neolithicRC: Eine Suchmaschine für Radiokohlenstoffdatierungen

Clemens Schmid, Dirk Seidensticker

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Radiocarbon datings

Introduction

Since the 1930s, research along the northeastern edge of Lake Eyasi (Karatu District, Arusha Region, Tanzania) has revealed a series of sites with Stone Age ceramic deposits (Kohl-Larsen 1943; Müller-Beck 1978; Mehlman 1989; Mabulla 1996, 2007; Rubaka 2000, 2002; Prendergast *et al.* 2007; Prendergast 2008). These sites are significant because they mark the southernmost extent of two material culture traditions: Kansyore ceramics, which are primarily found at Later Stone Age (LSA) sites dating *ca* 8000–1800 BP[1] in the Lake Victoria basin (***Fig. 1A***) and are associated with a fishing-foraging economy and, in later occupations, domestic livestock (Lane *et al.* 2007; Dale & Ashley 2010; Prendergast 2010); and Savanna Pastoral Neolithic (SPN) ceramics, associated with the spread of herding from Lake Turkana through the Rift Valley and across the plains of southern Kenya and northern Tanzania, *ca* 5000–1200 BP (Bower 1991; Gifford-Gonzalez 1998; Ambrose 2001; Marshall *et al.* 2011; Wright 2011). Both traditions are key to understanding transitions from foraging to food production in eastern Africa, and the Eyasi Basin has been positioned as a possible long-term interaction zone for foragers and herders (Lane 2004; Prendergast & Mutundu 2009; Gifford-Gonzalez 2011). However, this "southern frontier" is poorly understood in terms of local and regional chronologies, and little is known of relationships between Eyasi sites and their better-documented counterparts in Kenya. Here we present two dates obtained on organic carbon in Kansyore and SPN (Narosura) ceramic sherds from the sites of Mumba Rockshelter and Gileodabeshta 2 (***Fig. 1B***), respectively, which confirm and refine chronologies first advanced by Mehlman (1989). These findings highlight the potential of direct dating at Stone Age ceramic sites, particularly where stratigraphic disturbance or collagen preservation are concerns.

Prior research and chronologies for Eyasi Basin sites

Mumba Rockshelter

Mumba, a spacious shelter *ca* 2–4 km east of Lake Eyasi, has been excavated in three separate campaigns and is best-known for its Middle Stone Age (MSA) through LSA lithic sequence (Kohl-Larsen 1943; Mehlman 1989; Diez-Martin *et al.* 2009). However, it also has significant ceramic components in Upper Bed III and overlying Bed II, with 41 % of diagnostic sherds in the 1938 and 1977/1981 collections attributed to the Kansyore tradition, and fewer to SPN (Narosura) and Iron Age (Lelesu) traditions (Smolla 1957; Mehlman 1989).

Stratigraphic disturbances in Upper Bed III in the center of the shelter were caused by ten burials of at least eighteen individuals (Bräuer 1980). Peripheral areas, however, appear intact aside from isolated burials (Mehlman 1989; Prendergast *et al.* 2007). Indeed, Mehlman (1979: 90–91, 1989: 418) argues there is relatively clear stratification of Kansyore, Narosura and Lelesu ceramics in his units. However, Upper Bed III must have a complex depositional history: radiometric dates show marked variation and no clear relationship to depth (***Tab. 1, Fig. 2***), and the co-occurrence of Kansyore, Narosura and Lelesu ceramics in Prendergast *et al.*'s (2007) Bed III, Level 2

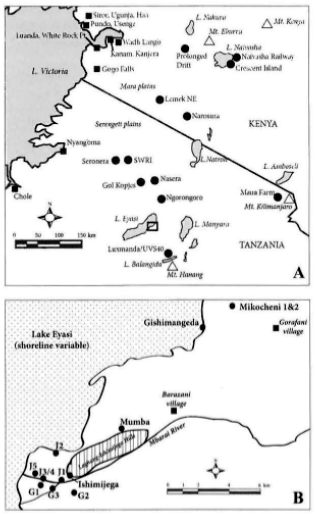

Fig. 1. A: Southern Kenya and northern Tanzania, showing sites with ceramics attributed to the Kansyore (square) and Narosura (circle) traditions. B: Detail of the Mang'ola basin, with modern towns (squares) and archaeological sites (circles) (J = Jangwani, G = Gileodabeshta).

1 Individual dates in this paper are presented as uncalibrated years bp, or calibrated years BP within the 2-sigma range, using the SHCal13 curve (Hogg *et al.* 2013) in OxCal Version 4.2.3. Date ranges BP are intended to provide a general framework and do not imply precision.

Year/ Trench	Context	Associated ceramics	Material/Method	uncal bp	cal BP*	Lab #	Reference
1977/2	Hearth near Burial XIX, Bed III/II junction	K, overlain by K, SPN & IA	Charcoal/C14	1780±80	1865–1433	ISGS-565	Mehlman 1989
2005/6	Bed III, Level 1 (Spit 1)	TCR	Charcoal/AMS C14	920±30	905–725	OS-61329	Prendergast *et al.* 2007
2005/6	Bed III, Level 2 (Spit 2)	K, SPN, IA	Ceramic/AMS C14	4190±20	4825–4574	ISGS-A2413	present work
1977/2	Bed III, 45–55 cm	K	Charcoal/AMS C14	1710±25	1696–1525	OS-63027	Prendergast 2008
2005/8	Bed III, Level 2 (Spit 3)	K, SPN, IA	Charcoal/AMS C14	1843±60	1876–1582	AA-69911	Prendergast *et al.* 2007
1938	Bed III, Burial IX	K	Charcoal/C14	4860±100	5844–5313	UCLA-1913	Bräuer 1980
1938	Bed III, Burial IX	K	Bone collagen/C14	4890±70	5740–5329	FRA-1	Bräuer 1980
2007/5	Bed III, 40 cm below surface (equivalent to Bed III, Level 2)	K, SPN, IA	Quartz/OSL	-	840±160 (min) 12,000±1700 (max)	Wollongong #MR2	Gliganic *et al.* 2012

Tab. 1. Radiometric dates from Mumba Rockshelter Upper Bed III (K = Kansyore, SPN = Savanna Pastoral Neolithic [Narosura], IA = Iron Age [Lelesu], TCR = Twisted-cord roulette. *Radiocarbon dates calibrated using the ShCal13 curve in OxCal version 4.2, 2-sigma range).

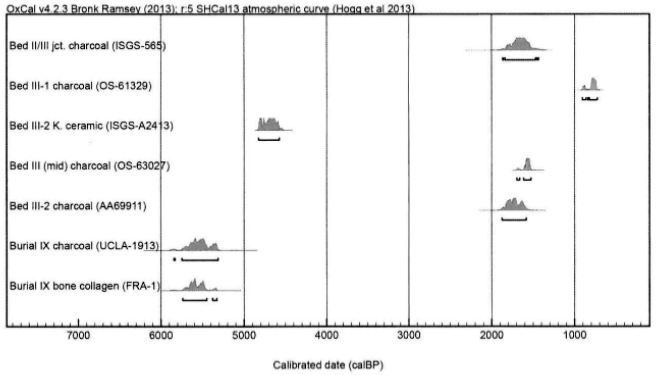

Fig. 2. Plot of calibrated BP dates from Upper Bed III at Mumba Rockshelter (see ***Tab. 1***). Note the lack of correspondence between depth within Bed III and chronology.

raises the possibility that there may be macroscopically invisible disturbance. This is confirmed by optically stimulated luminescence (OSL) dating of quartz and K-feldspar grains. A sample from III-2 gives a range spanning more than 11,000 years, indicating "these sediments have been extensively disturbed since initial deposition, with the oldest grains exposed to sunlight more recently than the vast majority of grains in [a sample from the underlying middle Bed III]" (Gliganic *et al.* 2012: 514). Two sets of dates are available for Upper Bed III. The first comes from Burial IX, the deepest burial, containing a large Kansyore sherd that refits with five others recovered 80 cm above. Collagen from the human remains produced a date of 4890±70 bp (Bräuer 1980), which Mehlman (1989) questioned, citing his critique of unrelated dates from the same lab (Mehlman 1984). Charcoal associated with the burial produced a remarkably similar date of 4860±100 bp. Even if the collagen date is disregarded, the charcoal date serves as a *terminus post quem* for

Figure 1: Prendergast, Grillo *et al.* 2014 - New Dates for Kansyore and Pastoral Neolithic Ceramics in the Eyasi Basin, Tanzania

Radiocarbon datings

- Bedeutung von Radiokohlenstoffdatierungen für Modellierung der Ausbreitung archäologischer Phänomene
- Faktoren für den Diskurs:
  - Datenbestand
  - Algorithmus

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ARTICLE

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Regional population collapse followed initial agriculture booms in mid-Holocene Europe

Stephen Shennan[1], Sean S. Downey[1,2], Adrian Timpson[1,3], Kevan Edinborough[1], Sue Colledge[1], Tim Kerig[1], Katie Manning[1] & Mark G. Thomas[3]

Following its initial arrival in SE Europe 8,500 years ago agriculture spread throughout the continent, changing food production and consumption patterns and increasing population densities. Here we show that, in contrast to the steady population growth usually assumed, the introduction of agriculture into Europe was followed by a boom-and-bust pattern in the density of regional populations. We demonstrate that summed calibrated radiocarbon date distributions and simulation can be used to test the significance of these demographic booms and busts in the context of uncertainty in the radiocarbon date calibration curve and archaeological sampling. We report these results for Central and Northwest Europe between 8,000 and 4,000 cal. BP and investigate the relationship between these patterns and climate. However, we find no evidence to support a relationship. Our results thus suggest that the demographic patterns may have arisen from endogenous causes, although this remains speculative.

[1] Institute of Archaeology, University College London, 31-34 Gordon Square, London WC1H 0PY, UK. [2] Department of Anthropology, University of Maryland, 1111 Woods Hall, College Park, Maryland 20742, USA. [3] Research Department of Genetics, Evolution and Environment, University College London, Darwin Building, Gower Street, London WC1E 6BT, UK. Correspondence and requests for materials should be addressed to S.S.D. (email: sdowney2@umd.edu).

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Modelling the Spread of Farming in the Bantu-Speaking Regions of Africa: An Archaeology-Based Phylogeography

Thembi Russell[1]*, Fabio Silva[2,3], James Steele[1,2]

1 School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Johannesburg, South Africa, 2 Institute of Archaeology, University College London, London, United Kingdom, 3 School of Archaeology, History and Anthropology, University of Wales Trinity Saint David, Lampeter, United Kingdom

Abstract

We use archaeological data and spatial methods to reconstruct the dispersal of farming into areas of sub-Saharan Africa now occupied by Bantu language speakers, and introduce a new large-scale radiocarbon database and a new suite of spatial modelling techniques. We also introduce a method of estimating phylogeographic relationships from archaeologically-modelled dispersal maps, with results produced in a format that enables comparison with linguistic and genetic phylogenies. Several hypotheses are explored. The 'deep split' hypothesis suggests that an early-branching eastern Bantu stream spread around the northern boundary of the equatorial rainforest, but recent linguistic and genetic work tends not to support this. An alternative riverine/littoral hypothesis suggests that rivers and coastlines facilitated the migration of the first farmers/horticulturalists, with some extending this to include rivers through the rainforest as conduits to East Africa. More recently, research has shown that a grassland corridor opened through the rainforest at around 3000–2500 BP, and the possible effect of this on migrating populations is also explored. Our results indicate that rivers and coasts were important dispersal corridors, but do not resolve the debate about a 'Deep Split'. Future work should focus on improving the size, quality and geographical coverage of the archaeological ^{14}C database; on augmenting the information base to establish descent relationships between archaeological sites and regions based on shared material cultural traits; and on refining the associated physical geographical reconstructions of changing land cover.

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* E-mail: thembiwe.russell@wits.ac.za

Introduction

In just a few thousand years farming spread from a cradle in West Africa to cover an area of more than 23 million square kilometres of sub-Saharan Africa, occupied today by more than 200 million Bantu language speakers speaking approximately 440 to 680 different Bantu languages [1]. It has been hypothesised that farming and Bantu languages dispersed simultaneously through demic expansion [2,3,4,5,6,7,8]. This is debated in archaeology, where there are proponents of demic expansion, cultural adaptation-diffusion, and demic diffusion explanations [9,10,11,12,13,14,15]. A literature review reveals however that demic expansion is still the overwhelmingly favoured explanation (see Table S1). Working within the demic expansion/demic diffusion framework, this paper describes new models of the spread of these farming populations from an origin in West Africa under different possible sets of environmental constraints, conditioned by archaeological evidence from a newly-compiled geo-referenced radiocarbon database.

Linguistic and archaeological evidence places the cradle of Bantu-language speakers in the Nigeria-Cameroon border area [7,16] and it is from here, that the expansion of pottery-making Neolithic Bantu-speaking horticulturalists/farmers started, with archaeologists finding apparent evidence for an early 'deep split' into two branches: the Eastern Bantu and the Western Bantu [6,7,16,17]. The earliest pottery found in a Bantu-speaker area is that from the site of Shum Laka in north-western Cameroon, dating to perhaps as early as 7000 BP [18,19,20,21,22]. Western Bantu expansion happened southwards from here, with the area to the west of the Sangha River, in the Democratic Republic of Congo, being settled first [16]. The pottery traces of the southward expansion are found at Obobogo in Cameroon; at the Denis 1 and 3 Settlements in Gabon (5000–3000 BP); at Nougoheyok in Gabon (4800–4400 BP) and at the sites of Okala, Ndjolé, Kango, Lalala, Mindouhé, Inkenguè, Mbalapé and Lopé in Gabon (2600–2400 BP) [18]. The pottery is found in similar contexts to the Shum Laka pottery; in association with the remains of village settlements, polished stone tools such as axes and hoes, upper and lower grinding stones, grooved stones, charcoal, quartz debitage, evidence of palm tree cultivation and the grains of the *Canarium schweinfurthii* [1,16,18,19]. Yams, which may also have been cultivated, leave no archaeological trace [16]. These early farmers were neither smelting nor using metal [16,18,19,20,23,24]. The expansion of the Western branch southwards and southeastwards through Central Africa continued as far as the present Zambia-

Modelling the diffusion of pottery technologies across Afro-Eurasia: emerging insights and future research

Peter Jordan[1,*], Kevin Gibbs[2], Peter Hommel[3], Henny Piezonka[4], Fabio Silva[5] & James Steele[5,6]

Where did pottery first appear in the Old World? Statistical modelling of radiocarbon dates suggests that ceramic vessel technology had independent origins in two different hunter-gatherer societies. Regression models were used to estimate average rates of spread and geographic dispersal of the new technology. The models confirm independent origins in East Asia (c. 16 000 cal BP) and North Africa (c. 12 000 cal BP). The North African tradition may have later influenced the emergence of Near Eastern pottery, which then flowed west into Mediterranean Europe as part of a Western Neolithic, closely associated with the uptake of farming.

Keywords: Neolithic transition, hunter-gatherers, agriculture, pottery, statistical model, radiocarbon dating, diffusion

Introduction

The origins of pottery and farming—and their roles in the European Neolithic—have occupied a central place in archaeological debate for over a century. Long assumed to be derived from a single origin in the Near East, these innovations now appear to have more complex and largely independent histories, extending beyond Europe and the Near East. There is now abundant evidence that in two areas, North Africa and East Asia, pottery was made by hunter-gatherer groups earlier than 10 000 cal BP. Modelling of available radiocarbon dates from across Africa and Eurasia indicates that pottery sites get younger with distance from each of these two potential source regions, and suggests that the earliest European pottery traditions may ultimately find their origins in one or both of these centres.

In this article, we focus on the emergence of pottery in the Old World and model its dispersal at continental scales using a dataset of radiocarbon dates from early pottery sites in

[1] *Arctic Centre, University of Groningen, PO Box 716, 9700 AS Groningen, the Netherlands*
[2] *Department of Anthropology, University of Nevada, Las Vegas, Box 455003, 4505 S. Maryland Parkway, Las Vegas, NV 89154, USA*
[3] *Institute of Archaeology, University of Oxford, 36 Beaumont Street, Oxford OX1 2PG, UK*
[4] *Eurasia Department, Deutsches Archäologisches Institut, Im Dol 2–6, Berlin 14195, Germany*
[5] *Institute of Archaeology, University College London, 31–34 Gordon Square, London WC1H 0PY, UK*
[6] *School of Geography, Archaeology and Environmental Sciences, University of the Witwatersrand, Jan Smuts Avenue, Braamfontein, Johannesberg 2000, South Africa*
* *Author for correspondence (Email: p.d.jordan@rug.nl)*

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Figure 2: Shennan, Downey *et al.* 2013; Russell, Silva *et al.* 2014; Jordan, Gibbs *et al.* 2016

Radiocarbon datings

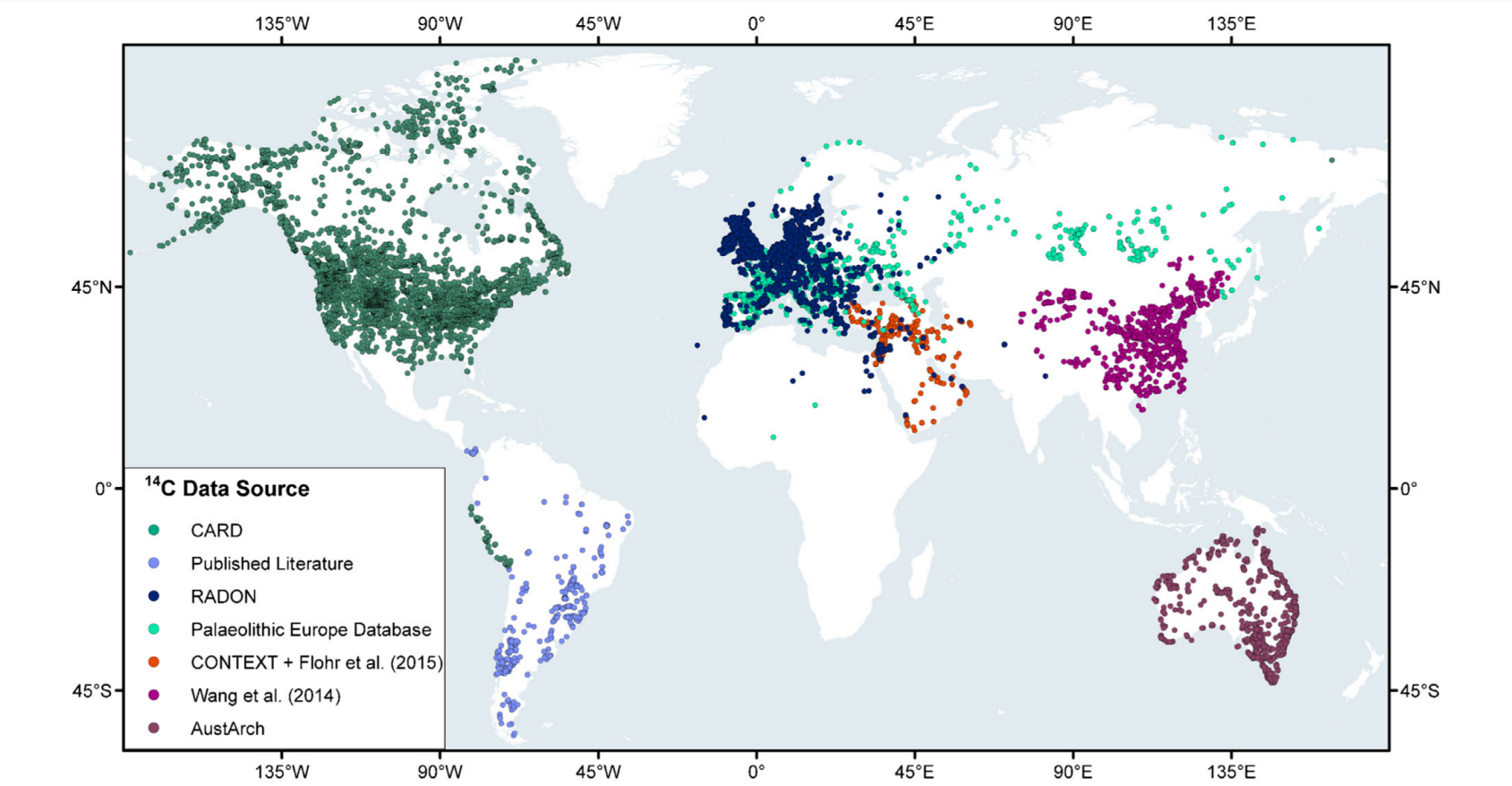


Fig. 1. Distribution of archaeological radiocarbon databases publically available on the web or in open literature (Table 1). Some points are dated using other methods (e.g., luminescence). Locations of dates from Gil et al. (2005),Mancini et al. (2013), Barnosky and Lindsey (2010), Campbell and Quiroz (2015), Latorre et al. (2013) and Lombardo et al. (2013) were georeferenced in ArcGIS from original publication figures.

Figure 3: Chaput, Gajewski 2015: 3 Fig. 1

Best practice: Archives des datations radiocarbone d'Afrique centrale

- OpenData-Veröffentlichung von publizierten ^{14}C-Datierungen aus Zentralafrika (DOI 10.5281/zenodo.61113)

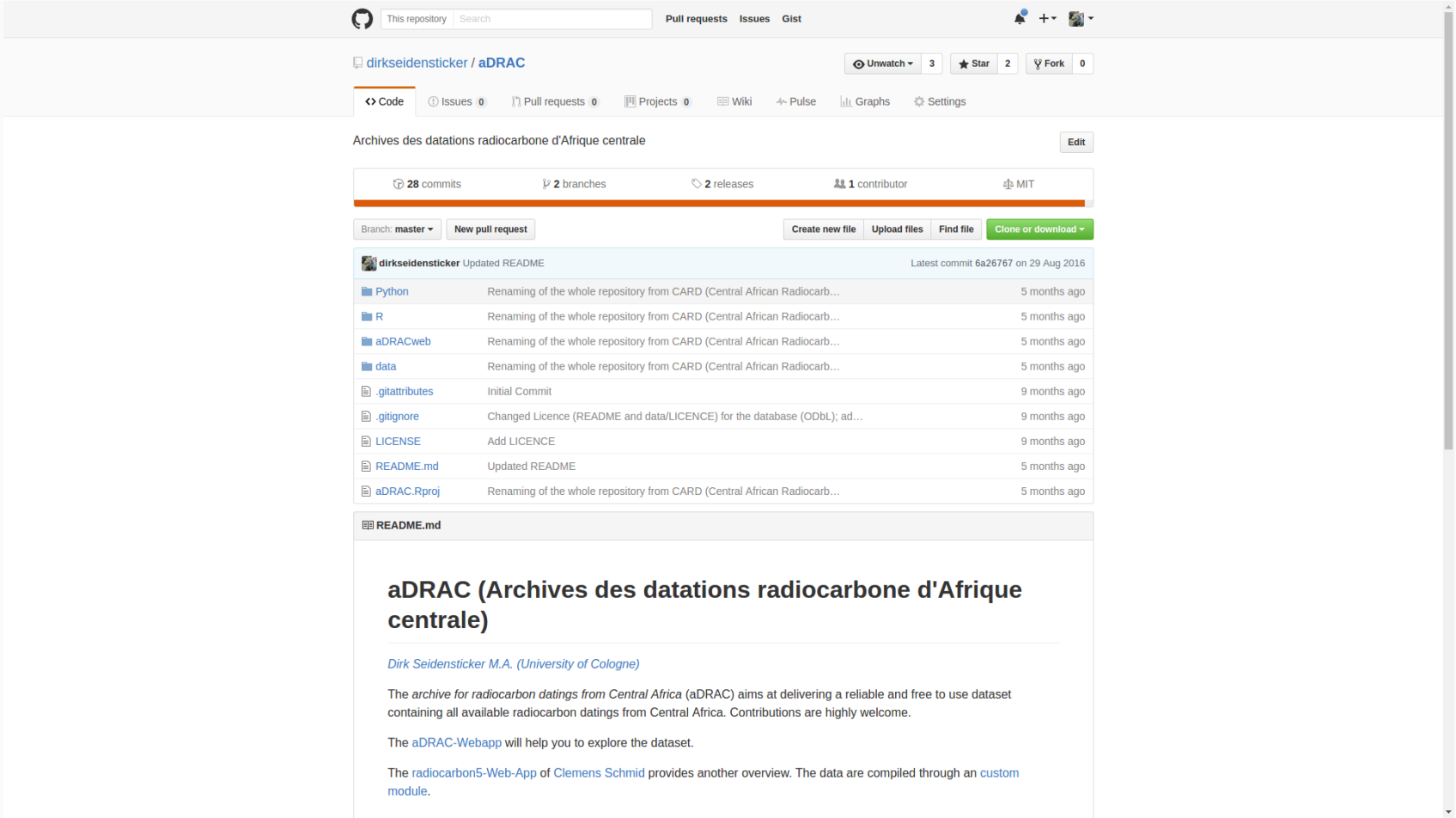


Figure 4: GitHub-Archiv

Best practice: Archives des datations radiocarbone d'Afrique centrale

Branch: master ▾ aDRAC / data / aDRAC.csv Find file Copy path

dirkseidensticker Renaming of the whole repository from CARD (Central African Radiocarb… a7cc96a on 29 Aug 2016

1 contributor

1193 lines (1192 sloc) 87.8 KB Raw Blame History

Search this file…

	LABNR	C14AGE	C14STD	C13	MATERIAL	SITE	COUNTRY	FEATURE	FEATURE_DESC	LAT	LO
2	AA-78447	2362	39	0.0		Mbaere	CAF		Pollencore	3.988639	16
3	AA-78448	2171	37	0.0		Mbaere	CAF		Pollencore	3.988639	16
4	AA-78449	834	35	0.0		Mbaere	CAF		Pollencore	3.988639	16
5	Arc-339	2310	60	0.0	Charcoal	Mont Brazza	GAB				
6	Arc-340	540	50	0.0		Mont Barnier	COG			-4.18639	15
7	Arc-341	2210	100	0.0	Charcoal	Kango 5	GAB			0.200833	10
8	Arc-343	1900	50	0.0		Oveng	GAB			0.478611	9.
9	Arc-373	2110	60	0.0		Les Saras	COG			-4.183333	12
10	Arc-530	2390	65	0.0		Otoumbi 13	GAB			-0.076389	11
11	B-263	1240	120	0.0		Sanga	COD				
12	B-264	1070	200	0.0		Sanga	COD				
13	B-696	6780	150	0.0		Mose	COD				

Figure 5: Datensatz im CSV-Format

Best practice: Archives des datations radiocarbone d'Afrique centrale

Description of the aDRAC-Dataset

Datafield	Description
LABNR	Laboratory number; all spaces where changed/unified to dashes
C14AGE	Carbon-14 Age
C14STD	Standard deviation
C13	Carbon-13 amount
MATERIAL	Dated Material
SITE	Name of the Site
COUNTRY	ISO 3166-1 alpha-3 three-letter country code
FEATURE	Designation of the Feature
FEATURE_DESC	Category of the Feature
LAT	Latitude as decimal degrees [1]
LONG	Longitude as decimal degrees [1]
SOURCE	Source

1 All geo-coordinates included within aDRAC are either obtained from the published sources that contained the radiocarbon dates itself or were derived by searching for the name of the site within geonames.org

Figure 6: Beschreibung des Datensatzes

Best practice: Archives des datations radiocarbone d'Afrique centrale

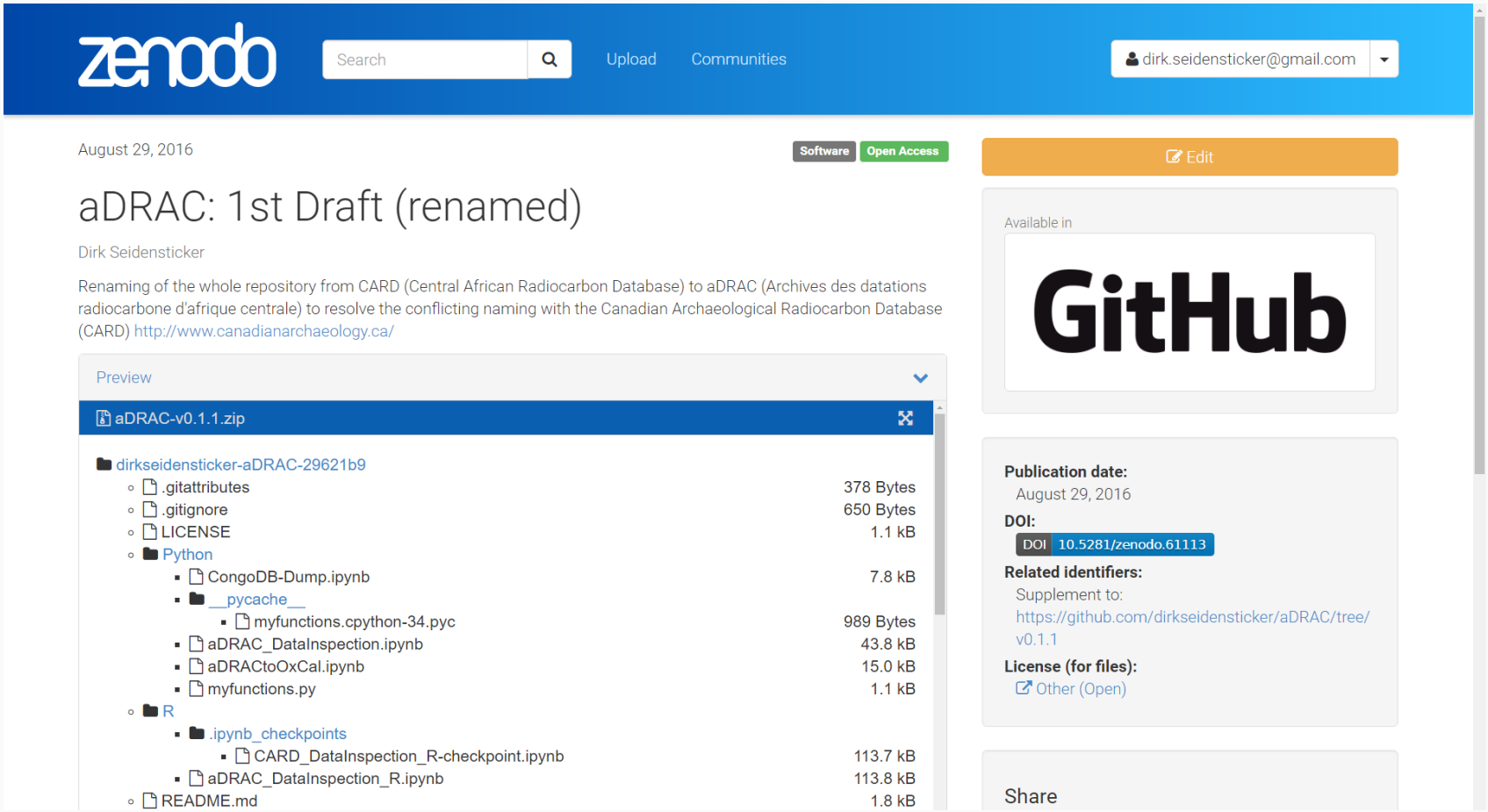


Figure 7: Veröffentlichung der Daten via Zenodo

Parsing the Past

"Building a database, per se, will be a thing of the past. Those databases will be dynamically generated based on the questions you're interested in, and the machine will do the heavy lifting."

– Shanan Peters (Univ. Wisconsin-Madison; Callaway 2015 - Computers read the fossil record. Nature 523: 115)

neolithicRC

Projektkontext

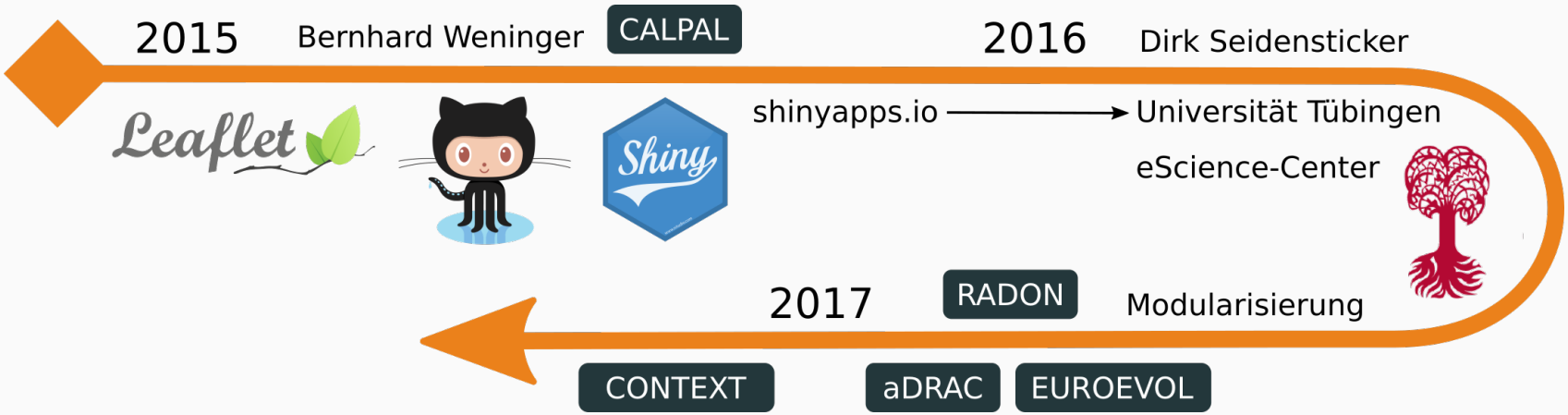


Figure 8: Timeline der Entwicklung von neolithicRC

- **DIY Freizeit- und Übungsprojekt** ohne institutionelle Anbindung
- intensiver Austausch mit den Teams hinter CALPAL und RADON
- strukturelle Anbindung an das eScience-Center der Universität Tübingen
- **Warum machen wir das?**
  - Technische Weiterentwicklung eines Werkzeugs
  - Verstehen von Datenverarbeitungs- und Datenhaltungsproblemen
  - Kommunizieren von zeitgemäßen Lösungsansätzen

Projektkonzept

Entwicklungsumgebung

- **R + RStudio:** Einfache Programmiersprache mit riesigem Funktionsumfang in einer optimierten IDE
- **shiny + htmlwidgets:** WebApp-Framework und R-JavaScript Interfaces zur interaktiven Datenvisualisierung
- **git + github:** Versionskontrollsoftware und Cloud-Plattform zur OpenSource-Softwareentwicklung

`https://github.com/nevrome/neolithicR`

Modulstruktur

Klare Trennung einzelner Datenverarbeitungs- und Visualisierungsschritte (Import, Bereinigung, WebApp) um einen zentralen Hub (Datenbank)

- Vereinfachen von Weiterentwicklung und Bugfixing
- Herabsetzen der Einstiegsschwelle für Mitentwickler und Nachnutzer
- Sprach- und Systemunabhängigkeit

Modulaufbau

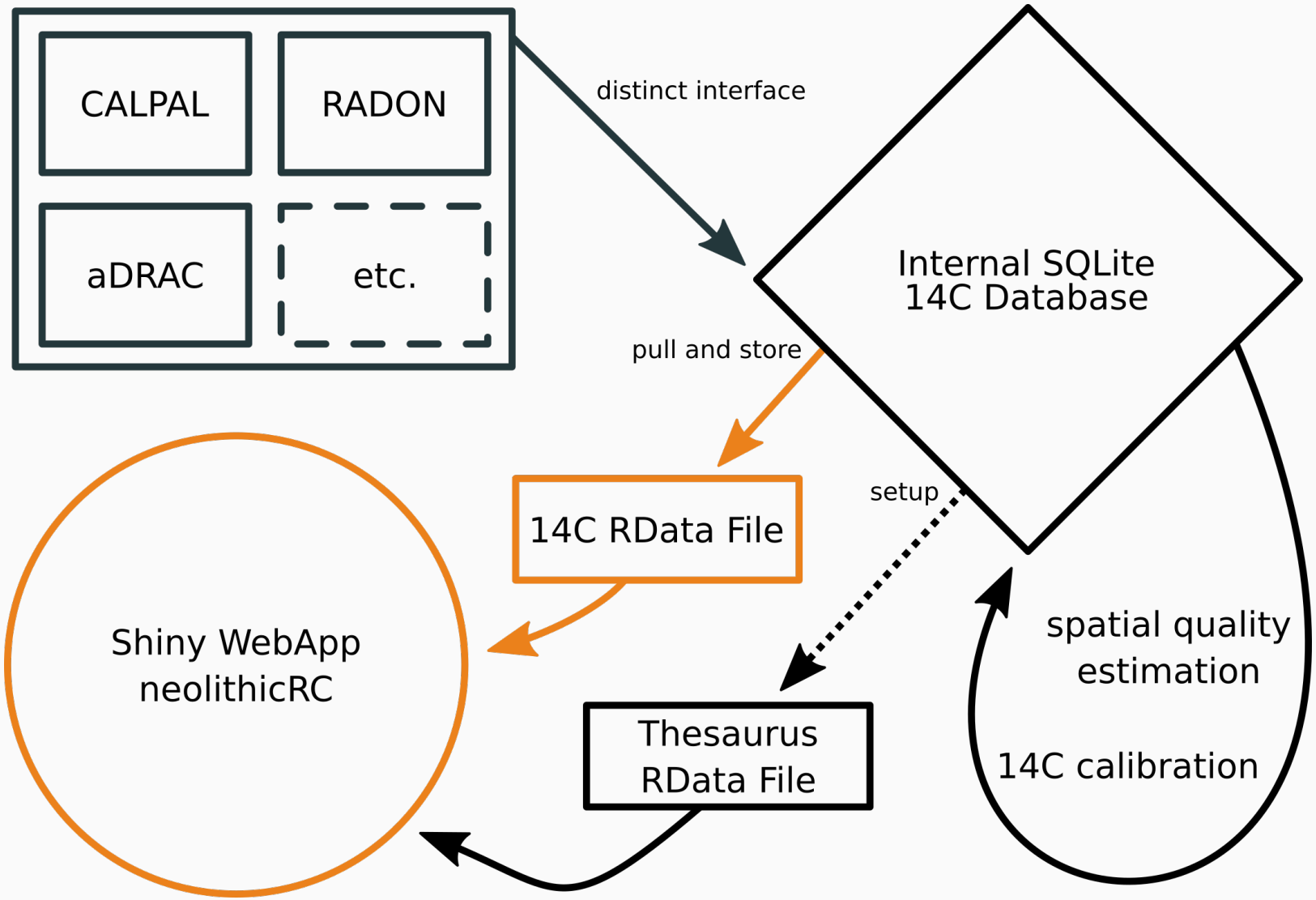


Figure 9: Modulaufbau von neolithicRC

- **CALPAL:** Radiocarbon Database of the CalPal software package.
- **RADON:** Central European and Scandinavian database of ^{14}C dates for the Neolithic and Early Bronze Age.
- **EUROEVOL:** Cultural Evolution of Neolithic Europe Dataset.
- **aDRAC:** Archives des datations radiocarbone d'Afrique centrale.
- **CONTEXT:** Collection of radiocarbon dates from sites in the Near East and neighboring regions (20.000 - 5.000 calBC).

Kerndatenelemente

Schlüssel: Quelldatenbank + Labornummer

Datum	Fundort	Kulturkontext	Probe	Referenz
C14AGE	COUNTRY	CULTURE	MATERIAL	REFERENCE
C14STD	LONGITUDE	PERIOD	SPECIES	NOTICE
CALAGE	LATITUDE	PHASE	C13	
CALSTD	SITE			
	FEATURE			
	LOCUS			

Datenbereinigung

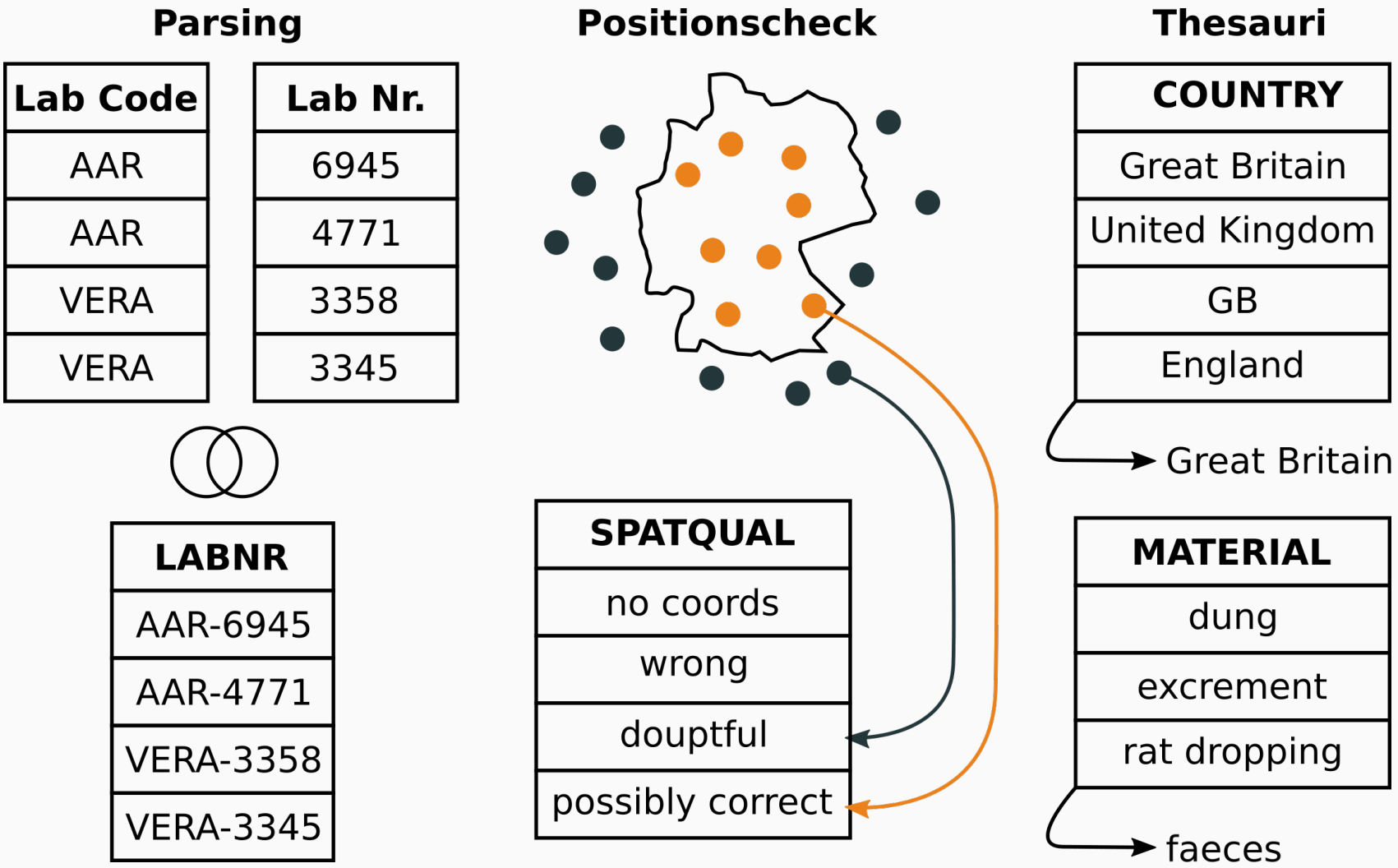


Figure 10: Bisher implementierte Bereinigungschritte

Datenbereinigung – offene Fragen

VERA-1830, Herxheim, Bandkeramik, 7110 ± 113 calBP

	RADON	EUROEVOL	CALPAL
MATERIAL	collagen, bone	human bone	bone
CULTURE	Linienband-keramik	*NA*	Linienband-keramik
PERIOD	n/a	EN	Neolithic
LATITUDE	49.140	49.140	49.146
LONGITUDE	8.210	8.210	8.214
REFERENCE	Whittle et al. 2011 p. 328	*NA*	Wild 2004

- kulturhistorische Zuordnung scheitert ohne einen hierarchischen Thesaurus
- Datenüberschneidungen mit deutlichen Abweichungen zwischen den Quelldatenbanken
  - Bedarf nach Zusammenführung?
  - Zusammenführung nach welcher Prioritätsabfolge?

^{14}C-Kalibration

```r
# 2sigma range probability threshold
threshold <- (1-0.9545)/2

interval95 <- datestable[-outofrange, ] %$%
  # date calibration with comprehensive output
  Bchron::BchronCalibrate(
    ages = C14AGE, ageSds = C14STD,
    calCurves = rep("intcal13", nrow(.)), eps = 1e-06
  ) %>%
  # extract border ages of the 2sigma range
  plyr::ldply(., function(x) {
      x$densities             %>% cumsum -> a      # cumulated density
      which(a <= threshold)   %>% max    -> my_min # lower border
      which(a > 1-threshold) %>% min    -> my_max # upper border
      x$ageGrid[c(my_min, my_max)]
  })

# calculate date as mean of lower and upper border
amean <- apply(interval95[, 2:3], 1, function(x){round(mean(x))})
```

https://forschungsdatenarchiv.escience.uni-tuebingen.de/cSchmid/neolithicRC

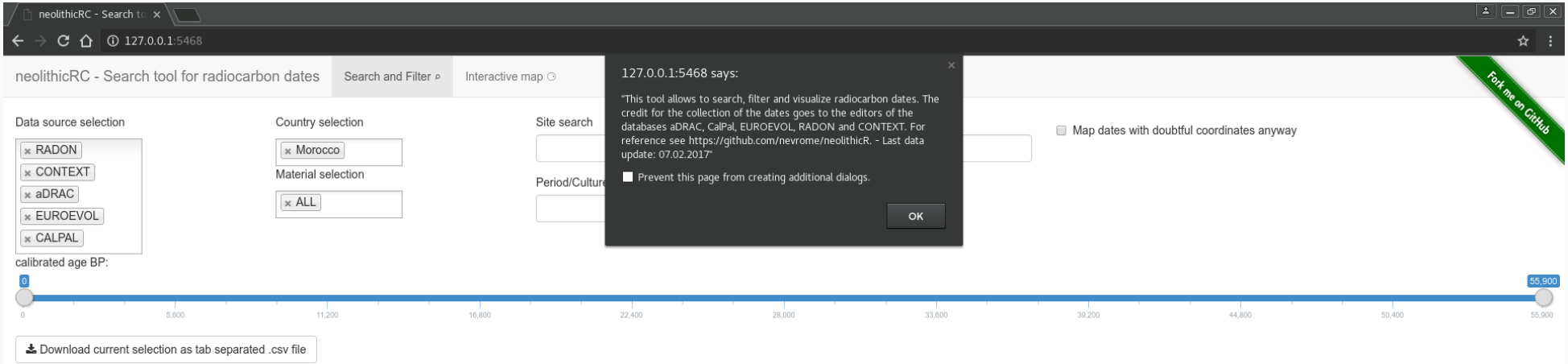
http://neolithicrc.de

Demo

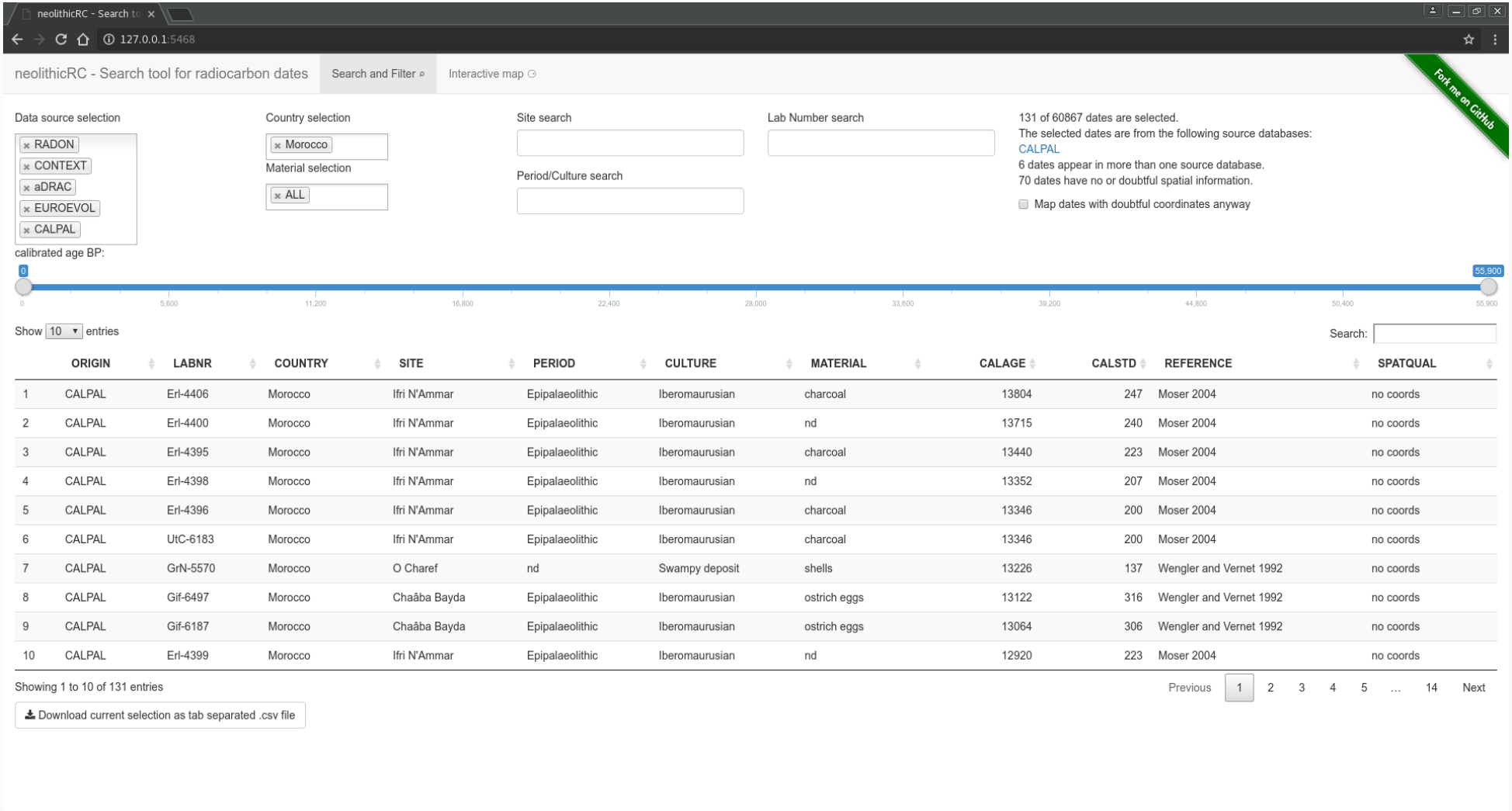
Danke

Clemens Schmid	**Dirk Seidensticker**
Institut für Ur-	eScience-Center
und Frühgeschichte,	Universitätsbibliothek
Universität Kiel	Universität Tübingen
clemens@nevrome.de	dirk.seidensticker@
	uni-tuebingen.de

Demo-Backup

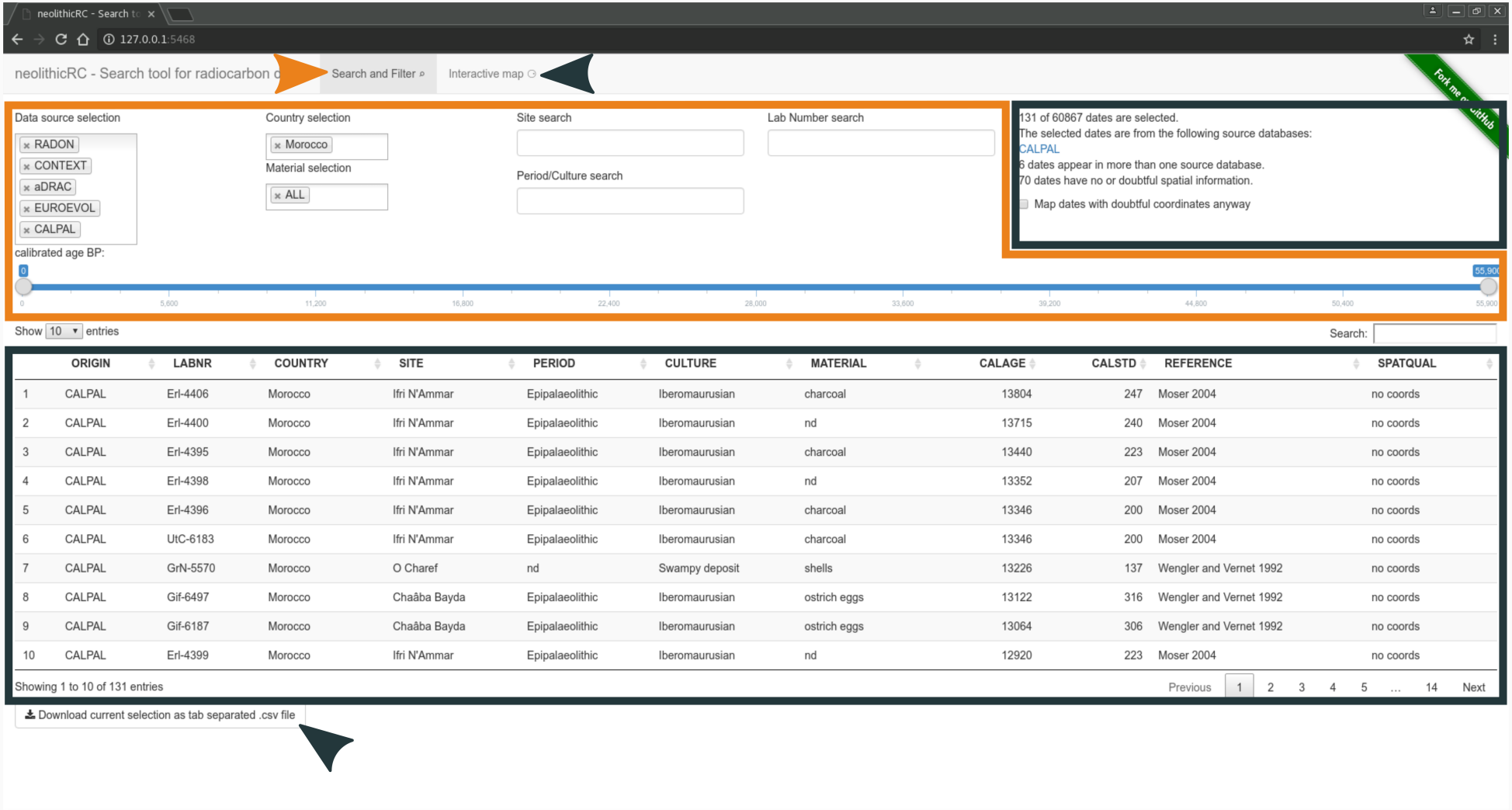

neolithicRC - Search to
127.0.0.1:5468
neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
127.0.0.1:5468 says:
"This tool allows to search, filter and visualize radiocarbon dates. The credit for the collection of the dates goes to the editors of the databases aDRAC, CalPal, EUROEVOL, RADON and CONTEXT. For reference see https://github.com/nevrome/neolithicR. - Last data update: 07.02.2017"
Prevent this page from creating additional dialogs.
OK
Fork me on GitHub
Data source selection
RADON
CONTEXT
aDRAC
EUROEVOL
CALPAL
Country selection
Morocco
Material selection
ALL
Site search
Map dates with doubtful coordinates anyway
calibrated age BP:
0
55,900
0
5,600
11,200
16,800
22,400
28,000
33,600
39,200
44,800
50,400
55,900
Download current selection as tab separated .csv file

Demo-Backup



	ORIGIN	LABNR	COUNTRY	SITE	PERIOD	CULTURE	MATERIAL	CALAGE	CALSTD	REFERENCE	SPATQUAL
1	CALPAL	Erl-4406	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13804	247	Moser 2004	no coords
2	CALPAL	Erl-4400	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	nd	13715	240	Moser 2004	no coords
3	CALPAL	Erl-4395	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13440	223	Moser 2004	no coords
4	CALPAL	Erl-4398	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	nd	13352	207	Moser 2004	no coords
5	CALPAL	Erl-4396	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13346	200	Moser 2004	no coords
6	CALPAL	UtC-6183	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13346	200	Moser 2004	no coords
7	CALPAL	GrN-5570	Morocco	O Charef	nd	Swampy deposit	shells	13226	137	Wengler and Vernet 1992	no coords
8	CALPAL	Gif-6497	Morocco	Chaâba Bayda	Epipalaeolithic	Iberomaurusian	ostrich eggs	13122	316	Wengler and Vernet 1992	no coords
9	CALPAL	Gif-6187	Morocco	Chaâba Bayda	Epipalaeolithic	Iberomaurusian	ostrich eggs	13064	306	Wengler and Vernet 1992	no coords
10	CALPAL	Erl-4399	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	nd	12920	223	Moser 2004	no coords

Demo-Backup

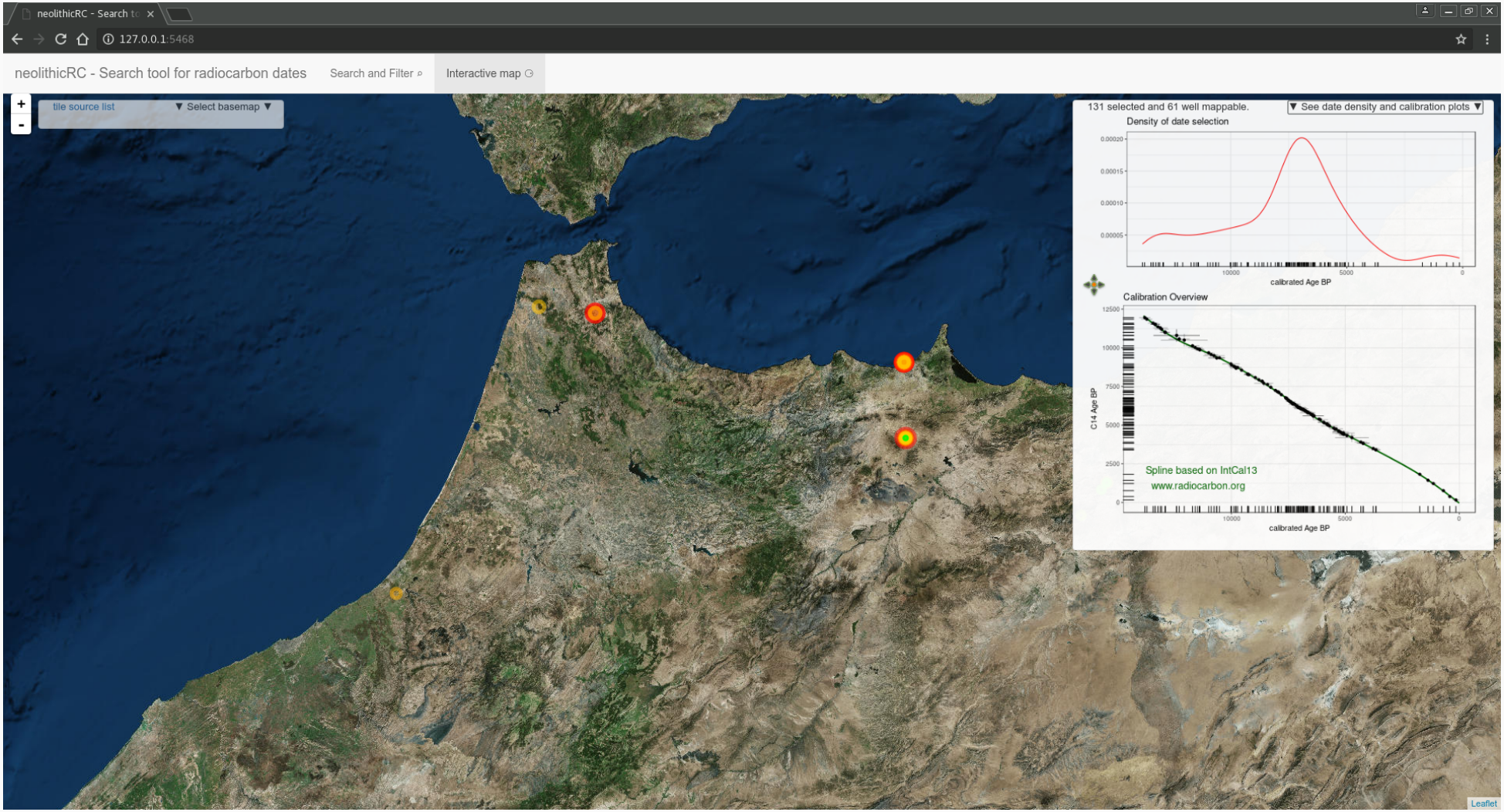


	ORIGIN	LABNR	COUNTRY	SITE	PERIOD	CULTURE	MATERIAL	CALAGE	CALSTD	REFERENCE	SPATQUAL
1	CALPAL	Erl-4406	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13804	247	Moser 2004	no coords
2	CALPAL	Erl-4400	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	nd	13715	240	Moser 2004	no coords
3	CALPAL	Erl-4395	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13440	223	Moser 2004	no coords
4	CALPAL	Erl-4398	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	nd	13352	207	Moser 2004	no coords
5	CALPAL	Erl-4396	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13346	200	Moser 2004	no coords
6	CALPAL	UtC-6183	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	charcoal	13346	200	Moser 2004	no coords
7	CALPAL	GrN-5570	Morocco	O Charef	nd	Swampy deposit	shells	13226	137	Wengler and Vernet 1992	no coords
8	CALPAL	Gif-6497	Morocco	Chaâba Bayda	Epipalaeolithic	Iberomaurusian	ostrich eggs	13122	316	Wengler and Vernet 1992	no coords
9	CALPAL	Gif-6187	Morocco	Chaâba Bayda	Epipalaeolithic	Iberomaurusian	ostrich eggs	13064	306	Wengler and Vernet 1992	no coords
10	CALPAL	Erl-4399	Morocco	Ifri N'Ammar	Epipalaeolithic	Iberomaurusian	nd	12920	223	Moser 2004	no coords

Demo-Backup


neolithicRC - Search to
127.0.0.1:5468
neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
tile source list
▼ Select basemap ▼
131 selected and 61 well mappable.
▼ See date density and calibration plots ▼
Leaflet

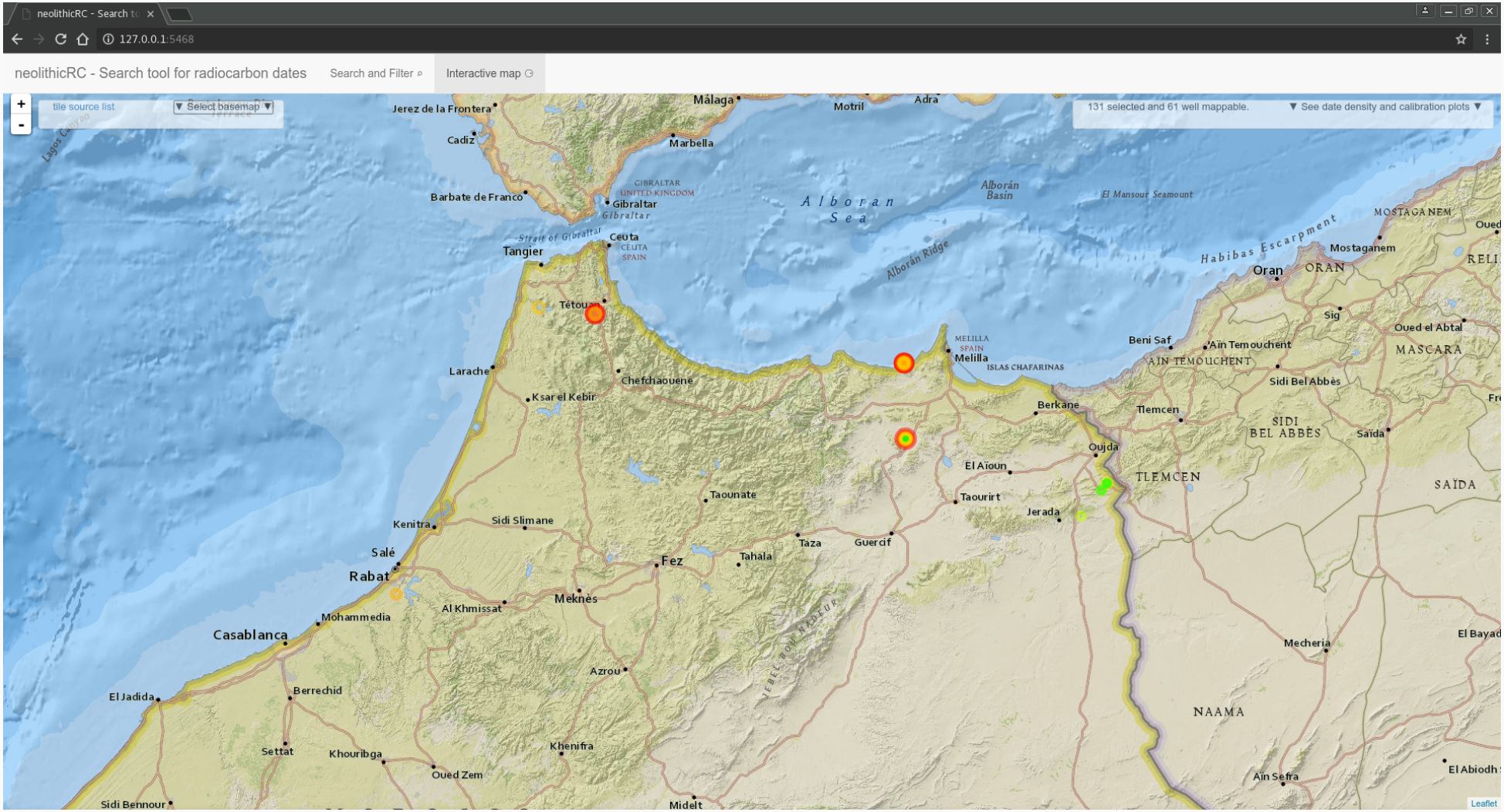
Demo-Backup


neolithicRC - Search to
127.0.0.1:5468
neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
tile source list
▼ Select basemap ▼
131 selected and 61 well mappable.
▼ See date density and calibration plots ▼
Density of date selection
calibrated Age BP
Calibration Overview
C14 Age BP
Spline based on IntCal13
www.radiocarbon.org
calibrated Age BP
Leaflet

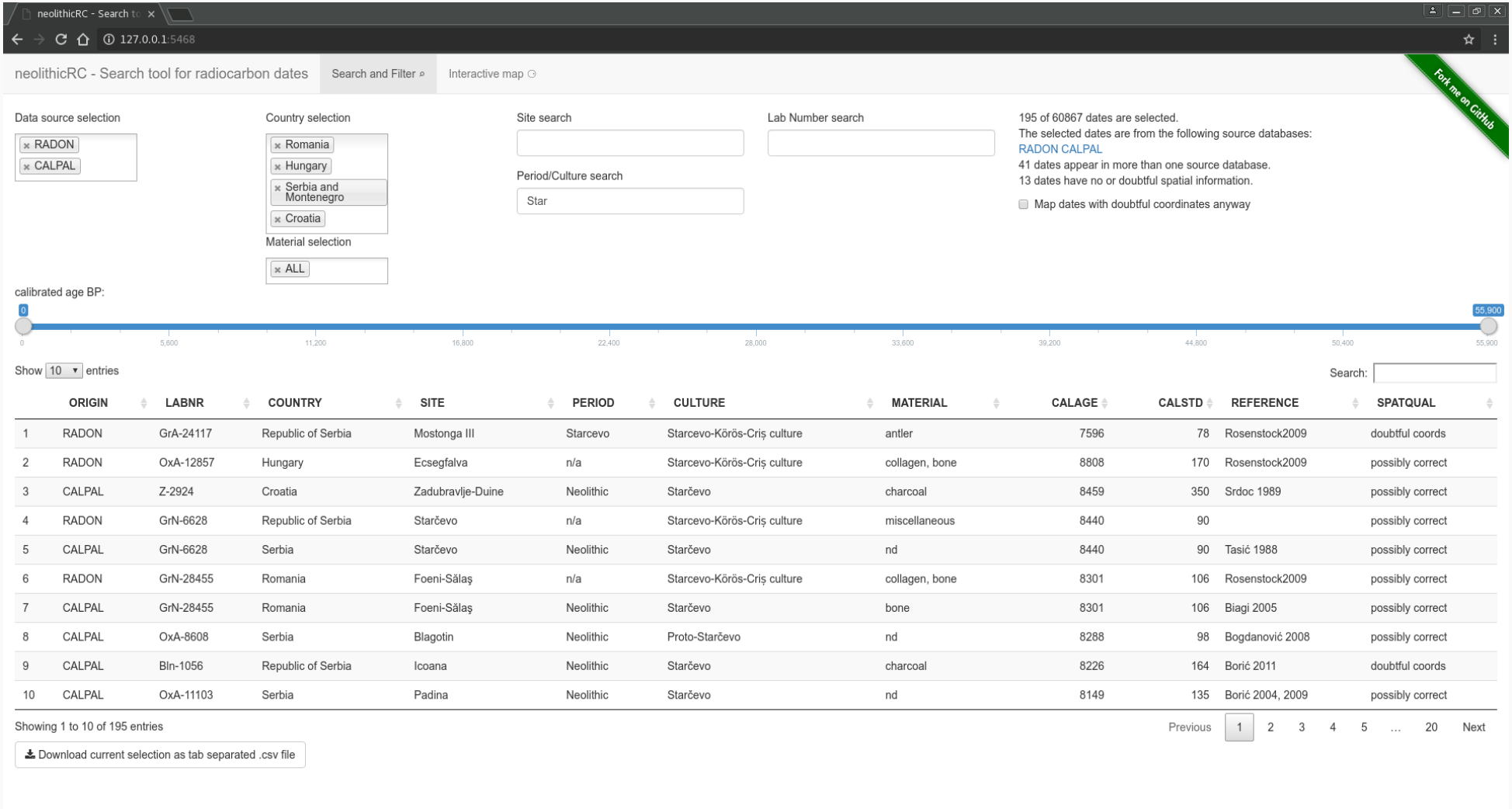
Demo-Backup


neolithicRC - Search to
127.0.0.1:5468
neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
tile source list
▼ Select basemap ▼
Esri.WorldImagery
Esri.WorldImagery
Esri.WorldPhysical
Esri.NatGeoWorldMap
OpenTopoMap
OpenMapSurfer.Roads
131 selected and 61 well mappable.
▼ See date density and calibration plots ▼
Leaflet

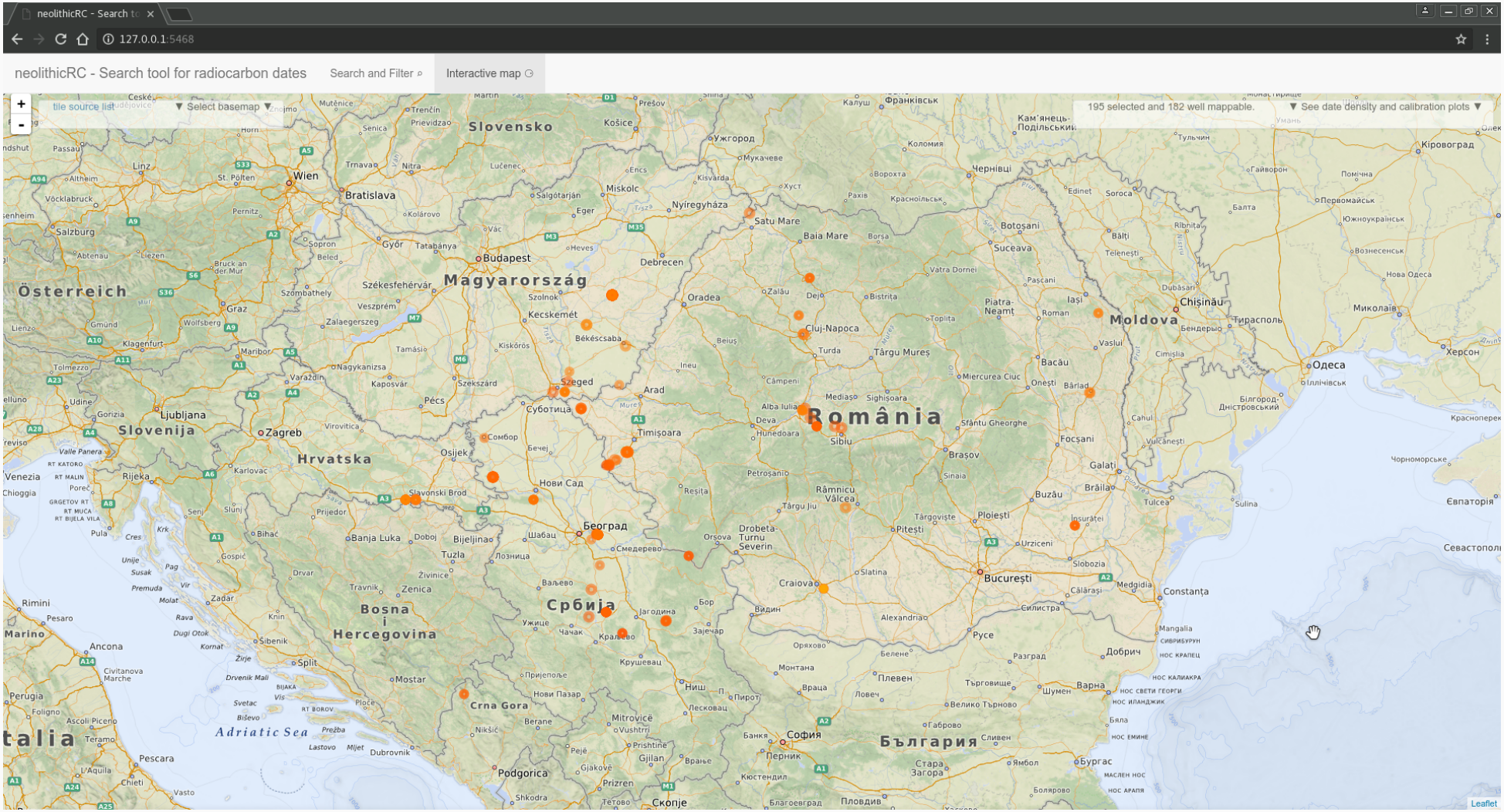
Demo-Backup


neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
tile source list
Select basemap
131 selected and 61 well mappable.
See date density and calibration plots
Jerez de la Frontera
Cadiz
Málaga
Motril
Adra
Marbella
Barbate de Franco
Gibraltar
Alboran Sea
Alborán Basin
El Mansour Seamount
Strait of Gibraltar
Ceuta
Tangier
Alborán Ridge
Habibas Escarpment
Oran
ORAN
MOSTAGANEM
Mostaganem
Sig
Oued el Abtal
MASCARA
Beni Saf
'Aïn Temouchent
AIN TEMOUCHENT
Sidi Bel Abbès
Tétouan
Melilla
ISLAS CHAFARINAS
Larache
Chefchaouene
Ksar el Kebir
Berkane
Tlemcen
SIDI BEL ABBÈS
Saïda
Oujda
El Aïoun
TLEMCEN
SAÏDA
Taounate
Taourirt
Jerada
Kenitra
Sidi Slimane
Taza
Guercif
Salé
Rabat
Fez
Tahala
Meknès
Al Khmissat
Mohammedia
Casablanca
Mecheria
El Jadida
Azrou
Berrechid
NAAMA
Settat
Khouribga
Khenifra
Oued Zem
Aïn Sefra
Sidi Bennour
Midelt
Leaflet

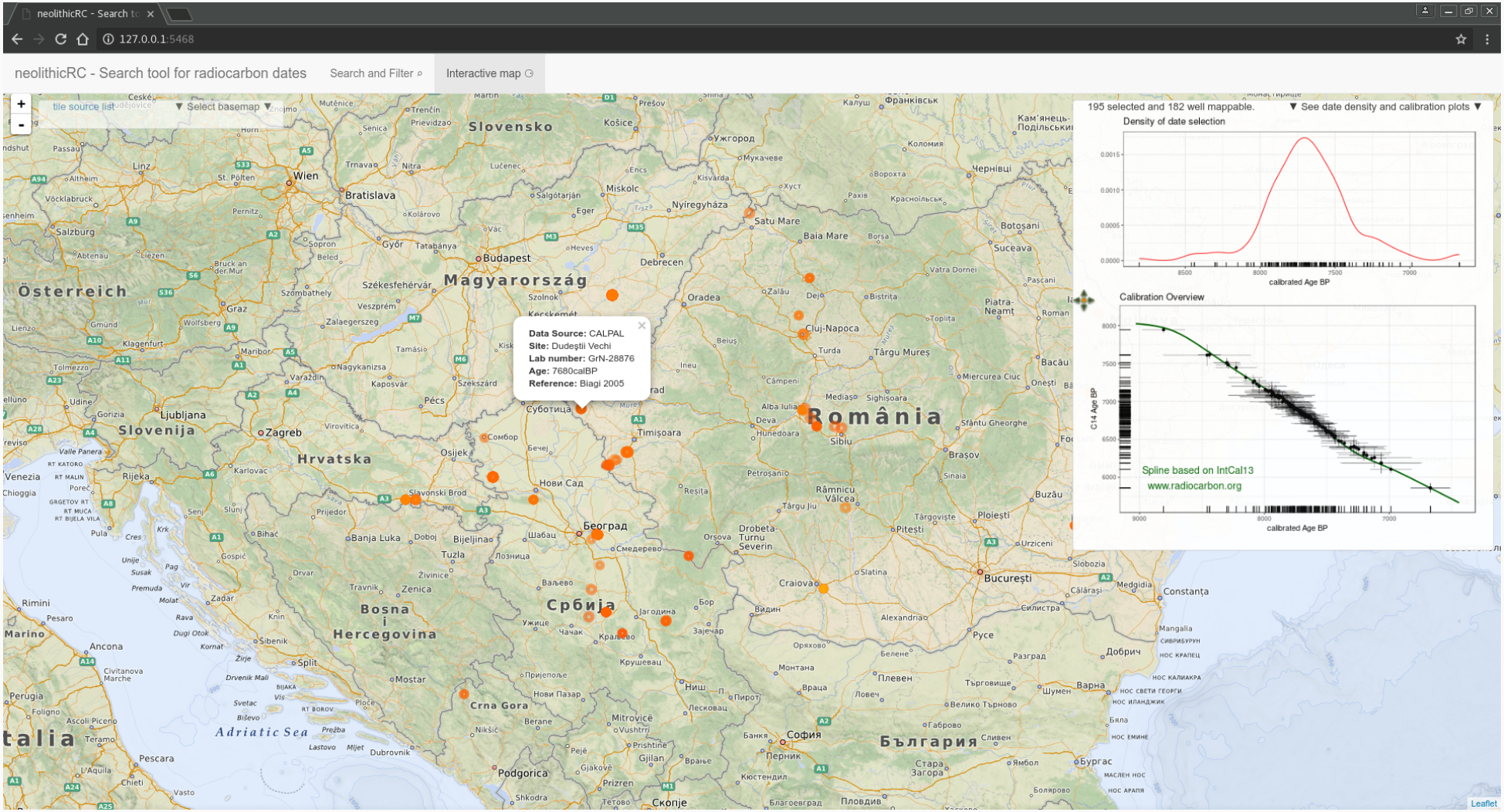
Demo-Backup


neolithicRC - Search to
127.0.0.1:5468
neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
Fork me on GitHub
Data source selection
RADON
CALPAL
Country selection
Romania
Hungary
Serbia and Montenegro
Croatia
Material selection
ALL
Site search
Period/Culture search
Star
Lab Number search
195 of 60867 dates are selected.
The selected dates are from the following source databases:
RADON CALPAL
41 dates appear in more than one source database.
13 dates have no or doubtful spatial information.
Map dates with doubtful coordinates anyway
calibrated age BP:
0
55,900
0
5,600
11,200
16,800
22,400
28,000
33,600
39,200
44,800
50,400
55,900
Show 10 entries
Search:
ORIGIN
LABNR
COUNTRY
SITE
PERIOD
CULTURE
MATERIAL
CALAGE
CALSTD
REFERENCE
SPATQUAL
1 RADON GrA-24117 Republic of Serbia Mostonga III Starcevo Starcevo-Körös-Criș culture antler 7596 78 Rosenstock2009 doubtful coords
2 RADON OxA-12857 Hungary Ecsegfalva n/a Starcevo-Körös-Criș culture collagen, bone 8808 170 Rosenstock2009 possibly correct
3 CALPAL Z-2924 Croatia Zadubravlje-Duine Neolithic Starčevo charcoal 8459 350 Srdoc 1989 possibly correct
4 RADON GrN-6628 Republic of Serbia Starčevo n/a Starcevo-Körös-Criș culture miscellaneous 8440 90 possibly correct
5 CALPAL GrN-6628 Serbia Starčevo Neolithic Starčevo nd 8440 90 Tasić 1988 possibly correct
6 RADON GrN-28455 Romania Foeni-Sălaș n/a Starcevo-Körös-Criș culture collagen, bone 8301 106 Rosenstock2009 possibly correct
7 CALPAL GrN-28455 Romania Foeni-Sălaș Neolithic Starčevo bone 8301 106 Biagi 2005 possibly correct
8 CALPAL OxA-8608 Serbia Blagotin Neolithic Proto-Starčevo nd 8288 98 Bogdanović 2008 possibly correct
9 CALPAL Bln-1056 Republic of Serbia Icoana Neolithic Starčevo charcoal 8226 164 Borić 2011 doubtful coords
10 CALPAL OxA-11103 Serbia Padina Neolithic Starčevo nd 8149 135 Borić 2004, 2009 possibly correct
Showing 1 to 10 of 195 entries
Previous 1 2 3 4 5 … 20 Next
Download current selection as tab separated .csv file

Demo-Backup


neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
127.0.0.1:5468
tile source list
Select basemap
195 selected and 182 well mappable.
See date density and calibration plots
Österreich
Slovensko
Magyarország
România
Moldova
Slovenija
Hrvatska
Srbija
Bosna i Hercegovina
Crna Gora
България
Adriatic Sea
Wien
Bratislava
Budapest
Beograd
Zagreb
Ljubljana
Sarajevo
Chișinău
Одеса
Leaflet

Demo-Backup


neolithicRC - Search tool for radiocarbon dates
Search and Filter
Interactive map
tile source list
Select basemap
Data Source: CALPAL
Site: Dudeştii Vechi
Lab number: GrN-28876
Age: 7680calBP
Reference: Biagi 2005
195 selected and 182 well mappable.
See date density and calibration plots
Density of date selection
calibrated Age BP
Calibration Overview
C14 Age BP
Spline based on IntCal13
www.radiocarbon.org
Österreich
Slovensko
Magyarország
România
Slovenija
Hrvatska
Bosna i Hercegovina
Србија
България
Adriatic Sea
Leaflet