Supporting information

Intraspecific variation in the skull morphology of the Black Caiman *Melanosuchus niger* (Alligatoridae, Caimaninae)

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Table S1. List of specimens of *Melanosuchus niger* used in the geometric morphometric analysis with information on sex, skull length SL, bite force, and data sets in which in was included (dorsal, ventral and lateral views). The bite force BF estimation based on the equation of Erickson et al. (2003): **LogBF = 2.75 x LogSL – 0.65**; **j** juvenile, **j*** juvenile specimens, which were x-rayed; **f** female, **m** male, **m*** identification of males by one of the authors (CF) based on the large size compared to the largest female. **SMF** Senckenberg Naturmuseum Frankfurt (Germany); **ZFMK** Zoologisches Forschungsmuseum Alexander Koenig, Bonn (Germany); **NHMW** Naturhistorisches Museum Wien (Austria); **ZMH** Zoologisches Museum Hamburg (Germany); **ZSM** Zoologische Staatssammlung München (Germany).

Specimen	sex	SL (cm)	logSL (cm)	logBF (N)
ZFMK 52355	j*	4.70	0.67	1.20
ZFMK 52353	j*	5.85	0.77	1.46
ZSM 858/1920	j*	6.10	0.79	1.51
ZSM 139/1982	j*	6.20	0.79	1.53
ZSM 2414/2006	j*	7.90	0.90	1.82
ZMH R08660	j*	8.00	0.90	1.83
SMF 30113	j	8.80	0.94	1.95
SMF 30102	j	10.20	1.01	2.12
ZSM 3/1971	j*	11.10	1.05	2.22
SMF 40142	j	13.10	1.12	2.42
SMF 40172	j	13.90	1.14	2.49
ZSM 13/1911	j	16.30	1.21	2.68
ZSM 130/1911	f	26.80	1.43	3.28
ZSM 27/1911	f	29.00	1.46	3.37
ZSM 87/1911	f	29.00	1.46	3.37
ZSM 76/1911	f	29.80	1.47	3.40
ZSM 85/1911	f	31.10	1.49	3.46
ZSM 84/1911	f	31.50	1.50	3.47
ZSM 77/1911	f	32.00	1.51	3.49
ZSM 86/1911	f	33.30	1.52	3.54

ZSM 83/1911	f	34.00	1.53	3.56
ZSM 91/1911	f	34.00	1.53	3.56
ZSM 68/1911	f	35.50	1.55	3.61
ZSM 14/1911	f	36.40	1.56	3.64
ZSM 89/1911	f	36.80	1.57	3.66
ZSM 70/1911	f	38.50	1.59	3.71
SMF 40171	m	25.70	1.41	3.23
ZSM 80/1911	m	30.00	1.48	3.41
ZSM 79/1911	m	30.30	1.48	3.42
ZSM 90/1911	m	33.50	1.53	3.54
ZSM 73/1911	m	34.50	1.54	3.58
ZSM 74/1911	m	35.50	1.55	3.61
ZSM 75/1911	m	35.90	1.56	3.63
ZSM 3/1911	m	36.60	1.56	3.65
ZSM 67/1911	m	37.50	1.57	3.68
ZSM 46/1911	m	38.50	1.59	3.71
ZSM 69/1911	m	39.50	1.60	3.74
ZSM 64/1911	m	39.80	1.60	3.75
ZSM 11/1911	m	40.30	1.61	3.76
ZSM 62/1911	m	42.30	1.63	3.82
ZSM 57/1911	m	43.50	1.64	3.86
ZSM 3039/0	m*	43.50	1.64	3.86
ZSM 1/1906	m*	45.00	1.65	3.90
NHMW 2024	m*	45.30	1.66	3.90
ZSM 35/1911	m	45.50	1.66	3.91
ZSM 52/1911	m	45.70	1.66	3.91
ZSM 2416/2006	m*	47.50	1.68	3.96
ZSM 63/1911	m*	49.50	1.69	4.01
ZSM 12/1911	m	50.00	1.70	4.02
SMF 28182	m*	50.00	1.70	4.02
ZSM 223/1295	m*	52.00	1.72	4.07
NHMW 2025	m*	52.50	1.72	4.08

Anatomical description of the landmarks (the landmarks are visualized in Fig. 1 of the main text; LM = landmark; semi-LM = semi-landmark)

Dorsal view

1	most anterior contact between both premaxillae
2	midpoint of the posterior margin of the skull table
3	contact between the supraoccipital and parietal along the posterior margin of the skull table
4	most posterolateral point of the squamosal (contact with the exoccipital)
5	most posterolateral point of the quadrate
6	contact of jugal process of the postorbital with skull table
7	most posterolateral point of the orbit
8	most anterior point of the orbit
9	contact between the premaxilla and maxilla along the lateral margin of the skull
10	one semi-LM on the anterolateral margin of the skull between LM 1 and LM 9
11-12	two semi-LMs on the medial margin of the orbit between LM 8 and LM 6, from anterior to posterior
13-15	three semi-LMs on the lateral margin of the skull between LM 9 and LM 5, from anterior to posterior

Lateral view

1	most anteroventral point of the premaxillae
2	contact between the maxilla and jugal along the ventral margin of the skull
3	most posterior point of the quadratojugal at the jaw joint
4	most posterior point of the skull roof surface
5	postorbital foramen
6	most ventral contact between the jugal and postorbital
7	most anterior point of the orbit
8	contact of the premaxilla and maxilla along the margin of the tooth row
9	one semi-LM on the ventral margin of the premaxilla between LM 1 and LM 8
10-12	three semi-LMs on the ventral margin od the maxilla between LM 8 and LM 2, from anterior to posterior
13-14	two semi-LMs on the ventral margin of the jugal between LM 2 and LM 3, from anterior to posterior
15-21	seven semi-LMs on the dorsal margin of the skull between LM 1 and LM 4, from anterior to posterior

Error test after Singleton (2002)

For the error test, estimating the methodological error of plotting landmarks on the skulls, Procrustes distances of the Procrustes coordinates to the respective consensus coordinates of each landmark were calculated. Then, the relation of these distances to the mean distance of the consensus landmarks to the centroid of the consensus shape was calculated as a percentage of the former from the latter. Based on the test all landmarks possess only a small percentage error for plotting landmarks (≈ 0. 08-1.27 %).

Table S2. Percentage error for each landmark for both photographed (ZSM 2416/2006) and the X-rayed specimens (ZSM 3/1971) (in dorsal and lateral view) with n = 10.

	Dorsal view		Lateral view	
LM	**Photograph**	**X-ray**	**Photograph**	**X-ray**
1	0.326	0.311	0.650	0.659
2	0.451	0.508	0.204	0.958
3	0.318	0.887	0.611	0.528
4	0.477	0.628	0.308	0.538
5	0.566	0.612	0.527	0.638
6	0.508	0.824	0.268	0.410
7	0.956	1.271	0.325	0.695
8	0.262	0.407	0.474	0.644
9	0.255	0.248	0.309	0.498
10	0.112	0.163	0.373	0.259
11	0.200	0.341	0.179	0.368
12	0.173	0.345	0.144	0.360
13	0.082	0.321	0.173	0.269
14	0.119	0.294	0.310	0.390
15	0.153	0.535	0.273	0.393
16	-	-	0.300	0.355
17	-	-	0.309	0.256
18	-	-	0.417	0.292
19	-	-	0.328	0.419
20	-	-	0.238	0.286
21	-	-	0.240	0.315

References

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