Details for fossil data hand-cleaning based on authors’ expertise.

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# Artiodactyla

*Palaeolama sp.* (coll. nb. 213138, [1]), *Lama castelnaudi* (coll. nb. 213136, [1]) and *Palaeolama weddeli* (coll. nb. 213136, [1]) age ranges were set to Early Pleistocene, according to [2].  
All *Bos taurus* and *Ovis* occurrences were removed, as representatives were introduced by humans.  
*Antifer crassus* (coll. nb. 53926, [3]) time range was set to Pleistocene according to [4]. *Platygonus narinoensis* (coll. nb. 133585, [5]) was renamed *Platygonus cf. marplatensis* according to [6].  
All occurrences of *Cervus gouazoubira* were renamed *Mazama gouazoubira*.

# Astrapotheria

*Grypolophodon imperfectus* (coll. nb. 176290, [7]) was removed as nomen dubium.  
*Parastrapotherium holmbergi* (coll. nb. 176290, [8]) formation was set to Sarmiento, stage to Deseadan-Colehuehuappian, and age range to 20-29 Ma.  
*Xenastrapotherium sp.* (coll. nb. 55602, [9]) and *Xenastrapotherium amazonense* (coll. nb. 55602, [10]) were reassigned to Laventan stage (11.8-13.8 Ma) according [11].  
*Notorhinus denticulatus* (coll. nb. 176290, [8]) removed as nomen dubium. *Astrapotherium* (coll. nb. 50074, [12]) re-assigned to Santacrucian.

# Carnivora

Removed *Felis domesticus* (coll. nb. 190846, [13]) as introduced by humans.

# Cetacea

# Cingulata

# Chiroptera

# Didelphimorphia

# Litopterna

*Archaeohyracotherium mediale* (*Didolodontidae*, coll. nb. 176164, [7]) was synonymised with *Asmithwoodwardia subtrigona* (*Protolipternidae*) by Gelfo (2006)[14].  
*Argyrolambda conidens* was synonymised with *Didolodus multicuspis* [14].  
*Didolodus sp.* (coll. nb. 199563, [15]) was removed as associated to “unidentified *Didolontidae*” in the paper. *Enneoconus parvidens* (coll. nb 176164, [16]) was synonymised with *Ernestokokenia nitida* by Gelfo (2006)[14].

# Microbiotheria

# Notoungulata

# Paucituberculata

# Perissodactyla

*Equus sp.* (coll. nb. 142016, [17]) was set to *Equus (Amerhippus)*. Together with *Equus sp.* (coll. nb. 71275, [18]; coll. nb. 70673, [19]; coll. nb. 92814, [20]), *Equus (Amerhippus)* (coll. nb. 70673, [21]) and *Hippidion sp.* (coll. nb. 70673, [21]), their upper time boundary were set to 0.99 Ma, according to MacFadden (2013) [22].  
*Equus sp.* (coll. nb. 142158 and 142160, [23]) were both set to *Equus (Amerhippus)*.  
*Equus asinus* (coll. nb. 190844, [13]) was removed as introduced by humans.  
*Equus caballus* (coll. nb. 63337, [24]) was set *Equus (Amerhippus) neogeus* by Alberdi and Prado (1992) [25].  
*Equus caballus* (coll. nb. 70704, [21]) time range was set to Holocene.  
*Equus caballus* (coll. nb. 142016, [17]) was set to *Equus (Amerhippus) insulatus*.  
*Equus caballus* (coll. nb. 73842, [26]) time range was set to Pleistocene by [27].  
*Equus santaeelenae* (coll. nb. 144922, 145506, [28]) time ranges were adjusted to Late Pleistocene.  
*Hippidium (Plagiohippus)* (coll. nb. 71304, [29]) name was set to *Hippidion* [25].  
*Hypohippidium humahuaquense* (coll. nb. 210722, [30]) was synonymised with *Hippidion devillei* by [25] *Hippidion sp.* (coll. nb. 73842, [26]; coll. nb. 199157, [31]; coll. nb. 53926, [3], 2 occurrences) time ranges were adjusted to Pleistocene.  
*Tapirus (Tapilarum)* (coll. nb. 53928, [3]) name was shortened to *Tapirus*, and age set to Early Pleistocene.  
*Tapirus oliverasi* (coll. nb. 146534, [32]) species name was removed as doubtful [33], occurrence therefore renamed *Tapirus*. *Tapirus tarijensis* (coll. nb. 70673, [21]) lower age boundary was set to 1.06 Ma.

# Pilosa

# Primates

# Proboscidea

*Mastotherium hyodon* (coll. nb. 142016, [17] and 145181, [34]) genus named was set to *Cuvieronius*.  
*Stegomastodon sp.* (coll. nb. 211646, [35]) was synonymised with *Notiomastodon platensis*.  
All mentions of *Mammut* were removed.  
*Notiomastodon platensis* (coll. nb. 144515, [36]), formerly described as *Amahuacatherium peruvianum* was removed as its age was questioned in [37].

# Rodentia

## Added Occurrences

*Ricardomys longidens*, Laventan age, San Martín department, Peru [38].  
*Microscleromys sp.* (two occurrences), *Microscleromys cribriphilus*, *Microscleromys paradoxalis*, *Microsteiromys jacobsi*, *Nuyuyomys chinqaska*, *Scleromys*, Laventan age, San Martín department, Peru [38].  
*Balsayacuy sp.*, Rupelian age (restricted to the 27.82-31.1 Ma interval), Departamento de Ucayali, Santa Rosa locality, Peru [39]. Described as an occurrence of *Balsayacuy huallagaensis*, but species attribution doubtful. Hence, restricted to genus level. From the same paper (same locality and same age), we also add one occurrence of *Shapajamys minor*, one of *Ucayalimys amahuacensis* and one of *Vucetichimys pterilophodonica*.  
*Erethizon sp.*, Vorohuean (Marplatan) age, Uquía formation, Quebrada de Humahuaca locality, Jujuy state, Argentina [40].  
*Eoincamys valverdei* and *Tarapotomys subandinus*, Early Oligocene of resp. TAR-72 and TAR-22, San Martín, Peru [41].

## Corrections

*Cachiyacuy contamanensis* (coll. nb. 149523, [42]) was renamed *Cachiyacuy sp.* as taxonomic assignation under debate. Two *Cachiyacuy contamanensis* occurrences from the same collection, same paper, were renamed *cf. Cachiyacuy contamanensis*, for the same reason.  
*Kichkasteiromys raimondii*: age range set to 34-35 Ma.  
Time boundaries of *Cachiyacuy cf. contamanensis* and *Cachiyacuy contamanensis* (coll. nbs. 207061 and 207062, [43]) were set to Priabonian (33.9-37.2 Ma). Same for *Cachiyacuy cf. kummeli*, *Eoespina* and *cf. Eoespina* (coll. nb. 207062, 207062 and 207065, [43]) Remaning occurrences of the genus *Cachiyacuy* (four in total) were set to Late-Middle Eocene (33.9-41.2 Ma).  
*Canaanimys maquiensis* (coll. nb. 149523, [42]) was renamed *Canaanimys sp.* as taxonomic assignation under debate.

Time boundaries of four *Cachiyacuy kummeli* occurrences (coll. nb. 144474, [44]; 176136, [45], 207067 and 207062 [43]) were set to Late-Middle Eocene (33.9-41.2 Ma). Same for *Eobranisamys sp.* (coll. nb. 176151, [45]) and for all occurrences from the 144474 collection, including one *Chachapoyamys cf. kathetos* [38], one *Eoespina sp.* [44], one *Canaanimys maquiensis* [44] and one *Eobranisamys javierpardoi* [45].  
Ages of all occurrences from the collection 149523 were restricted to Rupelian. These included two *cf. Cachiyacuy kummeli* occurrences [42], one *Canaanimys sp.* [42], one *Eobranisamys riverai*, one *Eobranisamys romeropittmanae*, one *Eoespina woodi*, one *Eoincamys ameghinoi*, one *Eoincamys pascuali*, one *Eopicure kraglievichi*, one *Eosachacui lavocati*, one *Eosallamys paulacoutoi*, one *Eosallamys simpsoni* [46], one *Pozomys sp.*, two *Pozomys ucayalensis* [42], one *Eodelphomys almeidacomposi*, one *Eopululo wigmorei* [46].  
Ages of two *Sallamys pascuali* occurrences (coll. nb. 95688, [47]; 133539, [48]), three *Branisamys luribayensis* (coll. nb. 95688 [47]; 95688 [49]; 133539 [48]) were sharpened to the 25-26 Ma interval.  
Ages of one *Pozomys ucayalensis* (coll. nb. 176129, [45]) were set to Late Eocene (33.9-41.2 Ma). Ages of two *Eoespina sp.* occurrences (coll. nb. 176140, [45]) was restricted to Late Eocene.  
Ages of one *Eoespina* and one *cf. Eoespina* occurrence (coll. nb. 207062 and 207065, [43]) were set to Rupelian.  
*Eoincamys pascuali* (coll. nb. 207064, [43]) was renamed *Eonincamys sp.*. Age range of all Late Oligocene occurrences from the Salla formation, La Paz, Bolivia, was set to 24.5-26 Ma. *Eopululo wigmorei* (coll. nb. 225588, [15]) species name was set to *Eopululo sp.* according to [38].  
Names of all *Eumysops chapalmalensis* occurrences were set to *Eumysops chapadmalensis*.

## Removed occurrences

*Cachiyacuy kummeli* (coll. nb. 207067, [43]), renamed *C. cf. kummeli* (doublon) according to [38].  
*Canaanimys sp.* (coll. nb. 176136, [50]), taxonomic revision [38].  
*Canaanimys maquiensis* (two occurrences, coll. nb. 207066 and 207067, [43]), taxonomic revision [38].  
*Chachapoyamys kathetos* (coll. nb. 207067, [38]), re-assigned to *C. cf. kathetos* (doublon) [38].  
Four Brazilian occurrences of the genera *Eobranisamys* (two) and *Eoincamys* (two) with absurd ages (coll. nb. 57989, [51]; coll. nb. 217834, [52]).  
*Tarapotomys sp.* (2 occurrences) (coll. nb. 199560, [41]; coll. nb. 199563, [15]), respectively re-described as *aff. Tarapotomys sp.* and *Tarapotomys subandinus* in [38].  
*Incamys bolivianus* (coll. nb. 95688, [47]), doulon.  
*Asteromys bolivianus* (coll. nb. 133591, [53]), doublon.  
All *Rattus rattus* occurrences, as introduced by humans.

# Sparassodonta

# Xenungulata

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