

Fig. S1. Allometry of the caecilian neurocranium based on the regression of neurocranium shape on log-10 centroid size ($R^2=0.12$; $p=0.001$). Increase in centroid size is associated with broader neurocranium. Warped surfaces represent the smallest neurocranium shape in blue, the mean shape in natural color, and the largest neurocranium in red. Shown on *Hypogeophis rostratus*.

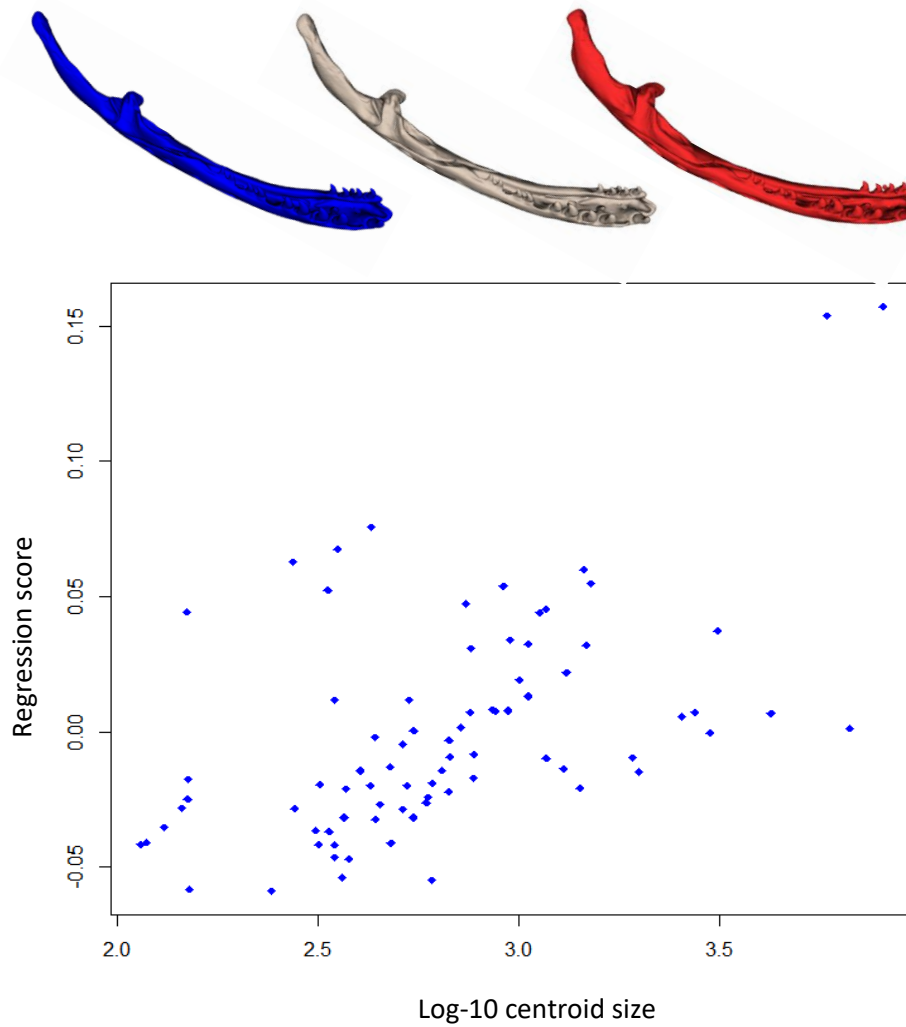


Fig. S2. Allometry of the caecilian mandible based on the regression of mandible shape on log-10 centroid size ($R^2=0.05$; $p=0.003$). Increase in centroid size is associated with shorter and thicker retroarticular process. Warped surfaces represent the smallest mandible shape in blue, the mean shape in natural color, and the largest mandible in red. Shown on *Hypogeophis rostratus*.

Table S1. Details of the specimens used in the study.

Family	Species	ID	Origin	Voxel size (mm)
Caeciliidae	<i>Caecilia museugoeldi</i> *	V2101	MW	0.017654
	<i>Caecilia tentaculata</i> *	3955	MW	0.02293
	<i>Caecilia tentaculata</i>	ku:kuh:175441	MS	0.0418017
Dermophiidae	<i>Dermophis mexicanus</i>	cas:herp:144523	MS	0.05079078
	<i>Dermophis mexicanus</i> *	A-52188	UTACV	0.023049
	<i>Dermophis mexicanus</i> *	AL2101201	AL	0.025633
	<i>Dermophis mexicanus</i> *	AL2101202	AL	0.02255
	<i>Geotrypetes seraphini</i> *	2	AH	0.017298
	<i>Geotrypetes seraphini</i> *	6	AH	0.01517
	<i>Geotrypetes seraphini</i> *	AL1	AH	0.016
	<i>Geotrypetes seraphini</i> *	AL21	AH	0.013772
	<i>Geotrypetes seraphini</i> *	AL5	AH	0.01517
	<i>Schistometopum gregorii</i>	cas:herp:245198	MS	0.02727788
	<i>Schistometopum thomense</i> *	6	AH	0.01417
	<i>Schistometopum thomense</i> *	7	AH	0.013694
	<i>Schistometopum thomense</i> *	#8	AH	0.015999
	<i>Schistometopum thomense</i> *	AL11	AH	0.013993
	Herpeliidae	<i>Boulengerula boulengeri</i>	fmnh:amphibians and reptiles:251369	MS
<i>Boulengerula fischeri</i> *		3	AH	0.014482
<i>Boulengerula fischeri</i> *		4	AH	0.008667
<i>Boulengerula fischeri</i> *		5	AH	0.009802
<i>Boulengerula fischeri</i> *		7	AH	0.009058
<i>Boulengerula fischeri</i> *		AH1	AH	0.009736
<i>Boulengerula taitanus</i> *		AH2	AH	0.01607
<i>Boulengerula taitanus</i> *		AL010401	AH	0.011702
<i>Boulengerula taitanus</i> *		AL010402	AH	0.009939
<i>Boulengerula taitanus</i> *		JM01452	AH	0.01223
<i>Boulengerula taitanus</i> *		JM01584	AH	0.01223
<i>Herpele squalostoma</i> *		AL10	AH	0.014342
<i>Herpele squalostoma</i> *		AL2	AH	0.016
<i>Herpele squalostoma</i> *		AL30	AH	0.011749
<i>Herpele squalostoma</i> *		AL31	AH	0.013531
<i>Herpele squalostoma</i> *		AL32	AH	0.015402
Ichthyophiidae	<i>Ichthyophis bombayensis</i>	uf:herp:76734	MS	0.0157204
	<i>Ichthyophis kohtaoensis</i>	ncsm:herp:79205	MS	0.0180084
	<i>Ichthyophis kohtaoensis</i>	ZMH A08981	ZMH	0.00683371
	<i>Ichthyophis kohtaoensis</i> *	218831	UMMZ	0.014288
	<i>Ichthyophis kohtaoensis</i> *	218832	UMMZ	0.013635
	<i>Uraeotyphlus oxyurus</i>	uf:herp:62870	MS	0.01541157
Indotyphlidae	<i>Gegeneophis ramaswamii</i>	151	MW	0.00652334
	<i>Gegeneophis ramaswamii</i>	616	MW	0.00657374
	<i>Gegeneophis ramaswamii</i>	654	MW	0.00657374
	<i>Gegeneophis ramaswamii</i>	1275	MW	0.00850015
	<i>Grandisonia alternans</i>	109185	RMCA	0.0125751
	<i>Grandisonia alternans</i>	109186	RMCA	0.0117884
	<i>Grandisonia alternans</i>	109187	RMCA	0.010592
	<i>Grandisonia alternans</i>	cas:herp:157086	MS	0.0449849
	<i>Hypogeophis rostratus</i>	73_38_B_101	RMCA	0.00860674

	<i>Hypogeophis rostratus</i>	73_38_B_110	RMCA	0.00973346
	<i>Hypogeophis rostratus</i>	73_38_B_111	RMCA	0.0103296
	<i>Hypogeophis rostratus</i>	73_48_B_1	RMCA	0.00960109
	<i>Sylvacaecilia grandisonae</i>	ummz:herps:227904	MS	0.0135
Rhinatremitidae	<i>Epicrionops bicolor</i>	lsumz:herps:27295	MS	0.01313565
	<i>Rhinatrema bivittatum</i>	byu:main:48675	MS	0.01280857
	<i>Rhinatrema bivittatum*</i>	A53	AH	0.016
	<i>Rhinatrema bivittatum*</i>	AL8	AH	0.016692
	<i>Rhinatrema bivittatum*</i>	B75	AH	0.01128
	<i>Rhinatrema bivittatum*</i>	B80	AH	0.028336
Scolecophoridae	<i>Scolecophorus kirkii</i>	101889	RMCA	0.00534591
	<i>Scolecophorus uluguruensis</i>	11102	RMCA	0.00724756
	<i>Scolecophorus uluguruensis</i>	101890	RMCA	0.0061962
	<i>Scolecophorus uluguruensis</i>	101891	RMCA	0.0074426
	<i>Scolecophorus uluguruensis</i>	101892	RMCA	0.00807479
	<i>Scolecophorus uluguruensis</i>	101894	RMCA	0.00697088
	<i>Scolecophorus uluguruensis</i>	101896	RMCA	0.00677692
Siphonopidae	<i>Microcaecilia unicolor</i>	MU1	MW	0.00722938
	<i>Microcaecilia unicolor*</i>	prey	AH	0.009237
	<i>Mimosiphonops vermiculatus</i>	ku:kuh:93271	MS	0.01601592
	<i>Siphonops annulatus</i>	cas:herp:74304	MS	0.02216916
	<i>Siphonops annulatus</i>	1924_9_20_9_Red0	MW	0.0098174
	<i>Siphonops annulatus</i>	ZMH A00235	ZMH	0.00919775
Typhlonectidae	<i>Atretochoana eiselti</i>	30919	AH	0.019982
	<i>Atretochoana eiselti</i>	uf:herp:185560	MS	0.02900359
	<i>Potomotyphlus kaupii</i>	PotomoH2_01	MW	0.00970784
	<i>Potomotyphlus kaupii</i>	PotomoH2_01	MW	0.00970784
	<i>Typhlonectes compressicauda</i>	11307	MW	0.00840397
	<i>Typhlonectes compressicauda</i>	cas:herp:125421	MS	0.03687404
	<i>Typhlonectes compressicauda*</i>	AL20	AH	0.01765
	<i>Typhlonectes compressicauda*</i>	AL6	AH	0.019413
	<i>Typhlonectes compressicauda*</i>	AL7	AH	0.020118
	<i>Typhlonectes natans</i>	ZMH A08984	ZMH	0.00389105

*Specimens scanned using the HECTOR micro computed tomography (μ CT) scanner

Abbreviations are as follows:

- Personal collection of Anthony Herrel (AH)
- Personal collection of Aurélien Lowie (AL)
- Morphosource.org (MS)
- Personal collection of Mark Wilkinson (MW)
- Royal Museum of Central Africa (RMCA)
- University of Michigan, Museum of Zoology (UMMZ)
- University of Texas Arlington, Amphibian & Reptile Diversity Research Center (UTACV)
- Zoological Museum, Hamburg (ZMH)

Table S2. Definition of the landmarks of the mandible used in geometric morphometric analyses.

Landmark	Bone	Definition
1	Pseudodentary	Posterior extreme
2	Pseudodentary	Posterodorsal suture with pseudoangular
3	Pseudodentary	Anterodorsal extreme of the mandibular symphysis
4	Pseudodentary	Anteroventral extreme of the mandibular symphysis
5	Pseudodentary	Anterodorsal extreme of the inner tooth row
6	Pseudodentary	Point of suture with the pseudoangular
7	Pseudoangular	Point of suture with the pseudodentary
8	Pseudoangular	Ventrodorsal extreme point of the <i>processus internus</i> insertion
9	Retroarticular process	Posterior extreme
10	Retroarticular process	Inflection point at the base of the <i>processus condyloides</i>
11	Pseudoangular	Posterolateral extreme of the articular surface
12	Pseudoangular	Medial extreme of the articular surface
13	Pseudoangular	Anterodorsal extreme of the articular surface on the lateral surface
14	Pseudoangular	Anterodorsal suture with pseudodentary
15	Pseudoangular	Posterior extreme of the <i>canalis primordialis</i>
16	Pseudoangular	Anterior extreme of the <i>canalis primordialis</i>
17	Pseudoangular	Posterior extreme of the alveolar foramen
18	Pseudoangular	Medial extreme of the <i>processus internus</i>
19	Pseudoangular	Posterior extreme of the <i>ramus intermandibularis</i> foramen

Table S3. Definition of the landmarks of the cranium used in geometric morphometric analyses.

Left side	Right side	Bone	Definition
1	45	Nasopremaxilla	Anteromedial extreme of tooth row
2	46	Nasopremaxilla	Posteromedial suture with frontal
3	47	Nasopremaxilla	Posterolateral suture with frontal
4	48	Nasopremaxilla	Posterolateral extreme of tooth row
5	49	Frontal	Suture with Nasopremaxilla along midline
6	50	Frontal	Suture with parietal along midline
7	51	Frontal	Posterolateral suture with parietal
8	52	Frontal	Anterolateral suture with Nasopremaxilla
9	53	Parietal	Suture with frontal along midline
10	54	Parietal	Suture with occipital along midline
11	55	Parietal	Anterolateral suture with frontal
12	56	Parietal	Anteromedial extreme of the <i>m. cutaneous dorsalis</i> insertion ridge
13	57	Parietal	Posteroventral extreme of the <i>m. adductor mandibulae</i> insertion ridge
14	58	Parietal	Posterodorsal extreme of the <i>m. adductor mandibulae</i> insertion ridge
15	59	Occipital	Anteromedial suture with parietal
16	60	Occipital	Dorsal extreme of foramen magnum
17	61	Occipital	Dorsal extreme of occipital condyle
18	62	Occipital	Medial extreme of occipital condyle
19	19	Occipital	Ventral extreme of foramen magnum
20	20	Os basale	Middle point on the muscle ridge
21	63	Os basale	Posterior extreme of the quadrate-os basale articulation
22	64	Os basale	Posterior extreme of foramen ovale
23	65	Maxillopalatine	Anterior extreme of tooth row
24	66	Maxillopalatine	Posterior extreme of tooth row
25	67	Squamosal	Posteroventral extreme
26	68	Quadrate	Anterior extreme of <i>processus ascendens</i>
27	69	Quadrate	Posterior extreme of <i>processus ascendens</i>
28	70	Squamosal	Posterodorsal extreme
29	71	Squamosal	Anterodorsal extreme
30	72	Maxillopalatine	Posterodorsal extreme
31	73	Vomer	Anteromedial extreme of tooth row
32	74	Vomer	Posterolateral extreme of tooth row
33	75	Maxillopalatine	Anterolateral extreme of tooth row
34	76	Maxillopalatine	Posterolateral extreme of tooth row
35	77	Os basale	Anterior extreme of carotid foramen
36	78	Os basale	Posterior extreme of jugular foramen
37	79	Nasopremaxilla	Anterolateral extreme of nares opening
38	80	Os basale	Anterolateral extreme point on the muscle ridge
39	81	Nasopremaxilla	Posteromedial extreme on the palatal surface
40	82	Vomer	Posterior extreme
41	83	Maxillopalatine	Anteromedial extreme of choanal rim
42	84	Maxillopalatine	Inflection point where bone splits to surround the choanae
43	85	Quadrate	Inflection point on the posteromedial surface of <i>processus ascendens</i>
44	86	Nasopremaxilla	Most anteromedial point
87	88	Squamosal	Most dorsal point on the muscle ridge