*Electronic Supplementary Materials*

*for*

**BIOTIC AND ABIOTIC FACTORS DRIVING THE DIVERSIFICATION DYNAMICS OF CROCODYLIA**

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**ESM\_1. Body size calculations**

After an extensive survey of the specialized literature, we bring together values ofdorsal cranial length (DCL) and, in minor proportion, the total length (TL) for all available crocodylian species. This data is shown in Table\_ESM\_1.

**Table\_ESM\_1.** DCL and TL (in mm) measurements for crocodylians species. \*estimated measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Taxa | Status | Skull length (mm) | TL (mm) | Primary source |
| *Acresuchus pachytemporalis* | extinct | 470 | - | (Souza-Filho *et al.* 2019) |
| *Akanthosuchus langstoni* | extinct | - | 2000 | (O’neill *et al.* 1981) |
| *Aktiogavialis caribesi* | extinct | 490 | - | (Salas-Gismondi *et al.* 2018) |
| *Aktiogavialis puertoricensis* | extinct | 300\* | - | (Salas-Gismondi *et al.* 2018) |
| *Albertochampsa langstoni* | extinct | 210 | - | (Wu 2005) |
| *Albertosuchus knudsenii* | extinct | 384 | - | (Wu and Brinkman 2015) |
| *Aldabrachampsus dilophus* | extinct | - | 2500 | (Mannion *et al.* 2019) |
| *Alligator luicus* | extinct | 105 | - | (Li and Wang 1987) |
| *Alligator mcgrewi* | extinct | 138 | - | (Schmidt 1941) |
| *Alligator mefferdi* | extinct | 287 | - | (Mook 1946) |
| *Alligator mississippiensis* | extant | - | 3500 | (Manolis and Stevenson 2010) |
| *Alligator olseni* | extinct | 251 | - | (White 1942) |
| *Alligator prenasalis* | extinct | - | 1881 | (Mannion *et al.* 2019) |
| *Alligator sinensis* | extant | - | 1800 | (Manolis and Stevenson 2010) |
| *Alligator thomsoni* | extinct | 330 | - | (Mook 1927) |
| *Allognathosuchus heterodon* | extinct |  | 936 | (Mannion *et al.* 2019) |
| *Allognathosuchus mlynarskii* | extinct | 401 | - | (Lucas and Sullivan 2004)vvLic |
| *Allognathosuchus polyodon* | extinct | - | 1386 | (Mannion *et al.* 2019) |
| *Allognathosuchus wartheni* | extinct | - | 1236 | (Mannion *et al.* 2019) |
| *Allognathosuchus woutersi* | extinct | - | - | - |
| *Arambourgia gaudryi* | extinct | 78\* | - | (Brochu 1999) |
| *Argochampsa krebsi* | extinct | 433 | - | (Hua and Jouve 2004) |
| *Asiatosuchus germanicus* | extinct | - | 4164 | (Mannion *et al.* 2019) |
| *Asiatosuchus grangeri* | extinct | 440\* | - | (Mook 1940) |
| *Asiatosuchus nanlingensis* | extinct | - | 5638 | (Mannion *et al.* 2019) |
| *Australosuchus clarkae* | extinct | - | 1935 | (Mannion *et al.* 2019) |
| *Balanerodus logimus* | extinct | - | - | - |
| *Baru darrowi* | extinct | 478 | - | (Yates and Pledge 2017) |
| *Baru huberi* | extinct | 200 | - | (Willis 1997; Yates and Pledge 2017) |
| *Baru wickeni* | extinct | 500 | - | (Yates 2017) |
| *Borealosuchus acutidentatus* | extinct | - | 3026 | (Mannion *et al.* 2019) |
| *Borealosuchus formidabilis* | extinct | 650 | - | (Brochu 1997) |
| *Borealosuchus griffithi* | extinct | - | 2543 | (Mannion *et al.* 2019) |
| *Borealosuchus sternbergii* | extinct | - | 2440 | (Mannion *et al.* 2019) |
| *Borealosuchus threeensis* | extinct | - | 2642 | (Mannion *et al.* 2019) |
| *Borealosuchus wilsoni* | extinct | - | 2881 | (Mannion *et al.* 2019) |
| *Bottosaurus harlani* | extinct | - | 4459 | (Mannion *et al.* 2019) |
| *Bottosaurus tuberculatus* | extinct | - | - | - |
| *Boverisuchus magnifrons* | extinct | - | 1878 | (Mannion *et al.* 2019) |
| *Boverisuchus vorax* | extinct | - | 2867 | (Mannion *et al.* 2019) |
| *Brachychampsa montana* | extinct | 392 | - | (Norell *et al.* 1994) |
| *Brachychampsa sealeyi* | extinct | 150 | - | (Williamson 1996) |
| *Brachyuranochampsa eversolei* | extinct | 365 | - | (Zangerl 1944) |
| *Brochuchus pigotti* | extinct | 337 | - | (Tchernov and Van Couvering 1978) |
| *Caiman australis* | extinct | - | 3074 | (Mannion *et al.* 2019) |
| *Caiman brevirostris* | extinct | 255 | - | AS personal observations |
| *Caiman crocodilus* | extant |  | 2000 | (Manolis and Stevenson 2010) |
| *Caiman gasparinae* | extinct | 450 | - | (Bona and Carabajal 2013) |
| *Caiman latirostris* | extant | - | 2000 | (Manolis and Stevenson 2010) |
| *Caiman venezuelensis* | extinct | - | 1325 | (Mannion *et al.* 2019) |
| *Caiman wannlangstoni* | extinct | 299 | - | (Salas-Gismondi *et al.* 2015) |
| *Caiman yacare* | extant | - | 2700 | (Manolis and Stevenson 2010) |
| *Centenariosuchus gilmorei* | extinct | 350 \* | - | (Hastings *et al.* 2013) |
| *Ceratosuchus burdoshi* | extinct | 232 | - | (Schmidt 1938) |
| *Charactosuchus fieldsi* | extinct | - | 2450 | (Mannion *et al.* 2019) |
| *Charactosuchus kugleri* | extinct | - | 2331 | (Mannion *et al.* 2019) |
| *Charactosuchus mendesi* | extinct | - | 5819 | (Mannion *et al.* 2019) |
| *Charactosuchus sansoai* | extinct | - | 3480 | (Mannion *et al.* 2019) |
| *Crocodilus clavirostris* | extinct | 584\* | - | (Morton 1844) |
| *Crocodylus acutus* | extant | - | 5000 | (Manolis and Stevenson 2010) |
| *Crocodylus anthropophagus* | extinct | - | 4777 | (Mannion *et al.* 2019) |
| *Crocodylus checchiai* | extinct | - | 3152 | (Mannion *et al.* 2019) |
| *Crocodylus depressifrons* | extinct | 500 | - | (Delfino and Smith 2009) |
| *Crocodylus falconensis* | extinct | 590 | - | (Scheyer *et al.* 2013) |
| *Crocodylus gariepensis* | extinct | - | 2289 | (Mannion *et al.* 2019) |
| *Crocodylus intermedius* | extant |  | 4000 | (Manolis and Stevenson 2010) |
| *Crocodylus johnsoni* | extant | - | 3000 | (Manolis and Stevenson 2010) |
| *Crocodylus megarhinus* | extinct | 670 |  | (Mook 1927) |
| *Crocodylus mindorensis* | extant |  | 2500 | (Manolis and Stevenson 2010) |
| *Crocodylus moreletii* | extant | - | 3500 | (Manolis and Stevenson 2010) |
| *Crocodylus niloticus* | extant | - | 4700 | (Manolis and Stevenson 2010) |
| *Crocodylus novaeguineae* | extant |  | 2800 | (Manolis and Stevenson 2010) |
| *Crocodylus palaeindicus* | extinct | 403 |  | (Mook 1933) |
| *Crocodylus palustris* | extant | - | 3500 | (Manolis and Stevenson 2010) |
| *Crocodylus porosus* | extant | - | 5000 | (Manolis and Stevenson 2010) |
| *Crocodylus rhombifer* | extant | - | 3000 | (Manolis and Stevenson 2010) |
| *Crocodylus siamensis* | extant | - | 3000 | (Manolis and Stevenson 2010) |
| *Crocodylus suchus* | extant |  | 2000 | (Mannion *et al.* 2019) |
| *Crocodylus thorbjarnarsoni* | extinct | 850 | - | (Brochu and Storrs 2012) |
| *Culebrasuchus mesoamericanus* | extinct | 270\* | - | (Hastings *et al.* 2013) |
| *Dadagavialis gunai* | extinct | 380\* | - | (Salas-Gismondi *et al.* 2018) |
| *Deinosuchus riograndensis* | extinct | 1310 | - | (Schwimmer 2002) |
| *Deinosuchus rugosus* | extinct | - | - | - |
| *Diplocynodon darwini* | extinct | - | 1579 | (Mannion *et al.* 2019) |
| *Diplocynodon deponiae* | extinct | - | 816 | (Mannion *et al.* 2019) |
| *Diplocynodon elavericus* | extinct | 345 | - | (Martin 2010) |
| *Diplocynodon hantoniensis* | extinct | - | 2906 | (Mannion *et al.* 2019) |
| *Diplocynodon muelleri* | extinct | - | 996 | (Mannion *et al.* 2019) |
| *Diplocynodon ratelii* | extinct | - | 2114 | (Mannion *et al.* 2019) |
| *Diplocynodon remensis* | extinct | 298 | - | (Martin *et al.* 2014) |
| *Diplocynodon tormis* | extinct | - | 3126 | (Mannion *et al.* 2019) |
| *Diplocynodon ungeri* | extinct | - | 2663 | (Mannion *et al.* 2019) |
| *Dollosuchoides densmorei* | extinct | 475\* | - | (Brochu 2007) |
| *Eoalligator chunyii* | extinct | - | - | - |
| *Eocaiman cavernensis* | extinct | 100\* | - | (Simpson 1933) |
| *Eocaiman itaboraiensis* | extinct | 70\* | - | (Pinheiro *et al.* 2013) |
| *Eocaiman palaeocenicus* | extinct | 130\* | - | (Bona 2007) |
| *Eogavialis africanum* | extinct | - | - | - |
| *Eogavialis andrewsi* | extinct | 700 | - | (Storrs 2003) |
| *Eogavialis gavialoides* | extinct | - | - | - |
| *Eosuchus lerichei* | extinct | 450\* | - | (Delfino *et al.* 2005) |
| *Eosuchus minor* | extinct | 500\* | - | (Brochu 2006) |
| *Eothoracosaurus mississippiensis* | extinct | 897 | - | (Carpenter 1983) |
| *Euthecodon arambourgi* | extinct | 1520 | - | (Storrs 2003) |
| *Euthecodon brumpti* | extinct | 1000\* | - | (Storrs 2003) |
| *Euthecodon nitriae* | extinct | 1000\* | - | (Storrs 2003) |
| *Gavialis bengawanicus* | extinct | 720 | - | (Martin *et al.* 2012) |
| *Gavialis breviceps* | extinct | - | - | - |
| *Gavialis browni* | extinct |  | 5681 | (Mannion *et al.* 2019) |
| *Gavialis curvirostris* | extinct | - | - | - |
| *Gavialis gangeticus* | extant | - | 4800 | (Manolis and Stevenson 2010) |
| *Gavialosuchus eggenburgensis* | extinct |  | 4829 | (Mannion *et al.* 2019) |
| *Globidentosuchus brachyrostris* | extinct | 290 | - | (Scheyer *et al.* 2013) |
| *Gnatusuchus pebasensis* | extinct | 219 | - | (Salas-Gismondi *et al.* 2015) |
| *Gryposuchus colombianus* | extinct | 970 | - | (Langston and Gasparini 1997) |
| *Gryposuchus croizati* | extinct | 1400 | - | (Riff and Aguilera 2008) |
| *Gryposuchus jessei* | extinct | 800\* | - | Estimated |
| *Gryposuchus neogaeus* | extinct | 1030 | - | (Langston and Gasparini 1997) |
| *Gryposuchus pachakamue* | extinct | 623 | - | (Salas-Gismondi *et al.* 2016) |
| *Harpacochampsa camfieldensis* | extinct | - | 3605 | (Mannion *et al.* 2019) |
| *Hassiacosuchus haupti* | extinct | - | 1142 | (Mannion *et al.* 2019) |
| *Hesperogavialis cruxenti* | extinct | 1000\* | - | (Bocquentin-Villanueva and Buffetaut 1981) |
| *Ikanogavialis gameroi* | extinct | 1020 | - | (Sill 1970) |
| *Jiangxisuchus nankangensis* | extinct | 197 | - | (Li *et al.* 2019) |
| *Kalthifrons aurivellensis* | extinct | 430 | - | (Yates and Pledge 2017) |
| *Kambara implexidens* | extinct | 290 | - | (Salisbury and Willis 1996) |
| *Kambara molnari* | extinct | - | 3515 | (Mannion *et al.* 2019) |
| *Kambara murgonensis* | extinct | 340 | - | (Willis *et al.* 1993) |
| *Kambara taraina* | extinct | 265 | - | (Buchanan 2009) |
| *Kentisuchus astrei* | extinct | 350\* | - | (Jouve 2016) |
| *Kentisuchus spenceri* | extinct | 420\* | - | (Brochu 2007) |
| *Krabisuchus siamogallicus* | extinct | 163 | - | (Martin and Lauprasert 2010) |
| *Kuttanacaiman iquitosensis* | extinct | 250 | - | (Salas-Gismondi *et al.* 2015) |
| *Leidyosuchus canadensis* | extinct | 400\* | - | (Wu *et al.* 2001) |
| *Listrognathosuchus multidentatus* | extinct | - | - | - |
| *Maomingosuchus petrolica* | extinct | 503 | - | (Shan *et al.* 2017) |
| *Maroccosuchus zennaroi* | extinct | 780\* | - | (Jouve *et al.* 2015) |
| *Mecistops leptorhynchus* | extant |  | 3000 | (Manolis and Stevenson 2010) |
| *Mecistops cataphractus* | extant |  | 3500 | (Manolis and Stevenson 2010) |
| *Mecistops nkondoensis* | extinct | - | - | - |
| *Megadontosuchus arduini* | extinct | 570 | - | (Piras *et al.* 2007) |
| *Mekosuchus inexpectatus* | extinct | - | 1242 | (Mannion *et al.* 2019) |
| *Mekosuchus kalpokasi* | extinct | - | 1246 | (Mannion *et al.* 2019) |
| *Mekosuchus sanderi* | extinct | - | 1325 | (Mannion *et al.* 2019) |
| *Mekosuchus whitehunterensis* | extinct | - | 1146 | (Mannion *et al.* 2019) |
| *Melanosuchus niger* | extant | - | 4000 | (Manolis and Stevenson 2010) |
| *Mourasuchus amazonensis* | extinct | 1114 | - | (Price 1964) |
| *Mourasuchus arendsi* | extinct | 910 | - | (Cidade *et al.* 2018) |
| *Mourasuchus atopus* | extinct | 739 | - | (Langston and Gasparini 1997) |
| *Mourasuchus pattersoni* | extinct | 1050 | - | (Cidade *et al.* 2017) |
| *Navajosuchus mooki* | extinct | 242 | - | (Lucas and Estep 2000) |
| *Necrosuchus ionensis* | extinct | 400\* | - | (Bona and Barrios 2015) |
| *Notocaiman stromeri* | extinct | - | 1987 | (Mannion *et al.* 2019) |
| *Ocepesuchus eoafricanus* | extinct | 375\* | - | (Jouve *et al.* 2008) |
| *Orthogenysuchus olseni* | extinct | 334 | - | (Mook 1924) |
| *Osteolaemus tetraspis* | extant |  | 1800 | (Manolis and Stevenson 2010) |
| *Palaeosuchus palpebrosus* | extant |  | 1700 | (Manolis and Stevenson 2010) |
| *Palaeosuchus trigonatus* | extant |  | 2000 | (Manolis and Stevenson 2010) |
| *Pallimnarchus gracilis* | extinct | - | 4859 | (Mannion *et al.* 2019) |
| *Pallimnarchus pollens* | extinct | - | 6191 | (Mannion *et al.* 2019) |
| *Paratomistoma courti* | extinct | - | - | - |
| *Penghusuchus pani* | extinct | 780 | - | (Shan *et al.* 2009) |
| *Piscogavialis jugaliperforatus* | extinct | 1140 | - | (Kraus 1998) |
| *Planocrania datangensis* | extinct | 225 | - | (Li 1984) |
| *Planocrania hengdongensis* | extinct | 200 | - | (Li 1984) |
| *Procaimanoidea kayi* | extinct | - | 1304 | (Mannion *et al.* 2019) |
| *Procaimanoidea utahensis* | extinct | 117 | - | (Gilmore 1946) |
| *Prodiplocynodon langi* | extinct | 466 | - | (Mook 1941) |
| *Protoalligator huiningensis* | extinct | - | 2249 | (Mannion *et al.* 2019) |
| *Protocaiman peligrensis* | extinct | 458\* | - | (Bona *et al.* 2018; Solórzano *et al.* 2018) |
| *Purussaurus brasiliensis* | extinct | 1400 | - | (Aureliano *et al.* 2015) |
| *Purussaurus mirandai* | extinct | 1260 | - | (Aguilera *et al.* 2006) |
| *Purussaurus neivensis* | extinct | 801 | - | (Aguilera *et al.* 2006) |
| *Quinkana babarra* | extinct | - | 5000 | (Molnar 2004) |
| *Quinkana fortirostrum* | extinct | - | 2500 | (Molnar 2004) |
| *Quinkana meboldi* | extinct | - | 2303 | (Mannion *et al.* 2019) |
| *Quinkana timara* | extinct | - | 2851 | (Mannion *et al.* 2019) |
| *Rhamphosuchus crassidens* | extinct | - | 9500 | (Head 2001) |
| *Rimasuchus lloydi* | extinct | - | 6447 | (Mannion *et al.* 2019) |
| *Siquisiquesuchus venezuelensis* | extinct | 1030 | - | (Brochu *et al.* 2004) |
| *Stangerochampsa mccabei* | extinct | 195 | - | (Wu *et al.* 1996) |
| *Tadzhikosuchus macrodentis* | extinct | - | 2081 | (Mannion *et al.* 2019) |
| *Thecachampsa americana* | extinct | 860 | - | (Mook 1921) |
| *Thecachampsa antiqua* | extinct | - | - | - |
| *Thecachampsa carolinensis* | extinct | - | 5592 | (Mannion *et al.* 2019) |
| *Thoracosaurus borissiaki* | extinct | - | - | - |
| *Thoracosaurus isorhynchus* | extinct | - | - | - |
| *Thoracosaurus macrorhynchus* | extinct | - | - | - |
| *Thoracosaurus neocesariensis* | extinct | - | 5000 | (Brownstein 2018) |
| *Tomistoma cairense* | extinct | - | - | - |
| *Tomistoma calaritanus* | extinct | - | 4238 | (Mannion *et al.* 2019) |
| *Tomistoma coppensi* | extinct | - | - | - |
| *Tomistoma gaudense* | extinct | - | - | - |
| *Tomistoma lusitanica* | extinct | 930 |  | (Antunes 2017) |
| *Tomistoma schlegelii* | extant |  | 4000 | (Manolis and Stevenson 2010) |
| *Tomistoma tandoni* | extinct | - | - | - |
| *Toyotamaphimeia machikanensis* | extinct | 1050 |  | (Kobatake *et al.* 1965) |
| *Trilophosuchus rackhami* | extinct | - | 1169 | (Mannion *et al.* 2019) |
| *Tsoabichi greenriverensis* | extinct | 200\* | - | (Brochu 2010) |
| *Ultrastenos willisi* | extinct | - | 3915 | (Mannion *et al.* 2019) |
| *Voay robustus* | extinct | - | 3590 | (Mannion *et al.* 2019) |
| *Volia athollandersoni* | extinct | 210\* | - | (Molnar *et al.* 2002) |
| *Wannaganosuchus brachymanus* | extinct | - | 1169 | (Mannion *et al.* 2019) |

Based on data from the Table\_ESM\_1, we estimated the body mass (BM in kg) for all taxa. For taxa with DCL data, we estimated first the TL. Then, for all taxa with TL data, we estimated the BM (kg) based in several linear or logarithmic regression analysis presented in the literature. The TL was calculated with the equations of Platt *et al.* (2009; based on *Crocodylus moreletii*) and Sereno *et al.* (2001; based on *Crocodylus porosus*) for Crocodyloidea; and the equations of Aureliano *et al.* (2015; based on *Caiman latirostris*), Hurlburt *et al.* (2003; based on *A. mississippiensis*), and Grigg (2015; based on *A. mississippiensis*) for Alligatoroidea. TL estimations for Gavialoidea (and tomistomines) were a bit more complicated task, mostly because modern allometric relationships in longirostrines have not been largely studied, as in some of its counterparts (*Crocodylus* and *Alligator*). Thus, for estimate the TL of Gavialoidea we used: 1) Sereno *et al.* (2001) equation based on *Gavialis gangeticus* (n=17) after DCL; 2) the TL:DCL ratio of 1:6.5 observed by Whitaker and Whitaker (2008) for longirostrine taxa; and 3) the TL equation of Edwards *et al.* (2017) based on the long, narrow-snouted *Crocodylus johnstoni*.

Previous works have acknowledged that allometric equations commonly employed can underestimate size (TL) for very large individuals by as much as 20% (e.g. Whitaker and Whitaker 2008; Brochu and Storrs 2012; Grigg 2015). Yet here, we prefer not to correct for this bias because it is unclear how this correction factor must be employed (e.g. 20% of increase for any taxa larger than 6 m, or a linear factor scaling up to 20% for taxa progressively larger than 6 m), or whether this factor must the same among different clades. In any case, as our analyses were conducted with logarithmically transformed data, this bias likely introduced only a minor degree of error (Lyons and Smith 2010).

**Table\_ESM\_2.** Statistical results from the regression analysis based on the data of longirostrine taxa (Erickson *et al.* 2012).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Var | Slope a | Intercept b | 95% bootstrapped confidence intervals (N=1999) | | R | r2 | P |
| **Slope a** | **Intercept b** |
| TL (mm) | 0.15892 | -395.66 | (0.1291; 0.23212) | (-621.74; -281.95) | 0.98695 | 0.97406 | 0.013054 |

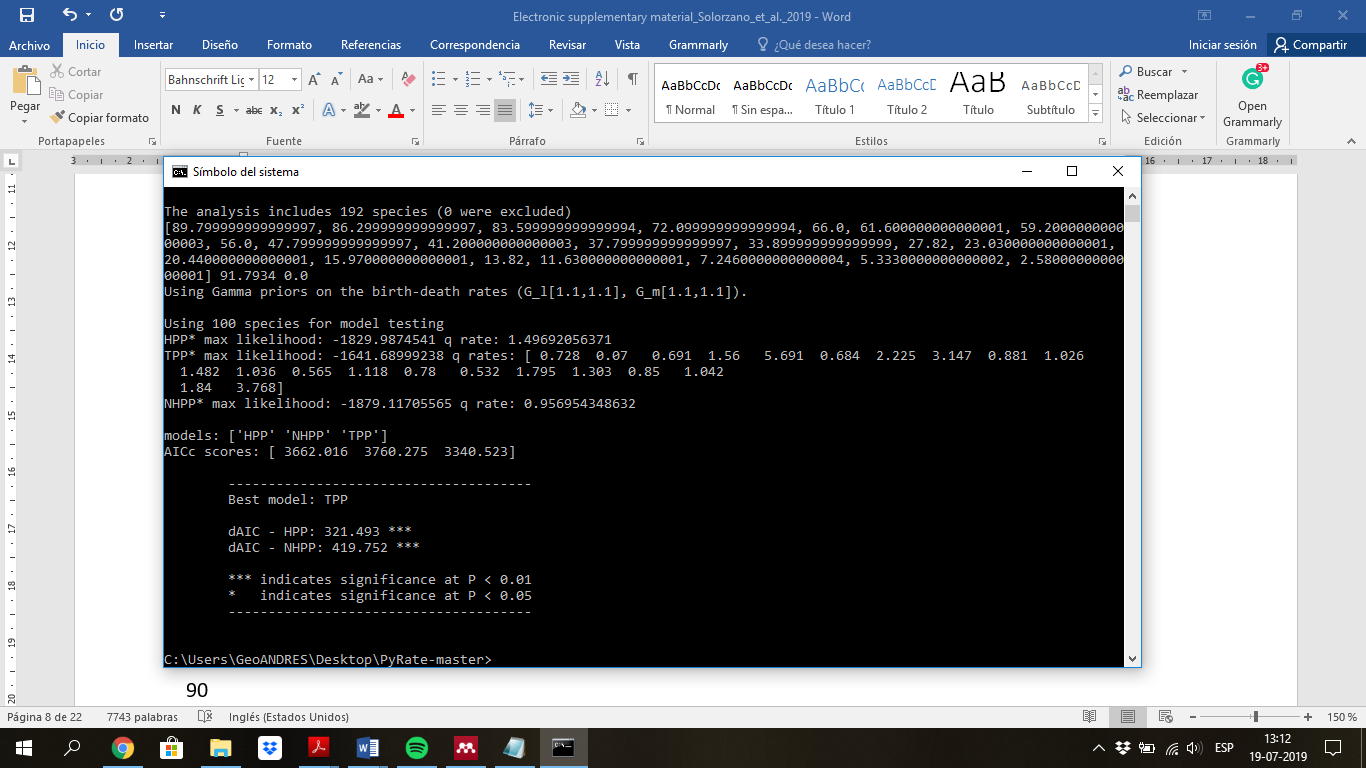
For BM estimations, we use the DCL and TL as proxies. First, we obtain the mean of the TL estimated by the equations previously mentioned. For BM estimations, we use the equations of Platt *et al.* (2009) and Grigg (2015) for Crocodyloidea, and those of Aureliano *et al.* (2015) and Grigg (2015) for Alligatoroidea. Well-established relationships among TL (or DCL) and BM in longirostrine (namely Gavialoidea and Tomistominae) taxa are scarce. Thus, we collect the TL (mm) and BM (kg) data (n=4) of *Gavialis* and *Tomistoma* from the work of Erickson *et al.* (2012) and performed a simple regression analysis (Ordinary Least Squares Regression) using the software Past 3.06 (Hammer *et al.* 2001). This allows us to find the relationship indicated in Table\_ESM\_2. Of course, this empirical relationship is far from definitive or robust, especially for very large or small longirostrine taxa. But in any case it allows us to obtain a more adequate estimation of BM in strictly longirostrine taxa. In addition, we used the BM regressions based in the extant long, narrow-snouted *Crocodylus johnstoni* (Edwards *et al.* 2017). All allometric equations previously mentioned are shown in the Table\_ESM\_3.

**Table\_ESM\_3.** Distinct allometric equations employed in the present work for BM and TL calculations. SVL= Snout-Vent length.

|  |  |  |  |
| --- | --- | --- | --- |
| Id | Measurements | Equation | Author |
| TL1 | Total length (mm) | TL = (7.4 \* DCL) – 69.369 | Sereno *et al.* (2001; based on *C. porosus*) |
| TL2 | Total length (mm) | TL= 7.09DCL – 2.69 | Platt *et al.* (2009; based on *C. moreletii*) |
| TL3 | Total length (mm) | Log TL = (log DCL \* 0.970) + 0.954 | Hurlburt *et al.* (2003; based on *A. mississippiensis*) |
| TL4 | Total length (mm) | Log10(TT) = a + b \* Log10(SVL), where SVL is Log10(SVL) = a + b \* Log10(DCL) | Aureliano *et al.* (2015; based on *Caiman latirostris*) |
| TT5 | Total length (mm) | TL = (7.717 \* DCL) – 20.224 | Sereno *et al.* (2001; based in *Gavialis gangeticus)* |
| TT6 | Total length (mm) | TL = 6.5 \* DCL | Whitaker and Whitaker (2008) for longirostrine taxa |
| TT7 | Total length (mm) | TL =((3.136\*DCL –2.616) + 4.356)/0.546 | Edwards *et al.* (2017), based *Crocodylus johnstoni* |
| BM1 | Body mass (kg) | BM = 2.658 \* TL^3.242 | Grigg (2015) for *C. porosus* |
| BM2 | Body mass (kg) | LnBM=(LnTL – 2.05) / 0.32 | Platt *et al.* (2009; based on *C. moreletii*) |
| BM3 | Body mass (kg) | Log10(BM) = –5.1240 + 2.9221\* Log10(TTL) | Aureliano *et al.* (2015; based on *Caiman latirostris*) |
| BM4 | Body mass (kg) | BM = 2.264 \* TL^3.428 | Grigg (2015) for *A. mississippiensis* |
| BM5 | Body mass (kg) | BM = (0.15892\*DCL) – 395.66 | Based on ESM\_Table 2. |
| BM6 | Body mass (kg) | Ln BM= (0.311 \* SVL) + 3.653 where the SVL is (DCL + 2.616)/ 3.136 | Edwards *et al.* (2017), based *Crocodylus johnstoni* |

**ESM\_2) Diversifications analysis results and body size as a time-continuous variable**

The maximum likelihood results strongly suggest that the TPP model is the best supported by our data (Fig. ESM\_1).



**Fig. ESM\_1**. Results of the maximum likelihood test for assessing which of NHPP, HPP, or TPP is best supported by the data.

In the Table ESM\_4 are summarized the results of the PyRate analyses, including the estimated speciation, extinction, diversification and preservation rates. This results permit us to estimate the mean time of speciation and extinction (in Ma) of each analyzed taxa considering the uncertainties of the fossil preservation, which together with the BM (kg) and Log10(BM), calculated for each taxon, are showed in the Table ESM\_5 (for details see main text). In this table, extant taxa without fossil record were coded as being originated during the Holocene. With these data (Table ESM\_5) we computed minimum, mean and standard deviation (disparity) of log-transformed body mass in 1 Myr time bins using the *paleoTS* (Hunt 2006) package (Table ESM\_6).

**Table\_ESM\_4**. Results from the PyRate analyses: speciation, extinction, diversification (in lineages/Myr ) and preservation rates by time bins. In bold are highlighted the time bins with significantly high rates of speciation, extinction and diversification.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time bins | | | Speciation | | Extintion | | Preservation | | Diversification |
| Start | **End** | **Name** | **mean** | **95% HPD Interval** | **mean** | **95% HPD Interval** | **mean** | **95% HPD Interval** | **Mean** |
| 89.8 | 93.9 | Tur | 0.4089 | 6.565E-3;1.1586 | 0.1695 | 1.5E-5;0.5292 | 1.1827 | 0.037;2.8966 | 0.239 |
| 86.3 | 89.8 | Con | 0.1578 | 0;0.4724 | 0.1406 | 2E-5;0.4206 | 0.6358 | 8.06E-4;1.8416 | 0.017 |
| 83.6 | 86.3 | San | **0.5227** | **5.3E-5;1.5468** | **0.6285** | **2.8E-5;1.4569** | 1.196 | 0.0355;3.112 | -0.106 |
| 72.1 | 83.6 | Cam | 0.1698 | 0.0438;0.3084 | 0.0734 | 8.113E-3;0.155 | 1.075 | 0.7289;1.4386 | 0.096 |
| 66 | 72.1 | Maas | 0.3 | 0.1116;0.5122 | 0.3182 | 0.1303;0.5312 | 5.1733 | 4.2113;6.088 | -0.018 |
| 61.6 | 66 | Dan | 0.3661 | 0.1425;0.6415 | 0.3504 | 0.0604;0.6612 | 0.491 | 0.1643;0.8911 | 0.016 |
| 59.2 | 61.6 | Sel | 0.5153 | 0.0143;1.214 | **0.9145** | **0.1309;1.9909** | 0.9242 | 0.2265;1.8723 | **-0.399** |
| 56 | 59.2 | Tha | 0.6618 | 0.1838;1.1669 | 0.2796 | 6.348E-3;0.601 | 1.8845 | 0.8498;3.1625 | **0.382** |
| 47.8 | 56 | Ypre | 0.224 | 0.0844;0.3741 | 0.2288 | 0.0955;0.3789 | 0.6114 | 0.3093;0.9418 | -0.005 |
| 41.2 | 47.8 | Lut | 0.345 | 0.1126;0.6103 | 0.4889 | 0.1679;0.8798 | 0.5777 | 0.2413;1.0034 | -0.144 |
| 37.8 | 41.2 | Bar | **0.9303** | **0.0151;2.3671** | 0.6275 | 2.93E-4;1.6799 | 0.7232 | 0.0345;1.7786 | **0.303** |
| 33.9 | 37.8 | Pri | 0.2537 | 3.95E-4;0.5868 | 0.2796 | 4.7E-4;0.6289 | 0.8852 | 0.2664;1.6251 | -0.026 |
| 27.82 | 33.9 | Rup | 0.2427 | 0.0333;0.4956 | 0.2035 | 4.597E-3;0.447 | 0.4562 | 0.094;0.9714 | 0.039 |
| 23.03 | 27.82 | Chat | 0.2911 | 0.0334;0.6118 | 0.2583 | 0.0332;0.5093 | 0.9276 | 0.32;1.7434 | 0.033 |
| 20.44 | 23.03 | Aqui | 0.4344 | 0.0462;0.8668 | 0.1065 | 2E-6;0.2876 | 0.5107 | 0.0945;1.0462 | **0.328** |
| 15.97 | 20.44 | Bur | 0.2441 | 0.0765;0.4236 | 0.1987 | 0.0754;0.3326 | 0.5065 | 0.2342;0.8078 | 0.045 |
| 13.82 | 15.97 | Lan | 0.2506 | 0.035;0.4983 | 0.1376 | 2.7E-5;0.3148 | 1.1661 | 0.639;1.7319 | 0.113 |
| 11.63 | 13.82 | Ser | 0.1852 | 6.703E-3;0.3744 | 0.1944 | 8.462E-3;0.389 | 1.0776 | 0.6552;1.5251 | -0.009 |
| 7.246 | 11.63 | Tor | 0.2106 | 0.1026;0.3317 | 0.1251 | 0.0181;0.2405 | 0.5781 | 0.3692;0.8178 | 0.086 |
| 5.333 | 7.246 | Mes | 0.1085 | 2.46E-4;0.2464 | **0.436** | **0.1736;0.7146** | 0.6162 | 0.3118;0.9386 | **-0.328** |
| 2.58 | 5.333 | Pli | 0.1985 | 0.0486;0.3578 | 0.1375 | 0.0208;0.2709 | 1.4681 | 1.0003;1.9559 | 0.061 |
| 0 | 2.58 | Ple | 0.303 | 0.1482;0.4772 | 0.3968 | 0.2182;0.5863 | 2.961 | 2.2247;3.7525 | -0.094 |
| Long- term mean | | | 0.333 | - | 0.304 | - | 1.165 | - | 0.029 |

**Table\_ESM\_6.** Mean times of speciation (Ts) and extinction (Te) in Ma, and mean BM(kg) and Log10BM for all extant and extinct species included in our analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Species | Status | Ts | Te | Mean (BM) | Log(BM) |
| *Acresuchus pachytemporalis* | extinct | 11.53 | 7.23 | 242.71 | 2.39 |
| *Akanthosuchus langstoni* | extinct | 64.97 | 61.02 | 32.08 | 1.51 |
| *Aktiogavialis caribesi* | extinct | 10.21 | 8.73 | 110.28 | 2.04 |
| *Aktiogavialis puertoricensis* | extinct | 26.97 | 25.83 | 22.00 | 1.34 |
| *Albertochampsa langstoni* | extinct | 77.07 | 75.99 | 19.72 | 1.29 |
| *Albertosuchus knudsenii* | extinct | 68.59 | 68.30 | 69.63 | 1.84 |
| *Aldabrachampsus dilophus* | extinct | 0.20 | 0.04 | 51.64 | 1.71 |
| *Alligator luicus* | extinct | 14.38 | 13.15 | 2.35 | 0.37 |
| *Alligator mcgrewi* | extinct | 19.06 | 17.70 | 5.42 | 0.73 |
| *Alligator mefferdi* | extinct | 12.70 | 11.46 | 51.94 | 1.72 |
| *Alligator mississippiensis* | extant | 8.53 | 0.00 | 185.06 | 2.27 |
| *Alligator olseni* | extinct | 22.73 | 16.69 | 34.26 | 1.53 |
| *Alligator prenasalis* | extinct | 38.05 | 33.79 | 26.48 | 1.42 |
| *Alligator sinensis* | extant | 4.22 | 0.00 | 23.12 | 1.36 |
| *Alligator thomsoni* | extinct | 18.93 | 17.64 | 80.23 | 1.90 |
| *Allognathosuchus heterodon* | extinct | 54.55 | 51.27 | 3.06 | 0.49 |
| *Allognathosuchus mlynarskii* | extinct | 53.71 | 52.49 | 147.51 | 2.17 |
| *Allognathosuchus polyodon* | extinct | 49.11 | 44.26 | 10.27 | 1.01 |
| *Allognathosuchus wartheni* | extinct | 56.85 | 51.67 | 7.22 | 0.86 |
| *Allognathosuchus woutersi* | extinct | 53.66 | 52.43 | - | - |
| *Arambourgia gaudryi* | extinct | 36.42 | 34.09 | 1.41 | 0.15 |
| *Argochampsa krebsi* | extinct | 65.15 | 60.24 | 69.03 | 1.84 |
| *Asiatosuchus germanicus* | extinct | 46.99 | 41.71 | 262.21 | 2.42 |
| *Asiatosuchus grangeri* | extinct | 43.20 | 42.34 | 107.99 | 2.03 |
| *Asiatosuchus nanlingensis* | extinct | 61.52 | 59.52 | 688.44 | 2.84 |
| *Australosuchus clarkae* | extinct | 26.53 | 14.72 | 22.85 | 1.36 |
| *Balanerodus logimus* | extinct | 20.95 | 10.74 | - | - |
| *Baru darrowi* | extinct | 16.25 | 11.42 | 141.00 | 2.15 |
| *Baru huberi* | extinct | 26.32 | 25.17 | 8.40 | 0.92 |
| *Baru wickeni* | extinct | 28.07 | 22.85 | 162.97 | 2.21 |
| *Borealosuchus acutidentatus* | extinct | 65.16 | 61.25 | 106.01 | 2.03 |
| *Borealosuchus formidabilis* | extinct | 58.72 | 55.27 | 425.15 | 2.63 |
| *Borealosuchus griffithi* | extinct | 64.42 | 63.49 | 50.99 | 1.71 |
| *Borealosuchus sternbergii* | extinct | 72.22 | 64.14 | 53.73 | 1.73 |
| *Borealosuchus threeensis* | extinct | 65.13 | 64.39 | 69.02 | 1.84 |
| *Borealosuchus wilsoni* | extinct | 53.83 | 47.25 | 90.74 | 1.96 |
| *Bottosaurus harlani* | extinct | 71.29 | 64.59 | 326.06 | 2.51 |
| *Bottosaurus tuberculatus* | extinct | 67.14 | 66.63 | - | - |
| *Boverisuchus magnifrons* | extinct | 46.05 | 42.27 | 23.58 | 1.37 |
| *Boverisuchus vorax* | extinct | 54.61 | 42.02 | 89.33 | 1.95 |
| *Brachychampsa montana* | extinct | 80.97 | 65.51 | 137.39 | 2.14 |
| *Brachychampsa sealeyi* | extinct | 77.86 | 76.87 | 6.99 | 0.84 |
| *Brachyuranochampsa eversolei* | extinct | 44.55 | 43.61 | 59.12 | 1.77 |
| *Brochuchus pigotti* | extinct | 22.59 | 16.50 | 45.68 | 1.66 |
| *Caiman australis* | extinct | 9.25 | 6.68 | 123.02 | 2.09 |
| *Caiman brevirostris* | extinct | 10.97 | 6.43 | 35.98 | 1.56 |
| *Caiman gasparinae* | extinct | 8.60 | 7.08 | 211.73 | 2.33 |
| *Caiman latirostris* | extant | 11.32 | 0.00 | 32.08 | 1.51 |
| *Caiman venezuelensis* | extinct | 1.49 | 1.11 | 8.94 | 0.95 |
| *Caiman wannlangstoni* | extinct | 16.19 | 6.96 | 59.00 | 1.77 |
| *Caiman yacare* | extant | 10.27 | 0.00 | 81.91 | 1.91 |
| *Centenariosuchus gilmorei* | extinct | 21.00 | 18.62 | 96.41 | 1.98 |
| *Ceratosuchus burdoshi* | extinct | 56.90 | 55.29 | 26.84 | 1.43 |
| *Charactosuchus fieldsi* | extinct | 14.42 | 7.92 | 48.45 | 1.69 |
| *Charactosuchus kugleri* | extinct | 46.02 | 42.60 | 41.31 | 1.62 |
| *Charactosuchus mendesi* | extinct | 10.43 | 6.64 | 57.88 | 1.76 |
| *Charactosuchus sansoai* | extinct | 10.18 | 8.64 | 147.99 | 2.17 |
| *Crocodilus clavirostris* | extinct | 57.77 | 57.09 | 268.48 | 2.43 |
| *Crocodylus acutus* | extant | 2.11 | 0.00 | 469.65 | 2.67 |
| *Crocodylus anthropophagus* | extinct | 3.53 | 0.31 | 406.07 | 2.61 |
| *Crocodylus checchiai* | extinct | 11.37 | 5.43 | 107.99 | 2.03 |
| *Crocodylus depressifrons* | extinct | 58.33 | 44.22 | 162.97 | 2.21 |
| *Crocodylus falconensis* | extinct | 1.96 | 1.53 | 277.44 | 2.44 |
| *Crocodylus gariepensis* | extinct | 17.39 | 16.13 | 38.99 | 1.59 |
| *Crocodylus johnsoni* | extant | 2.27 | 0.00 | 92.29 | 1.97 |
| *Crocodylus megarhinus* | extinct | 33.38 | 28.23 | 417.35 | 2.62 |
| *Crocodylus moreletii* | extant | 0.24 | 0.00 | 150.78 | 2.18 |
| *Crocodylus niloticus* | extant | 5.75 | 0.00 | 385.62 | 2.59 |
| *Crocodylus palaeindicus* | extinct | 5.94 | 2.41 | 81.37 | 1.91 |
| *Crocodylus palustris* | extant | 0.25 | 0.00 | 150.78 | 2.18 |
| *Crocodylus porosus* | extant | 5.99 | 0.00 | 469.65 | 2.67 |
| *Crocodylus rhombifer* | extant | 2.22 | 0.00 | 92.29 | 1.97 |
| *Crocodylus siamensis* | extant | 2.75 | 0.00 | 92.29 | 1.97 |
| *Crocodylus thorbjarnarsoni* | extinct | 8.56 | 1.11 | 895.34 | 2.95 |
| *Culebrasuchus mesoamericanus* | extinct | 20.60 | 19.17 | 42.96 | 1.63 |
| *Dadagavialis gunai* | extinct | 19.80 | 18.18 | 34.92 | 1.54 |
| *Deinosuchus riograndensis* | extinct | 81.20 | 73.65 | 6,287.35 | 3.80 |
| *Deinosuchus rugosus* | extinct | 83.59 | 68.63 | - | - |
| *Diplocynodon darwini* | extinct | 48.84 | 43.01 | 15.38 | 1.19 |
| *Diplocynodon deponiae* | extinct | 47.79 | 46.74 | 2.01 | 0.30 |
| *Diplocynodon elavericus* | extinct | 36.00 | 34.66 | 92.17 | 1.96 |
| *Diplocynodon hantoniensis* | extinct | 39.01 | 28.29 | 103.19 | 2.01 |
| *Diplocynodon muelleri* | extinct | 32.89 | 27.71 | 3.71 | 0.57 |
| *Diplocynodon ratelii* | extinct | 23.00 | 13.25 | 38.13 | 1.58 |
| *Diplocynodon remensis* | extinct | 58.56 | 56.00 | 58.39 | 1.77 |
| *Diplocynodon tormis* | extinct | 39.07 | 38.38 | 129.64 | 2.11 |
| *Diplocynodon ungeri* | extinct | 17.13 | 10.57 | 78.43 | 1.89 |
| *Dollosuchoides densmorei* | extinct | 44.54 | 43.63 | 98.73 | 1.99 |
| *Eoalligator chunyii* | extinct | 61.75 | 59.57 | - | - |
| *Eocaiman cavernensis* | extinct | 45.07 | 44.13 | 2.02 | 0.31 |
| *Eocaiman itaboraiensis* | extinct | 53.97 | 52.99 | 1.03 | 0.01 |
| *Eocaiman palaeocenicus* | extinct | 65.12 | 62.39 | 4.51 | 0.65 |
| *Eogavialis africanum* | extinct | 37.20 | 34.08 | - | - |
| *Eogavialis andrewsi* | extinct | 20.08 | 7.50 | 300.36 | 2.48 |
| *Eogavialis gavialoides* | extinct | 32.04 | 30.60 | - | - |
| *Eosuchus lerichei* | extinct | 58.02 | 51.81 | 80.59 | 1.91 |
| *Eosuchus minor* | extinct | 58.95 | 50.45 | 118.28 | 2.07 |
| *Eothoracosaurus mississippiensis* | extinct | 78.43 | 69.71 | 563.67 | 2.75 |
| *Euthecodon arambourgi* | extinct | 19.85 | 18.52 | 5,757.70 | 3.76 |
| *Euthecodon brumpti* | extinct | 10.67 | 0.15 | 1,507.15 | 3.18 |
| *Euthecodon nitriae* | extinct | 9.81 | 3.14 | 1,507.15 | 3.18 |
| *Gavialis bengawanicus* | extinct | 2.82 | 0.27 | 323.27 | 2.51 |
| *Gavialis breviceps* | extinct | 19.04 | 17.65 | - | - |
| *Gavialis browni* | extinct | 9.91 | 2.25 | 507.11 | 2.71 |
| *Gavialis curvirostris* | extinct | 22.23 | 17.28 | - | - |
| *Gavialis gangeticus* | extant | 6.01 | 0.00 | 367.16 | 2.56 |
| *Gavialosuchus eggenburgensis* | extinct | 18.97 | 17.60 | 404.07 | 2.61 |
| *Globidentosuchus brachyrostris* | extinct | 14.80 | 5.97 | 53.65 | 1.73 |
| *Gnatusuchus pebasensis* | extinct | 16.37 | 11.14 | 22.45 | 1.35 |
| *Gryposuchus colombianus* | extinct | 14.07 | 11.40 | 685.37 | 2.84 |
| *Gryposuchus croizati* | extinct | 9.35 | 6.69 | 1,758.40 | 3.25 |
| *Gryposuchus jessei* | extinct | 11.35 | 6.54 | 423.10 | 2.63 |
| *Gryposuchus neogaeus* | extinct | 8.78 | 7.17 | 796.73 | 2.90 |
| *Gryposuchus pachakamue* | extinct | 16.66 | 7.20 | 219.06 | 2.34 |
| *Harpacochampsa camfieldensis* | extinct | 14.23 | 13.06 | 165.66 | 2.22 |
| *Hassiacosuchus haupti* | extinct | 47.84 | 46.80 | 5.65 | 0.75 |
| *Hesperogavialis cruxenti* | extinct | 9.01 | 7.47 | 739.72 | 2.87 |
| *Ikanogavialis gameroi* | extinct | 15.18 | 5.64 | 777.42 | 2.89 |
| *Jiangxisuchus nankangensis* | extinct | 69.67 | 69.37 | 8.00 | 0.90 |
| *Kalthifrons aurivellensis* | extinct | 4.99 | 4.03 | 100.28 | 2.00 |
| *Kambara implexidens* | extinct | 52.53 | 51.27 | 28.10 | 1.45 |
| *Kambara molnari* | extinct | 41.52 | 40.65 | 152.86 | 2.18 |
| *Kambara murgonensis* | extinct | 52.52 | 51.26 | 47.01 | 1.67 |
| *Kambara taraina* | extinct | 43.52 | 42.68 | 20.98 | 1.32 |
| *Kentisuchus astrei* | extinct | 45.38 | 44.44 | 36.13 | 1.56 |
| *Kentisuchus spenceri* | extinct | 54.32 | 48.96 | 60.58 | 1.78 |
| *Krabisuchus siamogallicus* | extinct | 40.19 | 35.00 | 9.03 | 0.96 |
| *Kuttanacaiman iquitosensis* | extinct | 16.37 | 10.97 | 33.83 | 1.53 |
| *Leidyosuchus canadensis* | extinct | 80.23 | 72.13 | 146.36 | 2.17 |
| *Listrognathosuchus multidentatus* | extinct | 62.18 | 61.35 | - | - |
| *Maomingosuchus petrolica* | extinct | 39.63 | 35.46 | 120.72 | 2.08 |
| *Maroccosuchus zennaroi* | extinct | 54.89 | 48.75 | 461.92 | 2.66 |
| *Mecistops nkondoensis* | extinct | 5.64 | 2.60 | 181.34 | 2.26 |
| *Megadontosuchus arduini* | extinct | 44.94 | 44.02 | - | - |
| *Mekosuchus inexpectatus* | extinct | 0.08 | 0.00 | 5.57 | 0.75 |
| *Mekosuchus kalpokasi* | extinct | 0.09 | 0.00 | 5.64 | 0.75 |
| *Mekosuchus sanderi* | extinct | 14.54 | 13.25 | 6.85 | 0.84 |
| *Mekosuchus whitehunterensis* | extinct | 27.90 | 18.53 | 4.31 | 0.63 |
| *Melanosuchus niger* | extant | 9.07 | 0.00 | 281.95 | 2.45 |
| *Mourasuchus amazonensis* | extinct | 10.11 | 8.59 | 3,741.39 | 3.57 |
| *Mourasuchus arendsi* | extinct | 10.69 | 6.04 | 1,962.06 | 3.29 |
| *Mourasuchus atopus* | extinct | 15.21 | 11.33 | 1,012.62 | 3.01 |
| *Mourasuchus pattersoni* | extinct | 8.65 | 7.12 | 3,096.81 | 3.49 |
| *Navajosuchus mooki* | extinct | 65.13 | 61.29 | 30.59 | 1.49 |
| *Necrosuchus ionensis* | extinct | 64.07 | 63.18 | 146.36 | 2.17 |
| *Notocaiman stromeri* | extinct | 60.57 | 59.99 | 31.46 | 1.50 |
| *Ocepesuchus eoafricanus* | extinct | 68.41 | 68.10 | 45.11 | 1.65 |
| *Orthogenysuchus olseni* | extinct | 53.75 | 52.55 | 83.31 | 1.92 |
| *Pallimnarchus gracilis* | extinct | 5.78 | 0.73 | 428.67 | 2.63 |
| *Pallimnarchus pollens* | extinct | 4.30 | 0.17 | 927.74 | 2.97 |
| *Paratomistoma courti* | extinct | 39.65 | 38.98 | - | - |
| *Penghusuchus pani* | extinct | 9.01 | 7.53 | 461.92 | 2.66 |
| *Piscogavialis jugaliperforatus* | extinct | 10.31 | 5.33 | 1,030.18 | 3.01 |
| *Planocrania datangensis* | extinct | 60.97 | 60.34 | 14.77 | 1.17 |
| *Planocrania hengdongensis* | extinct | 57.66 | 56.97 | 10.18 | 1.01 |
| *Procaimanoidea kayi* | extinct | 49.75 | 46.80 | 8.51 | 0.93 |
| *Procaimanoidea utahensis* | extinct | 44.67 | 43.74 | 3.27 | 0.51 |
| *Prodiplocynodon langi* | extinct | 69.25 | 68.93 | 236.28 | 2.37 |
| *Protoalligator huiningensis* | extinct | 64.20 | 63.30 | 46.26 | 1.67 |
| *Protocaiman peligrensis* | extinct | 64.42 | 63.51 | 223.78 | 2.35 |
| *Purussaurus brasiliensis* | extinct | 11.31 | 6.82 | 7,782.17 | 3.89 |
| *Purussaurus mirandai* | extinct | 10.23 | 6.08 | 5,549.72 | 3.74 |
| *Purussaurus neivensis* | extinct | 15.95 | 11.33 | 1,307.64 | 3.12 |
| *Quinkana babarra* | extinct | 5.17 | 4.17 | 469.65 | 2.67 |
| *Quinkana fortirostrum* | extinct | 1.41 | 1.03 | 51.64 | 1.71 |
| *Quinkana meboldi* | extinct | 25.36 | 24.29 | 39.80 | 1.60 |
| *Quinkana timara* | extinct | 15.83 | 12.25 | 78.44 | 1.89 |
| *Rhamphosuchus crassidens* | extinct | 14.80 | 2.20 | 3,632.59 | 3.56 |
| *Rimasuchus lloydi* | extinct | 20.74 | 15.42 | 1,055.86 | 3.02 |
| *Siquisiquesuchus venezuelensis* | extinct | 20.09 | 16.60 | 796.73 | 2.90 |
| *Stangerochampsa mccabei* | extinct | 71.01 | 70.66 | 15.69 | 1.20 |
| *Tadzhikosuchus macrodentis* | extinct | 92.55 | 84.40 | 28.81 | 1.46 |
| *Thecachampsa americana* | extinct | 20.54 | 5.48 | 613.44 | 2.79 |
| *Thecachampsa antiqua* | extinct | 16.61 | 6.92 | - | - |
| *Thecachampsa carolinensis* | extinct | 31.75 | 22.79 | 611.43 | 2.79 |
| *Thoracosaurus borissiaki* | extinct | 70.81 | 70.48 | - | - |
| *Thoracosaurus isorhynchus* | extinct | 69.39 | 69.07 | - | - |
| *Thoracosaurus macrorhynchus* | extinct | 71.36 | 62.98 | - | - |
| *Thoracosaurus neocesariensis* | extinct | 79.27 | 63.58 | 446.08 | 2.65 |
| *Tomistoma cairense* | extinct | 43.93 | 43.10 | - | - |
| *Tomistoma calaritanus* | extinct | 20.19 | 9.15 | 277.58 | 2.44 |
| *Tomistoma coppensi* | extinct | 11.24 | 5.43 | 770.22 | 2.89 |
| *Tomistoma gaudense* | extinct | 20.73 | 15.80 | - | - |
| *Tomistoma lusitanica* | extinct | 21.50 | 12.29 | - | - |
| *Tomistoma tandoni* | extinct | 44.42 | 43.47 | - | - |
| *Toyotamaphimeia machikanensis* | extinct | 0.83 | 0.19 | 1,098.20 | 3.04 |
| *Trilophosuchus rackhami* | extinct | 14.59 | 13.30 | 4.60 | 0.66 |
| *Tsoabichi greenriverensis* | extinct | 53.60 | 52.36 | 16.96 | 1.23 |
| *Ultrastenos willisi* | extinct | 27.55 | 24.09 | 215.41 | 2.33 |
| *Voay robustus* | extinct | 0.20 | 0.00 | 163.50 | 2.21 |
| *Volia athollandersoni* | extinct | 0.24 | 0.00 | 9.85 | 0.99 |
| *Wannaganosuchus brachymanus* | extinct | 58.65 | 58.12 | 6.07 | 0.78 |

**Table\_ESM\_7.** Temporal variations of the mean, standard deviation (=disparity), minimum and maximum values for Log10(BM) within Crocodylia resulting from paleoTs resampling at 1 Ma time bins. Note that only intervals with n>2 (sample number) were considered in the following analysis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Age | n | Mean | Disparity | Min | Max |
| 0 | 36 | 2.028 | 0.387 | 0.746 | 3.178 |
| 1 | 21 | 2.278 | 0.325 | 0.952 | 3.178 |
| 2 | 21 | 2.425 | 0.296 | 1.364 | 3.560 |
| 3 | 17 | 2.530 | 0.349 | 1.364 | 3.560 |
| 4 | 18 | 2.504 | 0.345 | 1.364 | 3.560 |
| 5 | 20 | 2.569 | 0.267 | 1.506 | 3.560 |
| 6 | 23 | 2.615 | 0.523 | 1.506 | 3.891 |
| 7 | 32 | 2.603 | 0.436 | 1.506 | 3.891 |
| 8 | 35 | 2.602 | 0.440 | 1.506 | 3.891 |
| 9 | 29 | 2.553 | 0.487 | 1.506 | 3.891 |
| 10 | 26 | 2.454 | 0.550 | 1.506 | 3.891 |
| 11 | 22 | 2.351 | 0.475 | 1.351 | 3.891 |
| 12 | 19 | 2.319 | 0.399 | 1.351 | 3.560 |
| 13 | 24 | 2.016 | 0.770 | 0.371 | 3.560 |
| 14 | 24 | 2.057 | 0.669 | 0.371 | 3.560 |
| 15 | 17 | 2.265 | 0.386 | 1.351 | 3.116 |
| 16 | 17 | 2.075 | 0.345 | 1.351 | 3.024 |
| 17 | 15 | 2.092 | 0.474 | 0.734 | 3.024 |
| 18 | 17 | 2.107 | 0.723 | 0.635 | 3.760 |
| 19 | 16 | 2.059 | 0.764 | 0.635 | 3.760 |
| 20 | 13 | 2.070 | 0.545 | 0.635 | 3.024 |
| 21 | 6 | 1.609 | 0.531 | 0.635 | 2.887 |
| 22 | 7 | 1.681 | 0.456 | 0.635 | 2.786 |
| 23 | 4 | 1.748 | 0.895 | 0.635 | 2.786 |
| 24 | 6 | 1.821 | 0.603 | 0.635 | 2.786 |
| 25 | 8 | 1.649 | 0.545 | 0.635 | 2.786 |
| 26 | 7 | 1.656 | 0.635 | 0.635 | 2.786 |
| 27 | 5 | 1.707 | 1.064 | 0.570 | 2.786 |
| 28 | 5 | 2.040 | 0.772 | 0.570 | 2.786 |
| 29 | 4 | 1.998 | 1.016 | 0.570 | 2.786 |
| 30 | 4 | 1.998 | 1.016 | 0.570 | 2.786 |
| 31 | 4 | 1.998 | 1.016 | 0.570 | 2.786 |
| 32 | 3 | 1.735 | 1.110 | 0.570 | 2.621 |
| 33 | 3 | 2.019 | 0.359 | 1.423 | 2.621 |
| 34 | 4 | 1.388 | 0.752 | 0.150 | 2.014 |
| 35 | 6 | 1.432 | 0.583 | 0.150 | 2.082 |
| 36 | 5 | 1.325 | 0.643 | 0.150 | 2.082 |
| 37 | 4 | 1.619 | 0.283 | 0.956 | 2.082 |
| 38 | 5 | 1.717 | 0.261 | 0.956 | 2.113 |
| 39 | 4 | 1.791 | 0.312 | 0.956 | 2.113 |
| 42 | 6 | 1.786 | 0.181 | 1.322 | 2.419 |
| 43 | 10 | 1.618 | 0.294 | 0.514 | 2.419 |
| 44 | 13 | 1.552 | 0.432 | 0.306 | 2.419 |
| 45 | 9 | 1.515 | 0.418 | 0.306 | 2.419 |
| 46 | 10 | 1.375 | 0.454 | 0.303 | 2.419 |
| 47 | 8 | 1.288 | 0.459 | 0.303 | 2.212 |
| 48 | 8 | 1.712 | 0.380 | 0.930 | 2.665 |
| 49 | 7 | 1.787 | 0.390 | 0.930 | 2.665 |
| 50 | 6 | 2.107 | 0.095 | 1.782 | 2.665 |
| 51 | 11 | 1.728 | 0.375 | 0.486 | 2.665 |
| 52 | 14 | 1.738 | 0.325 | 0.486 | 2.665 |
| 53 | 13 | 1.633 | 0.581 | 0.014 | 2.665 |
| 54 | 8 | 1.742 | 0.516 | 0.486 | 2.665 |
| 55 | 7 | 1.839 | 0.326 | 0.858 | 2.629 |
| 56 | 7 | 1.839 | 0.326 | 0.858 | 2.629 |
| 57 | 7 | 2.003 | 0.280 | 1.008 | 2.629 |
| 58 | 5 | 1.893 | 0.481 | 0.783 | 2.629 |
| 60 | 4 | 1.836 | 0.521 | 1.169 | 2.838 |
| 61 | 5 | 1.939 | 0.305 | 1.486 | 2.838 |
| 62 | 5 | 1.502 | 0.277 | 0.654 | 2.025 |
| 63 | 10 | 1.805 | 0.304 | 0.654 | 2.649 |
| 64 | 13 | 1.856 | 0.267 | 0.654 | 2.649 |
| 65 | 9 | 1.875 | 0.346 | 0.654 | 2.649 |
| 66 | 4 | 2.258 | 0.170 | 1.730 | 2.649 |
| 67 | 4 | 2.258 | 0.170 | 1.730 | 2.649 |
| 68 | 6 | 2.088 | 0.175 | 1.654 | 2.649 |
| 69 | 7 | 2.151 | 0.421 | 0.903 | 2.751 |
| 70 | 6 | 2.163 | 0.366 | 1.196 | 2.751 |
| 71 | 5 | 2.356 | 0.176 | 1.730 | 2.751 |
| 72 | 5 | 2.287 | 0.173 | 1.730 | 2.751 |
| 73 | 5 | 2.700 | 0.453 | 2.138 | 3.798 |
| 74 | 5 | 2.700 | 0.453 | 2.138 | 3.798 |
| 75 | 6 | 2.466 | 0.692 | 1.295 | 3.798 |
| 76 | 7 | 2.235 | 0.952 | 0.845 | 3.798 |
| 77 | 7 | 2.235 | 0.952 | 0.845 | 3.798 |
| 78 | 5 | 2.700 | 0.453 | 2.138 | 3.798 |
| 79 | 4 | 2.688 | 0.603 | 2.138 | 3.798 |
| 80 | 3 | 2.701 | 0.904 | 2.138 | 3.798 |

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