

Geological Map and Distribution of Fossil Marine Vertebrates in the Lower Miocene Chilcatay Formation of Zamaca (Ica Desert, Peru)

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HEIGHT IN THE STRATIGRAPHIC SUCCESSION
AND PRELIMINARY SYSTEMATIC
DETERMINATION OF FOSSIL VERTEBRATES

Number	Determination	Preserved bones
ZM1	Testudines indet.	mandible
ZM2	Odontoceti indet.	articulated humerus, radius and ulna
ZM3	Odontoceti indet.	partial disarticulated skeleton including skull
ZM4	Odontoceti indet.	fragments of scapula
ZM5	aff. Odontoceti indet.	fragmentary ribs
ZM6	Myliobatiformes indet.	large caudal spine
ZM7	aff. Odontoceti indet.	10 articulated vertebrae
ZM8	Physeteroidea indet.	skull inside a concretion
ZM9	Kentriodont sp.	skull
ZM10	aff. Physeteroidea indet.	partially skeleton including skull
ZM12	Chilcacetus cavihinus	partial articulated skeleton including skull
ZM13	Testudines indet.	large skull inside a concretion
ZM14	Odontoceti indet.	disarticulated skeleton including mandible
ZM15	22.4 Kentriodont sp.	fragmentary skull and cervical
ZM21	Physeteroidea indet.	skull and portion of postcranium
ZM22	aff. Odontoceti indet.	6 disarticulated thoracics and ribs
ZM24	20.8 Kentriodont sp.	fragmentary skull with endocranial cast
ZM25	32.4 Eurhinodelphinidae indet.	skull and cervical
ZM26	32.4 Testudines indet.	large scapula and limb bones
ZM27	34.7 Physeteroidea indet.	disarticulated partial skeleton with skull
ZM28	22.4 aff. Odontoceti indet.	disarticulated vertebrae and ribs
ZM29	20.4 Odontoceti indet.	large rostrum
ZM30	40.2 aff. Odontoceti indet.	disarticulated vertebrae and ribs
ZM31	36.1 Odontoceti indet.	disarticulated partial skull and vertebrae
ZM32	22.4 Physeteroidea indet.	skull
ZM33	36.1 Physeteroidea indet.	skull
ZM34	5.1 Odontoceti indet.	small skull
ZM35	1.5 Inticetus vertzi	articulated skeleton including skull (holotype)
ZM36	25.9 Odontoceti indet.	eroded skull
ZM37	20.4 Odontoceti indet.	humerus, vertebrae and ribs
ZM43	36.1 Kentriodont sp.	skull
ZM44	20.9 Odontoceti indet.	fragmentary cranium and mandibles
ZM45	20.8 aff. Odontoceti indet.	vertebrae and ribs
ZM46	20.8 aff. Odontoceti indet.	vertebrae
ZM47	7.0 Notocetus sp.	cranium
ZM48	20.8 aff. Odontoceti indet.	ribs and 2 vertebrae
ZM49	20.8 Osteichthyes indet.	fragmentary bones
ZM50	10.7 Odontoceti indet.	disarticulated vertebrae including atlas
ZM51	20.8 Kentriodont sp.	fragmentary mandible, ear bones and teeth
ZM54	20.8 Odontoceti indet.	disarticulated skeleton with tympanic and atlas
ZM55	22.4 Odontoceti indet.	disarticulated partial skeleton including skull
ZM56	20.8 aff. Odontoceti indet.	ribs and fragmentary bones
ZM57	38.1 Odontoceti indet.	mandibles and tympanic fragment
ZM58	22.4 Kentriodont sp.	eroded cranium
ZM59	46.8 Kentriodont sp.	incomplete skull and fragmentary bones
ZM60	47.2 Testudines indet.	fragmentary carapax
ZM61	1.5 Notocetus sp.	disarticulated cranium, sternum and ribs
ZM62	1.5 Odontoceti indet.	cervicals and articulated forelimb bones
ZM64	26.8 Physeteroidea indet.	skull inside a concretion
ZM65	26.1 Kentriodont sp.	eroded cranium
ZM66	20.8 aff. Odontoceti indet.	vertebrae (not in situ)
ZM67	22.4 aff. latiporhidae indet.	fragmentary skull
ZM68	16.2 aff. Odontoceti indet.	disarticulated ribs
ZM69	22.4 Kentriodont sp.	cranium
ZM70	20.8 aff. Odontoceti indet.	disarticulated vertebrae and ribs
ZM71	20.8 Kentriodont sp.	disarticulated cranium, vertebrae and ribs
ZM72	33.5 aff. Odontoceti indet.	disarticulated cervical and ribs
ZM74	10.7 Osteichthyes indet.	large skull bone
ZM75	39.2 Odontoceti indet.	skull
ZM76	42.5 aff. Odontoceti indet.	disarticulated vertebrae
ZM77	41.8 Odontoceti indet.	mandible fragment and vertebrae
ZM78	47.2 Testudines indet.	partial skeleton with skull inside concretion
ZM79	45.7 aff. Odontoceti indet.	disarticulated partial skeleton inside concretion
ZM80	42.3 Odontoceti indet.	skull fragments with teeth
ZM81	41.8 aff. Odontoceti indet.	vertebrae and ribs inside concretion
ZM82	41.8 Kentriodont sp.	fragment of cranium
ZM83	20.8 Kentriodont sp.	fragment of rostrum inside concretion
ZM84	20.8 Osteichthyes indet.	large bones
ZM85	20.8 Odontoceti indet.	rostrum and humerus
ZM86	10.0 Odontoceti indet.	skull fragments and vertebrae
ZM87	10.0 Testudines indet.	almost complete large skeleton
ZM88	10.7 aff. latiporhidae indet.	skull
ZM89	6.4 Odontoceti indet.	humerus and radius
ZM90	6.4 Odontoceti indet.	incomplete mandibles
ZM91	6.4 Odontoceti indet.	mandibles
ZM92	7.0 aff. Odontoceti indet.	4 disarticulated vertebrae
ZM93	7.0 aff. Odontoceti indet.	lumbar vertebrae
ZM94	10.7 aff. Odontoceti indet.	partially disarticulated vertebrae and ribs
ZM95	5.1 Squalodelphinidae indet.	skull
ZM96	5.1 aff. Squalodelphinidae indet.	partial disarticulated skeleton including rostrum
ZM97	10.7 aff. Platanistidae indet.	articulated partial skeleton including skull
ZM98	7.0 Mysticeti indet.	mandible
ZM99	10.0 Osteichthyes indet.	large bones with teeth
ZM100	45.7 aff. Odontoceti indet.	thoracics inside concretion
ZM101	7.0 Testudines indet.	fragmentary bones
ZM102	20.8 Deshayidae indet.	dermal denticle
ZM103	19.4 aff. Odontoceti indet.	vertebrae and ribs
ZM104	18.4 Elasmobranchii indet.	1 vertebra
ZM105	10.7 Myliobatidae indet.	large tooth
ZM107	20.8 Osteichthyes indet.	large ray bones
ZM108	22.4 aff. Odontoceti indet.	4 eroded disarticulated vertebrae
ZM109	16.2 Odontoceti indet.	fragment of cranium and vertebra
ZM110	21.9 Osteichthyes indet.	bones of large skull
ZM111	46.8 aff. Odontoceti indet.	eroded fragments of vertebrae and ribs
ZM112	22.4 Osteichthyes indet.	bones of large skull
ZM113	36.1 Physeteroidea indet.	skull inside concretion
ZM114	22.8 aff. Odontoceti indet.	2 disarticulated vertebrae
ZM115	32.4 Odontoceti indet.	partially eroded skull
ZM116	47.2 Deshayidae indet.	dermal denticle
ZM117	41.3 Odontoceti indet.	disarticulated 3 skull, mandible and postcranial
ZM118	46.8 aff. Odontoceti indet.	8 lumbers to caudals
ZM119	47.2 Elasmobranchii indet.	4 disarticulated vertebrae
ZM120	34.7 Kentriodont sp.	fragmentary skull
ZM121	20.8 Testudines indet.	vertebrae
ZM122	22.4 Osteichthyes indet.	fragments large bones
ZM123	22.4 aff. Odontoceti indet.	disarticulated vertebrae and ribs
ZM124	22.4 aff. Odontoceti indet.	disarticulated 3 vertebrae and 2 ribs
ZM125	10.7 Osteichthyes indet.	large bones
ZM126	36.5 aff. Odontoceti indet.	small partially eroded skull
ZM127	36.1 Odontoceti indet.	skull fragments
ZM128	36.1 Platanistidae indet.	skull
ZM129	39.5 aff. Platanistidae sp.	skull
ZM130	22.4 Osteichthyes indet.	4 large vertebrae
ZM131	38.1 Odontoceti indet.	small eroded skull
ZM132	38.1 aff. Odontoceti indet.	disarticulated eroded ribs and vertebra
ZM133	32.4 aff. Odontoceti indet.	disarticulated eroded vertebrae and ribs
ZM134	34.7 Odontoceti indet.	skull
ZM135	35.0 Kentriodont sp.	cranium
ZM136	34.7 Elasmobranchii indet.	large vertebra
ZM137	20.8 Osteichthyes indet.	large bones
ZM138	20.8 Osteichthyes indet.	large bones
ZM140	20.8 Osteichthyes indet.	large skull bones
ZM141	21.9 Kentriodont sp.	fragmentary cranium with endocranial cast
ZM142	22.4 Osteichthyes indet.	large skull bones and 2 vertebrae
ZM143	21.9 Testudines indet.	large bone
ZM144	22.4 aff. Odontoceti indet.	2 disarticulated vertebrae
ZM145	20.8 Odontoceti indet.	scapula
ZM146	22.4 aff. Odontoceti indet.	fragments of ribs and vertebrae non in situ
ZM147	22.4 Osteichthyes indet.	2 large vertebrae
ZM148	20.8 Osteichthyes indet.	articulated portion of vertebral column
ZM150	22.5 Kentriodont sp.	fragmentary cranium with endocranial cast
ZM151	25.1 aff. Kentriodontidae	cranium
ZM152	59.0 Mysticeti indet.	skull

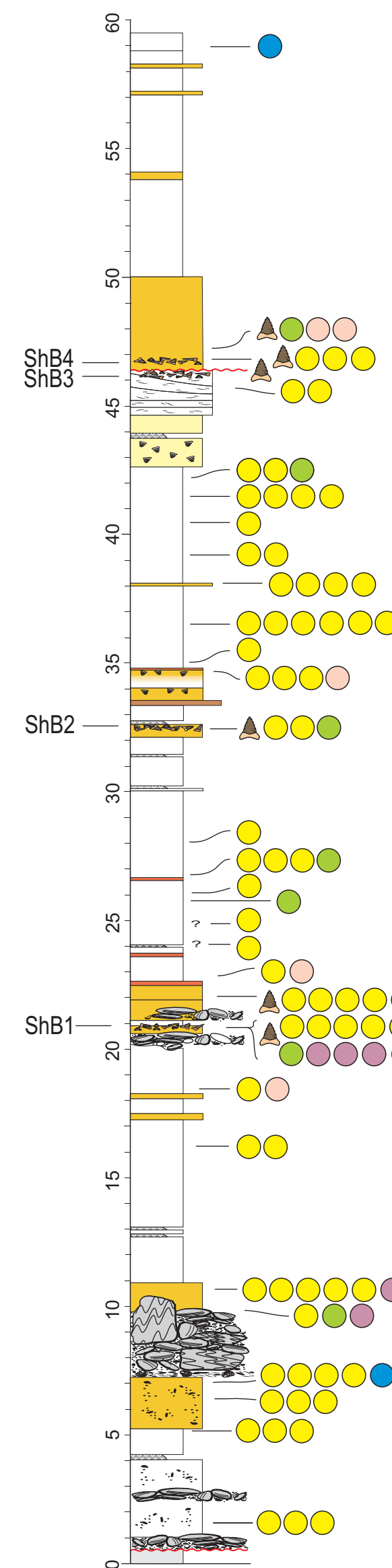
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SCHEMATIC SECTIONS WITH FOSSIL DISTRIBUTION

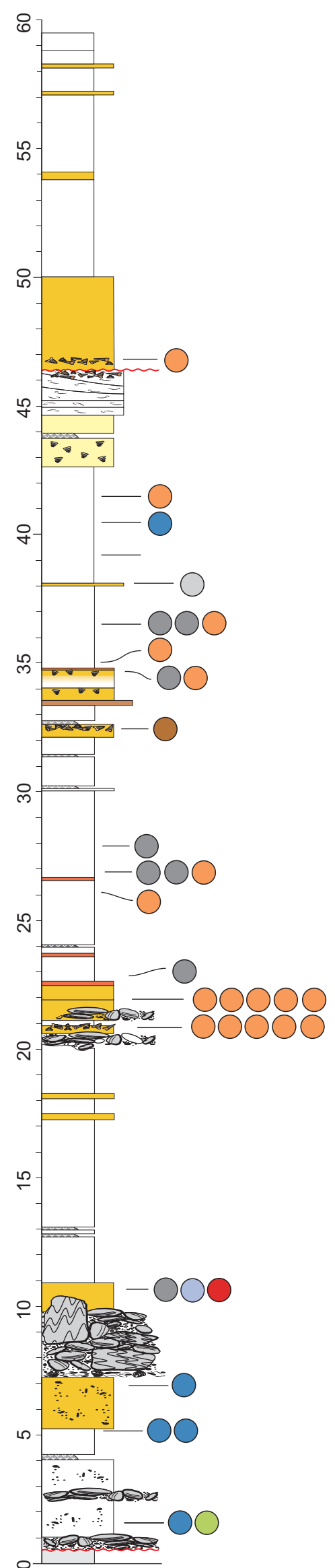
ALL MARINE VERTEBRATES

- Odontoceti
- Mysticeti
- Testudines
- Osteichthyes
- Elasmobranchii (incl. Myliobatiformes)
- Carcharocles teeth



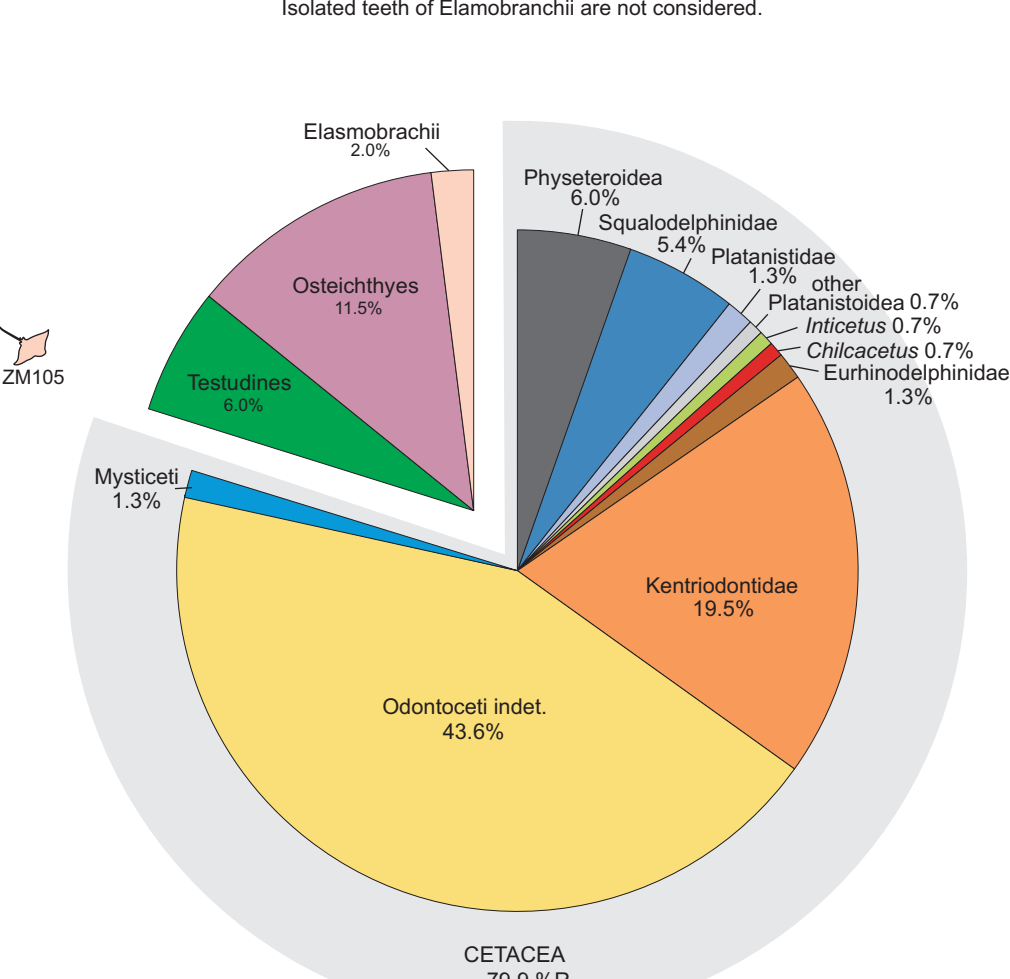
ODONTOCETI (excluding indeterminate specimens)

- Physeteroidea
- Squalodelphinidae
- Platanistidae
- other Platanistoidea
- Inticetus vertzi
- Chilcacetus cavihinus
- Eurhinodelphinidae
- Kentriodontidae



QUANTITATIVE COMPOSITION OF FOSSIL VERTEBRATE ASSEMBLAGE

Based on the data reported in the map and on a few fossils whose GPS coordinates are unknown. Isolated teeth of Elasmobranchii are not considered.



QUANTITATIVE COMPOSITION OF FOSSIL ELASMOBRANCH TEETH AND SPINES

