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

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# Artiodactyla

*Palaeolama sp.* (coll. numb. 213138, [1]), *Lama castelnaudi* (coll. numb. 213136, [1]) and *Palaeolama weddeli* (coll. numb. 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. numb. 53926, [3]) time range was set to Pleistocene according to [4]. *Platygonus narinoensis* (coll. numb. 133585, [5]) was renamed *Platygonus cf. marplatensis* according to [6].

# Astrapotheria

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

# Carnivora

# Cetacea

# Cingulata

# Chiroptera

# Didelphimorphia

# Litopterna

*Archaeohyracotherium mediale* (*Didolodontidae*, coll. nb. 176164, [7]) was synonymised with *Asmithwoodwardia subtrigona* (*Protolipternidae*) by Gelfo (2006)[13].  
*Argyrolambda conidens* was synonymised with *Didolodus multicuspis* [13].  
*Didolodus sp.* (coll. nb. 199563, [14]) was removed as associated to “unidentified *Didolontidae*” in the paper. *Enneoconus parvidens* (coll. nb 176164, [15]) was synonymised with *Ernestokokenia nitida* by Gelfo (2006)[13].

# Microbiotheria

# Notoungulata

# Paucituberculata

# Perissodactyla

*Equus sp.* (coll. nb. 142016, [16]) was set to *Equus (Amerhippus)*. Together with *Equus sp.* (coll. nb. 71275, [17]; coll. nb. 70673, [18]; coll. nb. 92814, [19]), *Equus (Amerhippus)* (coll. nb. 70673, [20]) and *Hippidion sp.* (coll. nb. 70673, [20]), their upper time boundary were set to 0.99 Ma, according to MacFadden (2013) [21].  
*Equus sp.* (coll. nb. 142158 and 142160, [22]) were both set to *Equus (Amerhippus)*.  
*Equus asinus* (coll. nb. 190844, [23]) 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, [20]) time range was set to Holocene.  
*Equus caballus* (coll. nb. 142016, [16]) 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, [20]) lower age boundary was set to 1.06 Ma.

# Pilosa

# Primates

# Proboscidea

*Mastotherium hyodon* (coll. numb. 142016, [16] and 145181, [34]) genus named was set to *Cuvieronius*.  
*Stegomastodon sp.* (coll. numb. 211646, [35]) was synonymised with *Notiomastodon platensis*.  
All mentions of *Mammut* were removed.

# Rodentia

# Sparassodonta

# Xenungulata

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