudo sp.	Linnaeus, 1758
439	Griesbeckerzell 1a	Germany	48.44680	11.05430	14.8000	Geochelone	Geochelone sp.	Fitzinger, 1835
440	Griesbeckerzell 1a	Germany	48.44680	11.05430	14.8000	Testudo	Testudo sp.	Linnaeus, 1758
441	Tobel Oelhalde Nord 1	Germany	48.04130	9.83060	14.8000	Geochelone	Geochelone sp.	Fitzinger, 1835
442	Tobel Oelhalde Süd	Germany	48.04130	9.83060	14.8000	Geochelone	Geochelone sp.	Fitzinger, 1835

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
443	Tobel Oelhalde Süd	Germany	48.04130	9.83060	14.8000	Testudo	Testudo sp.	Linnaeus, 1758
444	Ziemetshausen 1b	Germany	48.29390	10.53030	14.8000	Geochelone	Geochelone sp.	Fitzinger, 1835
445	Ziemetshausen 1b	Germany	48.29390	10.53030	14.8000	Testudo	Testudo sp.	Linnaeus, 1758
446	Ziemetshausen 1g	Germany	48.29390	10.53030	14.8000	gen.	gen. indet.	Gray, 1825
447	Valdemoros 3B. VA 3B	Spain	41.09000	-1.48200	14.8400	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
448	Derching 1b (unten)	Germany	48.40910	10.97190	14.9000	Geochelone	Geochelone sp.	Fitzinger, 1835
449	Edelbeuren-Maurerkopf	Germany	48.09620	10.03110	14.9000	Geochelone	Geochelone sp.	Fitzinger, 1835
450	Edelbeuren-Maurerkopf	Germany	48.09620	10.03110	14.9000	Testudo	Testudo sp.	Linnaeus, 1758
451	Alcalá de Henares, Cerro del Viso, Madrid	Spain	40.48820	-3.31340	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1917)
452	Vallecas, Madrid	Spain	40.38150	-3.62240	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
453	Burgerbachtobel 1 near Wippertsweiler	Germany	47.80180	9.45040	15.0000	Titanochelon	Titanochelon vitodurana	(Biedermann, 1862)
454	Przeworno I	Poland	50.68050	17.18330	15.0000	Testudo	Testudo sp.	Linnaeus, 1758
455	Barajas, Madrid	Spain	40.48390	-3.56790	15.0000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
456	Barajas, Madrid	Spain	40.48390	-3.56790	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
457	Ciudad Universitaria, Madrid	Spain	40.44670	-3.73020	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
458	Henares 1, Los Santos de la Humosa, Madrid	Spain	40.45060	-3.44270	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
459	Puente de los Franceses, Madrid	Spain	40.43370	-3.73580	15.0000	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
460	Puente de los Franceses, Madrid	Spain	40.43370	-3.73580	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
461	Vallecas, Madrid	Spain	40.38150	-3.62240	15.0000	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
462	Plum Point, Calvert County, Maryland	USA	38.00000	-76.00000	15.0000	Caudochelys	Caudochelys ducateli	(Collins & Lynn, 1936)
463	Hottell Ranch rhino quarries, Banner County, Nebraska	USA	41.50000	-103.80000	15.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
464	Lassé, Maine-et-Loire	France	47.53780	0.01160	15.0000	Testudo	Testudo promarginata	Reinach, 1900
465	Pontigné-les-Buisseneaux, Maine-et-Loire	France	47.54000	-0.04010	15.0000	Testudo	Testudo promarginata	Reinach, 1900
466	Calle Moratines, Madrid	Spain	40.40270	-3.70360	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
467	Calle Paseo de Moret, Madrid	Spain	40.43400	-3.72190	15.0000	Titanochelon	Titanochelon bolivari	(Hernández Pacheco, 1971)
468	Paracuellos de Jarama, Madrid	Spain	40.50570	-3.53020	15.0000	Titanochelon	Titanochelon cf. bolivari	(Hernández Pacheco, 1971)
469	Benistobel (Kohltobel)	Germany	47.79570	9.44290	15.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
470	Burgerbachtobel 1 near Wippertsweiler	Germany	47.80180	9.45040	15.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
471	Burgerbachtobel 1 near Wippertsweiler	Germany	47.80180	9.45040	15.0000	Testudo	Testudo sp.	Linnaeus, 1758
472	Ettishofener Ach between Inntobel and Berg-Ettishofen	Germany	47.82330	9.59010	15.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
473	Ettishofener Ach between Inntobel and Berg-Ettishofen	Germany	47.82330	9.59010	15.0000	Testudo	Testudo sp.	Linnaeus, 1758
474	Griesbeckerzell 1b	Germany	48.44680	11.05430	15.0000	Testudo	Testudo sp.	Linnaeus, 1758
475	Hotterloch-Tobel SW Ravensburg	Germany	47.76960	9.56860	15.0000	Paleotestudo	Paleotestudo antiqua	(Bronn, 1831)
476	Lattentobel	Germany	47.82910	9.42970	15.0000	Testudo	Testudo sp.	Linnaeus, 1758
477	Ochsenhausen am Heselsberg, Baustelle Remmele	Germany	48.06870	9.95670	15.0000	Testudo	Testudo sp.	Linnaeus, 1758
478	Schmalegger Tobel	Germany	47.80930	9.53320	15.0000	Geochelone	Geochelone cf. sp.	Fitzinger, 1835
479	Schmalegger Tobel	Germany	47.80930	9.53320	15.0000	Testudo	Testudo sp.	Linnaeus, 1758

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
480	Ziemetshausen 1d	Germany	48.29390	10.53030	15.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
481	Ziemetshausen 1f	Germany	48.29390	10.53030	15.0000	gen.	gen. indet.	Gray, 1825
482	Grund near Hollabrunn (Collection Schaffer)	Austria	48.61670	16.06670	15.1000	Testudo	Testudo sp.	Linnaeus, 1758
483	Petersbuch 41	Germany	48.97790	11.19090	15.2000	Testudo	Testudo sp.	Linnaeus, 1758
484	Eibiswald	Austria	46.68780	15.24890	15.2200	Paleotestudo	Paleotestudo mellingi	Peters, 1868
485	Furth 460m	Germany	48.60000	12.03330	15.2250	Testudo	Testudo sp.	Linnaeus, 1758
486	Eberstetten 2 (unter Weg)	Germany	48.53050	11.53690	15.3000	Testudo	Testudo sp.	Linnaeus, 1758
487	Untereichen-Altenstadt 565m	Germany	48.18330	10.11670	15.3000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
488	Untereichen-Altenstadt 565m	Germany	48.18330	10.11670	15.3000	Testudo	Testudo sp.	Linnaeus, 1758
489	Randle Cliff, Calvert County, Maryland	USA	38.66650	-76.52980	15.4000	Floridemys	Floridemys hurdi	Weems & George, 2013
490	Pontlevoy-Thenay, Loir-et-Cher	France	47.40000	1.20000	15.4000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
491	Pontlevoy-Thenay, Loir-et-Cher	France	47.40000	1.20000	15.4000	Testudo	Testudo sp.	Linnaeus, 1758
492	Biberach-Jordanbad	Germany	48.07480	9.82220	15.5000	Testudo	Testudo sp.	Linnaeus, 1758
493	Heggbach am Buchhaldenberg, Maselheim, near Biberach	Germany	48.14070	9.88710	15.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
494	Heggbach am Buchhaldenberg, Maselheim, near Biberach	Germany	48.14070	9.88710	15.5000	Testudo	Testudo sp.	Linnaeus, 1758
495	Coldspring Trinity River Local Fauna, San Jacinto County, Texas	USA	30.00000	-95.00000	15.5000	Hesperotestudo	Hesperotestudo sp.	Williams, 1950
496	Chesapeak Beach RR Station, Maryland	USA	38.67990	-76.53240	15.7000	Caudochelys	Caudochelys ducateli	(Collins & Lynn, 1936)
497	Oberbernbach a	Germany	48.47160	11.12840	15.7000	Testudo	Testudo sp.	Linnaeus, 1758
498	Oggenhof near Häder	Germany	48.35800	10.76060	15.7000	Testudo	Testudo sp.	Linnaeus, 1758
499	Vieux-Collonges, Saint-Cyr-au-Mont-d'Or, Rhône, France	France	45.75000	4.85000	15.7500	gen.	gen. indet	Gray, 1825
500	Vieux-Collonges, Saint-Cyr-au-Mont-d'Or, Rhône, France	France	45.75000	4.85000	15.7500	Testudo	Testudo sp.	Linnaeus, 1758
501	Moratilla 2. MOR 2	Spain	40.63330	-2.03330	15.7800	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
502	Gisseltshausen 1b	Germany	48.71090	12.01800	15.8000	Testudo	Testudo sp.	Linnaeus, 1758
503	Castelnau d'Arbieu, Gers	France	43.88330	0.70000	15.8500	Cheirogaster	Cheirogaster cf. sp.	Bergounioux, 1935
504	Dénezé-sous-le-Lude, Maine-et-Loire	France	47.53300	0.13300	15.9000	Testudo	Testudo promarginata	Reinach, 1900
505	Noyant-sous-le-Lude, Maine-et-Loire	France	47.51700	0.11700	15.9000	Testudo	Testudo promarginata	Reinach, 1900
506	Savigné-sur-Lathan, Indre-et-Loire	France	47.45000	0.31700	15.9000	Testudo	Testudo promarginata	Reinach, 1900
507	Gisseltshausen 1a	Germany	48.71090	12.01800	15.9000	Testudo	Testudo sp.	Linnaeus, 1758
508	Sainbach (bei Ichenhofen)	Germany	48.51670	11.10000	15.9000	Testudo	Testudo sp.	Linnaeus, 1758
509	Häder	Germany	48.35630	10.63890	16.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
510	Unterempfenbach 1d	Germany	48.63040	11.74730	16.0000	Testudo	Testudo sp.	Linnaeus, 1758
511	Walda 2 (oben)	Germany	48.61090	11.09080	16.1000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
512	Walda 2 (oben)	Germany	48.61090	11.09080	16.1000	Testudo	Testudo sp.	Linnaeus, 1758
513	Altheim-Breitenlauh 2	Germany	48.32830	9.79170	16.2650	Testudo	Testudo sp.	Linnaeus, 1758
514	Eggingen-Schleiche B	Germany	48.35220	9.85210	16.2650	Geochelone	Geochelone sp.	Fitzinger, 1835
515	Eggingen-Schleiche B	Germany	48.35220	9.85210	16.2650	Testudo	Testudo sp.	Linnaeus, 1758
516	Maßendorf	Germany	48.59710	12.44930	16.3000	Geochelone	Geochelone sp.	Fitzinger, 1835

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
517	Maßendorf	Germany	48.59710	12.44930	16.3000	Testudo	Testudo sp.	Linnaeus, 1758
518	Walda 1 (unten)	Germany	48.61090	11.09080	16.3000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
519	Walda 1 (unten)	Germany	48.61090	11.09080	16.3000	Testudo	Testudo sp.	Linnaeus, 1758
520	San Roque 3. SR 3	Spain	41.10000	-1.49500	16.3300	Geochelone	Geochelone aff. sp.	Fitzinger, 1835
521	Sandelzhausen	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
522	Sandelzhausen unterer Geröllmergel (B)	Germany	48.62830	11.79600	16.3700	Titanochelon	Titanochelon cf. perpiniana	(Depéret, 1885)
523	Sandelzhausen	Germany	48.62830	11.79600	16.3700	Titanochelon	Titanochelon cf. perpiniana	(Depéret, 1885)
524	Sandelzhausen oberer Geröllmergel (D2)	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
525	Sandelzhausen oberer Geröllmergel (E)	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
526	Sandelzhausen unterer Geröllmergel (B)	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
527	Sandelzhausen unterer Geröllmergel (C1)	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
528	Sandelzhausen unterer Geröllmergel (C2)	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
529	Sandelzhausen unterer Geröllmergel (C3/D1)	Germany	48.62830	11.79600	16.3700	Testudo	Testudo rectogularis	Schleich, 1981
530	Monteagudo, Aragón	Spain	41.96270	-1.69220	16.4000	gen.	gen. indet.	Gray, 1825
531	Puttenhausen 2	Germany	48.61220	11.77730	16.4000	Testudo	Testudo sp.	Linnaeus, 1758
532	Puttenhausen E	Germany	48.61220	11.77730	16.5000	Testudo	Testudo sp.	Linnaeus, 1758
533	Schießen	Germany	48.29740	10.24320	16.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
534	Schießen	Germany	48.29740	10.24320	16.5000	Testudo	Testudo sp.	Linnaeus, 1758
535	Schönenberg near Jettingen	Germany	48.37190	10.40960	16.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
536	Schönenberg near Jettingen	Germany	48.37190	10.40960	16.5000	Testudo	Testudo sp.	Linnaeus, 1758
537	Teiritzberg (T1 = 001/D/C), Korneuburg Basin, Lower Austria	Austria	48.36670	16.33330	16.5500	Paleotestudo	Paleotestudo sp.	Lapparent de Broin, 2000
538	Teiritzberg (T1 = 001/D/C), Korneuburg Basin, Lower Austria	Austria	48.36670	16.33330	16.5500	gen.	gen. indet.	Gray, 1825
539	Kleinebersdorf, Wolmuth-Sandgrube (010/G/Liegendes), Korneuburg Basin	Austria	48.50000	16.40000	16.5500	gen.	gen. indet.	Gray, 1825
540	Obergänserndorf (OG2), Korneuburg Basin, Lower Austria	Austria	48.41670	16.36670	16.5500	gen.	gen. indet.	Gray, 1825
541	Teiritzberg (001/X/C), Korneuburg Basin, Lower Austria	Austria	48.36670	16.33330	16.5500	gen.	gen. indet.	Gray, 1825
542	Teiritzberg (001/X/C), Korneuburg Basin, Lower Austria	Austria	48.36670	16.33330	16.5500	Paleotestudo	Paleotestudo angustihyoplastralis	
543	Weinsteig (107), Korneuburg Basin, Lower Austria	Austria	48.45000	16.40000	16.5500	gen.	gen. indet.	Gray, 1825
544	Weinsteig (107/S/B), Korneuburg Basin, Lower Austria	Austria	48.45000	16.40000	16.5500	gen.	gen. indet.	Gray, 1826
545	Kirchdorf an der Iller	Germany	48.07280	10.14240	16.6500	Geochelone	Geochelone sp.	Fitzinger, 1835
546	Langenmosen	Germany	48.60670	11.21410	16.7000	Testudo	Testudo sp.	Linnaeus, 1758
547	Puttenhausen B	Germany	48.61220	11.77730	16.8000	Testudo	Testudo sp.	Linnaeus, 1758
548	Eitensheim	Germany	48.82030	11.32030	16.8000	gen.	gen. indet	Gray, 1825
549	Eitensheim	Germany	48.82030	11.32030	16.8000	Testudo	Testudo sp.	Linnaeus, 1758
550	Randecker Maar	Germany	48.56670	9.53333	16.8250	Testudo	Testudo sp.	Linnaeus, 1758
551	Illerkirchberg 1	Germany	48.31000	10.04600	16.8500	Geochelone	Geochelone sp.	Fitzinger, 1835
552	Illerkirchberg 1	Germany	48.31000	10.04600	16.8500	Testudo	Testudo sp.	Linnaeus, 1758
553	Puttenhausen A	Germany	48.61220	11.77730	16.9000	Testudo	Testudo sp.	Linnaeus, 1758

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
554	Wackersdorf Westfeld	Germany	49.31670	12.18330	17.0000	Testudo	Testudo sp.	Linnaeus, 1758
555	Contres, Loir-et-Cher	France	47.41810	1.42870	17.0000	Testudo	Testudo sp.	Linnaeus, 1758
556	Günzburg 2/1 Umgehungsstrasse Sande	Germany	48.45600	10.27680	17.0000	gen.	gen. indet	Gray, 1825
557	Günzburg 2/2 Umgehungstr höhere Bereiche der Sande	Germany	48.45600	10.27680	17.0000	gen.	gen. indet	Gray, 1825
558	Günzburg 2/5 Umgehung Sande im Süden Aufschluss	Germany	48.45600	10.27680	17.0000	gen.	gen. indet	Gray, 1825
559	Günzburg 2/6 Umgehung Sande im Norden Aufschluss	Germany	48.45600	10.27680	17.0000	gen.	gen. indet	Gray, 1825
560	La Romieu, Gers	France	44.20000	0.90000	17.2000	gen.	gen. indet.	Gray, 1825
561	Forsthart	Germany	48.63580	13.03140	17.2000	Testudo	Testudo sp.	Linnaeus, 1758
562	Arrisdrift	Namibia	-28.55000	16.50000	17.2500	Mesocherus	Mesocherus orangeus	Lapparent de Broin, 2003
563	Arrisdrift	Namibia	-28.55000	16.50000	17.2500	Namibchersus	Namibchersus aff. namaquensis	(Stromer, 1926)
564	Aerotrain a Chevilly pres d'Artenay (Loiret)	France	48.05000	1.85000	17.2500	Testudo	Testudo sp.	Linnaeus, 1758
565	Baigneaux-en-Beauce (Eure-et-Loir)	France	48.10000	2.15000	17.2500	Paleotestudo	Paleotestudo mellingi	(Peters, 1868)
566	Suèvres aux Imberts, Loir-et-Cher	France	47.67000	1.47000	17.2500	Ergilemys	Ergilemys bruneti	Broin, 1977
567	Suèvres aux Imberts, Loir-et-Cher	France	47.67000	1.47000	17.2500	Paleotestudo	Paleotestudo mellingi	(Peters, 1868)
568	Erkertshofen 1	Germany	48.97970	11.22500	17.2500	Testudo	Testudo sp.	Linnaeus, 1758
569	Erkertshofen 2	Germany	48.97970	11.22500	17.2500	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
570	Gerlenhofen	Germany	48.20000	10.02000	17.2500	Testudo	Testudo sp.	Linnaeus, 1758
571	Can Mas near El Papiol, Barcelone province, Cataluña, Vallés-Penedés basin	Spain	41.43330	2.01670	17.3000	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
572	Ba?a Dolina in Ve?ký Krtíš	Slovakia	48.20730	19.34780	17.4000	gen.	gen. Indet.	Gray, 1825
573	Reisensburg near Günzburg	Germany	48.46200	10.31400	17.4500	Geochelone	Geochelone sp.	Fitzinger, 1835
574	Reisensburg near Günzburg	Germany	48.46200	10.31400	17.4500	Testudo	Testudo sp.	Linnaeus, 1758
575	Culebra Reach, Station 1998 + 00, 600 feet W of center line of Panama Canal	Panama	9.10000	-79.70000	17.5000	gen.	gen. Indet.	Gray, 1825
576	Freudenegg 2 Baggersee	Germany	48.33330	10.01670	17.5000	Testudo	Testudo sp.	Linnaeus, 1758
577	Freudenegg 3 Baggersee	Germany	48.33330	10.01670	17.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
578	Freudenegg 3 Baggersee	Germany	48.33330	10.01670	17.5000	Testudo	Testudo sp.	Linnaeus, 1758
579	Petersbuch 4	Germany	48.97790	11.19090	17.5000	Testudo	Testudo sp.	Linnaeus, 1758
580	Djebel Zelten	Libya	28.50000	20.00000	17.5000	Geochelone	Geochelone sp.	Fitzinger, 1835
581	Béon 1 (Montréal-du-Gers)	France	43.95000	0.20000	17.6500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
582	Béon 1 (Montréal-du-Gers)	France	43.95000	0.20000	17.6500	Testudo	Testudo sp.	Linnaeus, 1758
583	Petersbuch 7	Germany	48.97790	11.19090	17.7500	Testudo	Testudo sp.	Linnaeus, 1758
584	Pamunkey River, between King William and New Kent Counties, Virginia	USA	37.61640	-77.09630	17.7500	Caudochelys	Caudochelys williamsi	(Auffenberg, 1964)
585	Pollack Farm Site near Cheswold, Kent County, Delaware	USA	39.23460	-75.57270	17.7500	Caudochelys	Caudochelys williamsi	(Auffenberg, 1964)
586	Rauscheröd near Passau, Bavaria	Germany	48.55650	13.26020	17.7500	Testudo	Testudo sp.	Linnaeus, 1758
587	Langenau 1	Germany	48.50030	10.12190	17.7750	Geochelone	Geochelone sp.	Fitzinger, 1835
588	Langenau 1	Germany	48.50030	10.12190	17.7750	Testudo	Testudo sp.	Linnaeus, 1758
589	Langenau 2	Germany	48.50000	10.10000	17.7750	Geochelone	Geochelone sp.	Fitzinger, 1835
590	Langenau 2	Germany	48.50000	10.10000	17.7750	Testudo	Testudo sp.	Linnaeus, 1758

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
591	Hiwegi loc. R 1	Kenya	-0.40000	34.20000	17.8000	gen.	gen. indet.	Gray, 1825
592	Hiwegi loc. R 106	Kenya	-0.40000	34.20000	17.8000	gen.	gen. indet.	Gray, 1825
593	Hiwegi loc. R 3	Kenya	-0.40000	34.20000	17.8000	gen.	gen. indet.	Gray, 1825
594	Hiwegi loc. R 5	Kenya	-0.40000	34.20000	17.8000	gen.	gen. indet.	Gray, 1825
595	Mfangano	Kenya	-0.45000	34.05000	17.8000	gen.	gen. indet.	Gray, 1825
596	Nira and Kachuku near Karungu	Kenya	-0.90000	34.25000	17.8000	Geochelone	Geochelone crassa	(Andrews, 1914)
597	Rangoye, Uyoma peninsula lake Victoria	Kenya	-0.30000	34.30000	17.8000	gen.	gen. indet.	Gray, 1825
598	Eggingen-Mittelhart	Germany	48.35230	9.85980	17.8750	Geochelone	Geochelone sp.	Fitzinger, 1835
599	Eggingen-Mittelhart	Germany	48.35230	9.85980	17.8750	Testudo	Testudo sp.	Linnaeus, 1758
600	Walangani	Kenya	-0.45000	34.05000	17.9000	gen.	gen. indet.	Gray, 1825
601	Auchas	Namibia	-28.55000	16.50000	18.0000	Namibchersus	Namibchersus namaquensis	(Stromer, 1926)
602	Leithagebirge between Au and Loretto	Austria	47.91510	16.53580	18.0000	Testudo	Testudo kalksburgensis	Toula, 1896
603	Marsolan, Gers	France	43.95000	0.55000	18.0000	Testudo	Testudo promarginata	Reinach, 1900
604	Neuville-aux-Bois, Loiret	France	48.06700	2.05000	18.0000	Testudo	Testudo promarginata	Reinach, 1900
605	Grimmelfingen	Germany	48.22000	9.56000	18.0000	Testudo	Testudo sp.	Linnaeus, 1758
606	Kiahera loc. R 120	Kenya	-0.40000	34.20000	18.0000	gen.	gen. indet.	Gray, 1825
607	Thomas Farm Local Fauna, Gilchrist County, Florida	USA	29.70000	-82.60000	18.5000	Geochelone	Geochelone tedwhitei	(Williams, 1953)
608	Chitenay, Loir-et-Cher	France	47.50000	1.36670	18.5000	Testudo	Testudo cf. promarginata	Reinach, 1900
609	Mauvieres, Marcilly-sur-Maulne, Indre-et-Loire	France	47.55000	0.33000	18.5000	Testudo	Testudo cf. promarginata	Reinach, 1900
610	Thomas Farm Local Fauna, Gilchrist County, Florida	USA	29.70000	-82.60000	18.5000	Geochelone	Geochelone cf. sp.	Rafinesque, 1832
611	Torralba de Ribota (Zaragoza)	Spain	41.58330	-1.00000	18.5050	Paleotestudo	Paleotestudo cf. antiqua	(Bronn, 1831)
612	Baltringen	Germany	48.16670	9.86670	18.6000	Geochelone	Geochelone sp.	Fitzinger, 1835
613	Baltringen	Germany	48.16670	9.86670	18.6000	Testudo	Testudo sp.	Linnaeus, 1758
614	Chilleurs-aux-Bois, Loiret (Burdigalian)	France	48.06670	2.13330	19.0000	Testudo	Testudo promarginata	Reinach, 1900
615	La Brosse, Maine-et-Loire	France	47.23000	0.22000	19.0000	Testudo	Testudo cf. promarginata	Reinach, 1900
616	Stubersheim 3	Germany	48.59470	9.91390	19.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
617	Glastal	Namibia	-26.90000	15.40000	19.0000	Namibchersus	Namibchersus sp.	Lapparent de Broin, 2003
618	Langental, nothern Sperrgebiet	Namibia	-26.90000	15.40000	19.0000	Namibchersus	Namibchersus sp.	Lapparent de Broin, 2003
619	Elisabethfeld (= Elisabeth Bay) area, northern Sperrgebiet	Namibia	-26.91610	15.18380	19.5000	Namibchersus	Namibchersus namaquensis	(Stromer, 1926)
620	Chubut Valley south side between Gaiman and Dolavon, Patagonia	Argentina	-43.28560	-65.58220	19.5000	Testudo	Testudo gringorum	Simpson, 1942 (p. 1-3, fig. 1.2)
621	Fiskus	Namibia	-26.90000	15.40000	19.5000	Namibchersus	Namibchersus namaquensis	(Stromer, 1926)
622	Grillental, northern Sperrgebiet	Namibia	-26.98330	15.35000	19.5000	Namibchersus	Namibchersus cf. namaquensis	(Stromer, 1926)
623	Marsland Quadrangle, Box Butte County, Nebraska	USA	42.40000	-103.30000	19.9000	gen.	gen. indet.	Gray, 1825
624	Eggenburg-Schindergraben, Lower Austria	Austria	48.63330	15.81700	19.9650	Testudo	Testudo kalksburgensis	Toula, 1896
625	Auterive, Haute-Garonne	France	43.35060	1.47320	20.7500	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
626	Grépiac, Haute-Garonne	France	43.40490	1.44790	20.7500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
627	Grépiac, Haute-Garonne	France	43.40490	1.44790	20.7500	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
628	Landes-le-Gaulois, Loir-et-Cher	France	47.65410	1.18380	20.7500	Testudo	Testudo sp.	Linnaeus, 1758
629	Barbotan-les-Thermes (Gers)	France	44.20000	0.40000	20.7500	Cheirogaster	Cheirogaster cf. sp.	Bergounioux, 1935
630	Aresing (shallow lake)	Germany	48.53330	11.30000	20.9000	Testudo	Testudo rectogularis	Schleich, 1981
631	Tréteau, Allier	France	46.36820	3.52490	21.0000	gen.	gen. indet.	Gray, 1825
632	Marcoin, Volvic, Puy-de-Dôme	France	45.87270	3.03950	21.5000	Testudo	Testudo sp.	Linnaeus, 1758
633	Saint-Gérand-le-Puy, Allier	France	46.25810	3.51200	21.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
634	Saint-Gérand-le-Puy, Allier	France	46.25810	3.51200	21.5000	Ergilemys	Ergilemys aff. bruneti	Broin, 1977
635	Saint-Gérand-le-Puy, Allier	France	46.25810	3.51200	21.5000	Testudo	Testudo promarginata	Reinach, 1900
636	Wallenried Channel, 10 km N Fribourg	Switzerland	46.88160	7.10650	21.7500	gen.	gen indet.	Gray, 1825
637	Montaigu-le-Blin, La Chacotte, Allier	France	46.32000	3.52000	22.0000	gen.	gen. indet.	Gray, 1825
638	Langy, Allier	France	46.26730	3.46970	22.1000	Testudo	Testudo sp.	Linnaeus, 1758
639	Saulcet, Allier	France	46.33000	3.27000	22.5000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
640	Pechbonnieu, Haute-Garonne	France	43.70280	1.46650	22.7500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
641	Pechbonnieu, Haute-Garonne	France	43.70280	1.46650	22.7500	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
642	Toledo Bend Dam, Newton County, Texas	USA	31.00000	-93.00000	23.0000	Geochelone	Geochelone sp.	Fitzinger, 1835
643	Paulhiac, Lot-et-Garonne	France	44.56190	0.82040	23.0300	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
644	Peublanc, Sorbier, Allier	France	46.36630	3.63640	23.0300	gen.	gen. indet.	Gray, 1825
645	Créchy, Allier	France	46.26670	3.41670	23.0650	Ergilemys	Ergilemys bruneti	Broin, 1977
646	Venelles 35 km N Marseille	France	43.62000	5.48000	23.0650	gen.	gen. indet.	Gray, 1825
647	Toulouse Puits Borderouge niveau inférieur, Haute-Garonne	France	43.60000	1.43330	23.1150	Ergilemys	Ergilemys bruneti	Broin, 1977
648	Hautesvignes, Lot-et-Garonne	France	44.45910	0.34440	23.3500	gen.	gen. indet.	Gray, 1825
649	Moissac 2, Tarn-et-Garonne	France	44.10390	1.08500	23.4150	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
650	Moissac 2, Tarn-et-Garonne	France	44.10390	1.08500	23.4150	gen.	gen. indet.	Gray, 1825
651	La Milloque, Hautefage, Lot-et-Garonne	France	44.32000	0.78000	23.5000	Ergilemys	Ergilemys bruneti	Broin, 1977
652	Mine des Rois, Dallet et Pont-du-Château, Puy-de-Dôme	France	45.78420	3.25840	23.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
653	Saint-Thomas, Hautefage, Lot-et-Garonne	France	44.35570	0.77130	23.5000	gen.	gen. indet.	Gray, 1825
654	Dieupentale, Tarn-et-Garonne	France	43.86190	1.26960	23.5150	gen.	gen. indet.	Gray, 1825
655	Oberleichtersbach	Germany	50.35000	10.05000	24.0000	Geochelone	Geochelone aff. sp.	Fitzinger, 1835
656	Oberleichtersbach	Germany	50.35000	10.05000	24.0000	Testudo	Testudo sp.	Linnaeus, 1758
657	Coderet, Bransat, Allier	France	46.30000	3.28330	24.0000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
658	Gannat, Allier (shallow lake)	France	46.10000	3.20000	24.0000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
659	Prairéal, Vaumas, Allier	France	46.44600	3.63000	24.2500	gen.	gen. indet.	Gray, 1825
660	Pech-Desse, Moulliac, Tarn-et-Garonne, Phosphorite du Quercy	France	44.40000	1.60000	24.3000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
661	Pech-Desse, Moulliac, Tarn-et-Garonne, Phosphorite du Quercy	France	44.40000	1.60000	24.3000	gen.	gen. indet.	Gray, 1825
662	Paali Nala level 1, Balochistan	Pakistan	28.85000	69.21670	24.5000	gen.	gen. Indet.	Gray, 1825
663	Pech-du-Fraysse, Saint-Projet, Tarn-et-Garonne, Phosporites du Quercy	France	44.75000	2.66670	24.9000	Cheirogaster	Cheirogaster phosphoritarum	Bergounioux, 1935
664	Pech-du-Fraysse, Saint-Projet, Tarn-et-Garonne, Phosporites du Quercy	France	44.75000	2.66670	24.9000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
665	Pech-du-Fraysse, Saint-Projet, Tarn-et-Garonne, Phosporites du Quercy	France	44.75000	2.66670	24.9000	Testudo	Testudo sp.	Linnaeus, 1758
666	Veauche, Loire	France	45.56230	4.27560	25.0000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
667	Paali Nala level C2, Balochistan	Pakistan	28.85000	69.21670	25.5000	gen.	gen. Indet.	Gray, 1825
668	Aktau Chul'adyr Formatioon Lower Member	Kazakhstan	44.06670	79.36670	26.1000	gen.	gen. indet.	Gray, 1825
669	Marseille, Saint-André, Bouches-du-Rhône	France	43.45000	5.45000	26.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
670	Marseille, Saint-André, Bouches-du-Rhône	France	43.45000	5.45000	26.5000	gen.	gen. indet.	Gray, 1825
671	Le Crozatier, Brons, Cantal	France	45.04020	3.15070	28.0000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
672	Le Crozatier, Brons, Cantal	France	45.04020	3.15070	28.0000	Testudo	Testudo sp.	Linnaeus, 1758
673	Le Garouillas, Phosphorites du Quercy	France	44.40000	1.60000	28.7500	Cheirogaster	Cheirogaster nov. sp.	-
674	Rigal-Jouet, Phosphorites du Quercy	France	44.40000	1.60000	28.7500	gen.	gen. indet.	Gray, 1825
675	Neschers à La Sauvetat, Puy-de-Dôme	France	45.59920	3.17100	28.8500	gen.	gen. indet.	Gray, 1825
676	Saint-Germain-Lembron, Puy-de-Dôme	France	45.45850	3.23870	28.8500	gen.	gen. indet.	Gray, 1825
677	Vaumas, Allier	France	46.44610	3.63030	28.8500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
678	Puylaurens, Tarn	France	43.57140	2.01380	29.5000	gen.	gen. indet.	Gray, 1825
679	Pichovet, Vachères, Lubéron, Provence-Alpes-Côte d'Azur	France	43.90000	5.60000	29.7000	gen.	gen. indet.	Gray, 1825
680	Espenhain near Leipzig	Germany	51.18000	12.47000	30.2500	gen.	gen. indet	Gray, 1825
681	Talagay (Tayzhuzgen section)	Kazakhstan	47.59840	84.00000	30.2500	Ergilemys	Ergilemys saikenensis	(Chkhikvadze, 1972)
682	Saint-Vivien-de-Monségur, Gironde	France	44.61570	0.17010	30.5000	gen.	gen. indet.	Gray, 1825
683	Itardies (Caylus, Tarn-et-Garonne)	France	44.23330	1.78330	30.5000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
684	Mounayne, Phosphorites du Quercy	France	44.40000	1.60000	30.5000	gen.	gen. indet.	Gray, 1825
685	Roqueprune, Mouillac, Tarn-et-Garonne, Phosphorites du Quercy	France	44.61670	0.03330	30.5000	gen.	gen. indet.	Gray, 1825
686	Pech-Crabit, Bach, Lot, Phosphorites du Quercy	France	44.40000	1.60000	30.6000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
687	Pech-Crabit, Bach, Lot, Phosphorites du Quercy	France	44.40000	1.60000	30.6000	gen.	gen. indet.	Gray, 1825
688	North Mesa, Shara Murun region, Inner Mongolia	China	43.00000	112.00000	31.0000	Testudo	Testudo ulanensis	Gilmore, 1931
689	Twin Oboes, Shara Murun region, Inner Mongolia	China	43.00000	112.00000	31.0000	Testudo	Testudo nanus	Gilmore, 1931
690	Ardyn Obo basin, Chinese Postroad	Mongolia	45.00000	110.00000	31.0000	Ergilemys	Ergilemys insolitus	(Matthew & Granger, 1923)
691	Ardyn Obo basin, Chinese Postroad	Mongolia	45.00000	110.00000	31.0000	Testudo	Testudo demissa	Gilmore, 1931
692	Ardyn Obo basin, Chinese Postroad	Mongolia	45.00000	110.00000	31.0000	Testudo	Testudo kaiseni	Gilmore, 1931
693	Promontory Bluff (Sair Usu 150- Kalgan 350 miles)	Mongolia	45.00000	110.00000	31.0000	Ergilemys	Ergilemys insolitus	(Matthew & Granger, 1923)
694	Bournoncle-Saint-Pierre, Auvergne, Haute-Loire	France	45.34870	3.32530	31.0000	Taraschelon	Taraschelon gigas	(Bravard, 1844)
695	Los Barros quarry, 4 km SE Àvila	Spain	40.63080	-4.65870	31.0000	Cheirogaster	Cheirogaster ? sp.	Bergounioux, 1935
696	La Plante 2, Concots, Lot, Phosporite du Quercy	France	44.40000	1.60000	31.8000	gen.	gen. indet.	Gray, 1825
697	Mas de Got A, Phosphorites du Quercy	France	44.40000	1.60000	31.8000	gen.	gen. indet.	Gray, 1825
698	Mas de Got B, Phosphorites du Quercy	France	44.40000	1.60000	31.8000	gen.	gen. indet.	Gray, 1825
699	Quercy (Phosphorites du Quercy)	France	44.20000	1.50000	32.0000	Cheirogaster	Cheirogaster phosphoritarum	Bergounioux, 1935
700	Quercy (Phosphorites du Quercy)	France	44.20000	1.50000	32.0000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
701	Thaytiniti, Dhofar	Oman	17.00000	54.00000	32.5000	gen.	gen. Indet.	Gray, 1825

Table S14 – *continued from previous page*

	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
702	Kalgan area	China	41.00000	115.00000	32.5000	Testudo	Testudo kalganensis	Gilmore, 1931
703	Gua Teg	Mongolia	43.50000	108.00000	32.6000	Ergilemys	Ergilemys insolitus	(Matthew & Granger, 1923)
704	AMNH quarries A, B, C, Fayyum	Egypt	29.50000	30.90000	32.6500	Gigantochersina	Gigantochersina ammon	Andres in Andrews & Beadnell, 1903
705	Neumühle near Weinheim/Alzey	Germany	49.73610	8.06530	32.9500	gen.	gen. indet	Gray, 1825
706	Ruch, Gironde	France	44.77550	-0.03920	33.1000	gen.	gen. indet.	Gray, 1825
707	Sainte-Marthe, Eymet, Dordogne	France	44.67850	0.39680	33.1000	gen.	gen. indet.	Gray, 1825
708	Ravet-Lupo, Caylus, Lot, Phosphorites du Quercy	France	44.40000	1.60000	33.2000	gen.	gen. indet.	Gray, 1825
709	Soumaille, Pardaillan, Lot-et-Garonne	France	44.66710	0.25980	33.2500	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
710	Aubrelong 1, Phosphorites du Quercy, Lot	France	44.40000	1.60000	33.5000	Cheirogaster	Cheirogaster cf. sp.	Bergounioux, 1935
711	Baby 2, Saint-André-et-Appelles, Gironde	France	44.81200	0.21330	33.9500	Cheirogaster	Cheirogaster maurini	Bergounioux, 1935
712	Saint-Capraise-d'Eymet, Dordogne	France	44.70870	0.50320	33.9500	gen.	gen. indet.	Gray, 1825
713	Korablik Kiinkerish	Kazakhstan	48.00000	84.50000	34.2000	Ergilemys	Ergilemys sp.	Chkhikvadze, 1972
714	Ardyn Obo (Ergelyeen Dzo), SE Gobi	Mongolia	43.50000	109.00000	34.2000	Ergilemys	Ergilemys insolitus	(Matthew & Granger, 1923)
715	Escamps, Phosphorites du Quercy	France	44.40000	1.58330	34.4000	gen.	gen. indet.	Gray, 1825
716	Lostange, Beduer, Lot	France	44.58110	1.94840	34.4000	Dithyrosternon	Dithyrosternon sp.	Pictet & Humbert, 1869
717	Lostange, Beduer, Lot	France	44.58110	1.94840	34.4000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
718	Rosières, Escamps, Lot, Phosporites du Quercy	France	44.40000	1.60000	34.4000	gen.	gen. indet.	Gray, 1825
719	Sainte-Croix-de-Brignon, Gard	France	43.98890	4.21660	35.0000	Ergilemys	Ergilemys aff. sp.	Ckhikvadze, 1972
720	Sindou D, Phosphorites du Quercy	France	44.40000	1.60000	35.0000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
721	Paris Montmartre	France	48.86670	2.33330	35.2000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
722	Côja, Cerâmica da Carriça	Portugal	40.27010	-7.97810	35.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
723	La Débruge = Butte de Sainte Radegonde (pres d'Apt, Gargas, Vaucluse)	France	43.90000	5.38330	35.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
724	La Grave, Bonsac, Gironde	France	45.01130	-0.22510	35.5000	Cheirogaster	Cheirogaster sp.	Bergounioux, 1935
725	Langlès, Saint-Martin-de-Villeréal, Lot-et-Garonne	France	44.64470	0.82040	35.5000	gen.	gen. indet.	Gray, 1825
726	Sainte-Néboule, Béduer, Lot	France	44.58330	1.93330	35.5500	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
727	Santiago Yolomécatl, Oaxaca	Mexico	17.47000	-97.56000	36.5000	Hadrianus	Hadrianus aff. sp.	Cope, 1872
728	Santiago Yolomécatl, Oaxaca	Mexico	17.47000	-97.56000	36.5000	Stylemys	Stylemys sp.	Leidy, 1851
729	Calf Creek near Eastend, Saskatchewan	Canada	49.00000	-109.00000	36.9000	gen.	gen. indet.	Gray, 1825
730	Chéry-Chartreuve (Aisne)	France	49.26670	3.61670	37.7000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
731	Grisolles, Est du Basin de Paris, Aisne	France	49.15000	3.35000	37.7000	gen.	gen. indet.	Gray, 1825
732	Rocourt-Saint-Martin, Aisne	France	49.15000	3.38330	38.5000	gen.	gen. indet.	Gray, 1825
733	Rocourt-Saint-Martin, Aisne	France	49.15000	3.38330	38.5000	Hadrianus	Hadrianus sp.	Cope, 1872
734	Myaing UCMP locality V6204	Myanmar	21.60000	94.80000	38.5000	gen.	gen. Indet.	Gray, 1825
735	Thandaung kyitchaung, UCMP locality V78090	Myanmar	21.92000	94.56000	38.5000	gen.	gen. Indet.	Gray, 1825
736	Naia, Tondela, Viseu	Portugal	40.57480	-8.03980	38.5000	Cheirogaster	Cheirogaster ? sp.	Bergounioux, 1935
737	Castres, Bassin de l'Agout, Tarn	France	43.60520	2.24090	39.0000	Hadrianus	Hadrianus castrensis	(Bergounioux, 1935)
738	Lautrec, Tarn	France	43.70560	2.13590	39.0000	Hadrianus	Hadrianus sp.	Cope, 1872

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	Locality	Country	Latitude	Longitude	Age	Genus	Taxon	Author
739	Robiac, Saint-Mamert, Gard	France	44.26670	4.13330	39.0000	gen.	gen. indet.	Gray, 1825
740	Robiac, Saint-Mamert, Gard	France	44.26670	4.13330	39.0000	Hadrianus	Hadrianus sp.	Cope, 1872
741	Mazaterón, Soria Province, Castilla y León	Spain	41.50000	-2.10000	39.5000	Pelorochelon	Pelorochelon soriana	Pérez García et al. (2016)
742	Issel, Department Aude	France	43.46670	1.98330	42.4000	Hadrianus	Hadrianus sp.	Cope, 1872
743	Le Guépelle, Saint-Witz, Val d'Oise	France	49.08420	2.53550	42.5000	Ergilemys	Ergilemys sp.	Ckhikvadze, 1972
744	Aigues-Vives 2, Hérault	France	43.33750	2.81790	43.5000	Hadrianus	Hadrianus sp.	Cope, 1872
745	Jumencourt, Aisne	France	49.50860	3.35630	43.5000	Hadrianus	Hadrianus sp.	Cope, 1872
746	La Défense, Hauts-de-Seine	France	48.90000	2.23330	43.6000	Hadrianus	Hadrianus sp.	Cope, 1872
747	Swift Current Creek, southern Saskatchewan	Canada	50.20000	-107.60000	44.5000	gen.	gen. indet.	Gray, 1826
748	Geiseltal near Halle (Mücheln), Sachsen-Anhalt	Germany	51.33390	11.83180	44.5000	Pelorochelon	Pelorochelon eocaenica	(Hummel, 1935)
749	Bouxwiller, Bas-Rhin	France	48.81670	7.48330	45.0000	Hadrianus	Hadrianus sp.	Cope, 1872
750	Stena	Kazakhstan	47.50000	84.80000	48.0000	Hadrianus	Hadrianus obailiensis	Chkhikvadze, 1972
751	UCMP V98009, Uinta County, Wyoming	USA	41.00000	-110.00000	49.4000	Hadrianus	Hadrianus corsoni	(Leidy, 1871)
752	North Fork, Wapiti Valley north Shoshone River (NF-5 Wapiti III), Park County, Wyoming	USA	44.30000	-109.00000	49.4500	Hadrianus	Hadrianus sp.	Cope, 1872
753	Cuis (Marne)	France	49.00000	3.96670	49.5000	Hadrianus	Hadrianus sp.	Cope, 1872
754	Grauves (Marne)	France	48.96670	3.96670	49.5000	Hadrianus	Hadrianus sp.	Cope, 1872
755	Mancy, Marne	France	48.98370	3.93510	49.5000	Hadrianus	Hadrianus sp.	Cope, 1872
756	Monthelon, Marne	France	48.98330	3.93330	49.5000	Hadrianus	Hadrianus sp.	Cope, 1872
757	Haunsberg near St. Pankraz, Salzburg	Austria	47.76560	14.20790	50.0000	Titanochelon	Titanochelon steinbacheri	Karl, 1996
758	Andarak 2, Osh Region	Kyrgyzstan	39.79000	69.49000	50.5000	Hadrianus	Hadrianus vialovi	(Chkhikvadze, 1984)
759	Andarak 1, Osh Region	Kyrgyzstan	39.74990	69.49160	52.0000	Hadrianus	Hadrianus vialovi	(Chkhikvadze, 1984)
760	Khayzhin-Ula 2	Mongolia	44.20000	100.00000	52.0000	Kansuchelys	Kansuchelys sp.	Ye, 1963
761	Saint-Papoul NE Carcasonne, Aude	France	43.33330	2.03330	52.2000	Fontainechelon	Fontainechelon cassouleti	(Claude & Tong, 2004)
762	North Fork, Wapiti Valley north Shoshone River (NF-16 Wapiti II), Park County, Wyoming	USA	44.30000	-109.00000	52.8500	Hadrianus	Hadrianus sp.	Cope, 1872
763	North Fork, Wapiti Valley north Shoshone River (NF-17 Wapiti II), Park County, Wyoming	USA	44.30000	-109.00000	52.8500	Hadrianus	Hadrianus sp.	Cope, 1872
764	North Fork, Wapiti Valley north Shoshone River (NF-3 Wapiti II), Park County, Wyoming	USA	44.30000	-109.00000	52.8500	Hadrianus	Hadrianus sp.	Cope, 1872
765	North Fork, Wapiti Valley north Shoshone River (NF-8 Wapiti II), Park County, Wyoming	USA	44.30000	-109.00000	52.8500	Hadrianus	Hadrianus sp.	Cope, 1872
766	UCMP V70251, Patrick Draw S, Sweetwater County, Wyoming	USA	41.70000	-109.00000	52.9000	Hadrianus	Hadrianus majusculus	Hay, 1904
767	UCMP V70251, Patrick Draw S, Sweetwater County, Wyoming	USA	41.70000	-109.00000	52.9000	Hadrianus	Hadrianus sp.	Cope, 1872
768	UCMP V74024, Turtle Graveyard General, Sweetwater County, Wyoming	USA	41.00000	-108.00000	52.9000	Hadrianus	Hadrianus majusculus	Hay, 1904
769	Tsagan-Khushu (Naran member, layer 2)	Mongolia	43.45500	100.37000	56.1100	gen.	gen. Indet.	Gray, 1825
770	Kaseki-Kabe near Shiramine, Kuwajima, Hakusan City, Ishikawa Prefecture, Honshu	Japan	36.20000	136.63300	122.0000	gen.	gen. indet.	Gray, 1825

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Eigenständigkeitserklärung

Hiermit versichere ich, dass ich die vorliegende Masterarbeit erstmalig einreiche, selbständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel verwendet habe.

Berlin, den 15. September 2017