

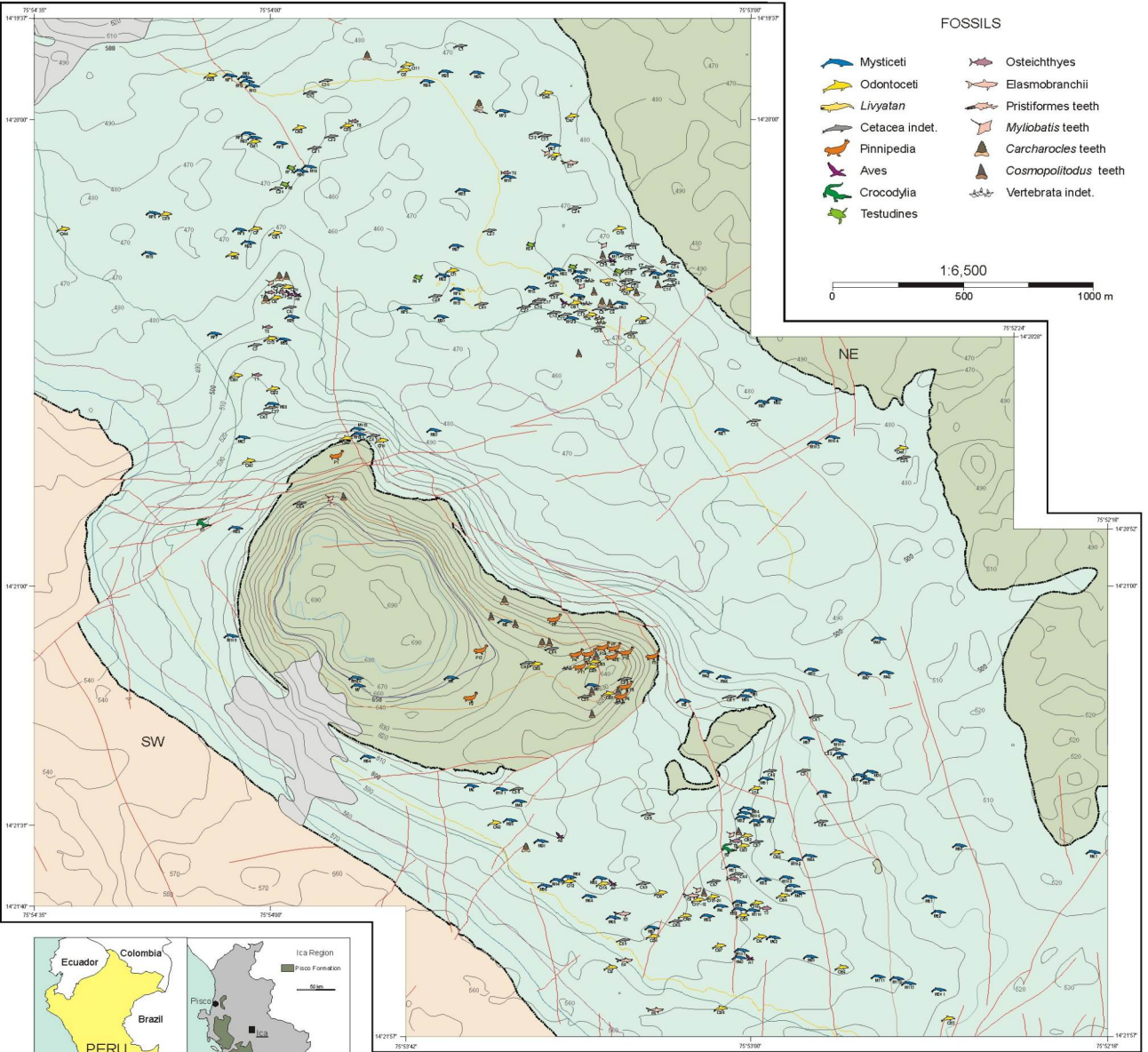
Mapping and vertical distribution of fossil marine vertebrates in Cerro Colorado

The type locality of the giant raptorial sperm whale *Livyatan melvillei* (Miocene, Pisco Formation, Peru)

Page 1

Giovanni Bianucci¹, Claudio Di Ceima², Walter Landini³, Klaas Post⁴, Chiara Tinelli⁵, Christian de Muizon⁶, Karen Gariboldi⁷, Elisa Malinverno⁸, Gino Cantalamessa⁹, Anna Glioncada¹⁰, Alberto Collarota¹¹, Rodolfo Salas Gismondi¹², Rafael Varas-Malca¹³, Mario Urbina¹⁴, Olivier Lambert¹⁵

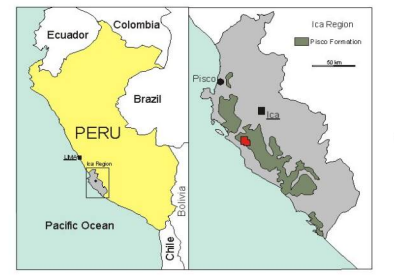
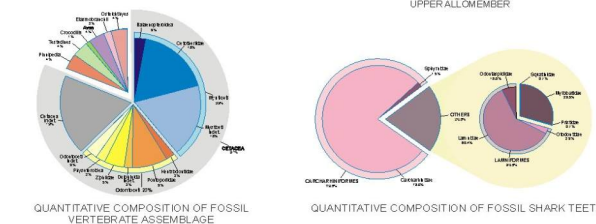
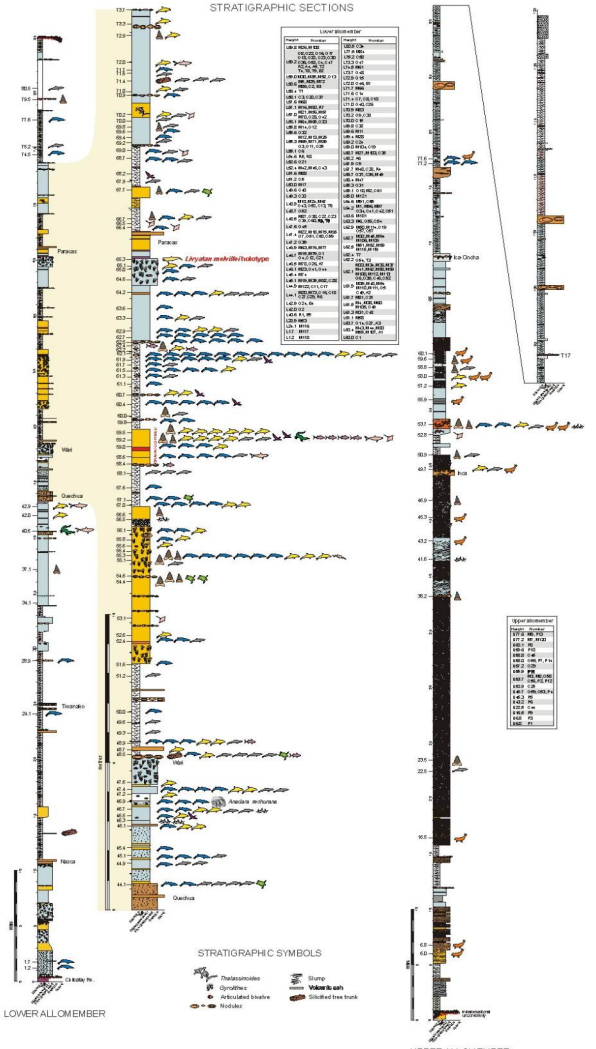
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- ### FOSSILS
- Mysticeti
 - Odontoceti
 - Livyatan*
 - Cetacea indet.
 - Pinnipedia
 - Aves
 - Crocodylia
 - Testudines
 - Osteichthyes
 - Elasmobranchii
 - Pristiformes teeth
 - Myliobatis teeth
 - Carcharocetes teeth
 - Cosmopolitodus* teeth
 - Vertebrata indet.

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

Number	Height	Determination	Number	Height	Determination
M1	141.0	Odontoceti	101	141.0	Vertebrata indet.
M2	140.5	Odontoceti	102	140.5	Vertebrata indet.
M3	140.0	Odontoceti	103	140.0	Vertebrata indet.
M4	139.5	Odontoceti	104	139.5	Vertebrata indet.
M5	139.0	Odontoceti	105	139.0	Vertebrata indet.
M6	138.5	Odontoceti	106	138.5	Vertebrata indet.
M7	138.0	Odontoceti	107	138.0	Vertebrata indet.
M8	137.5	Odontoceti	108	137.5	Vertebrata indet.
M9	137.0	Odontoceti	109	137.0	Vertebrata indet.
M10	136.5	Odontoceti	110	136.5	Vertebrata indet.
M11	136.0	Odontoceti	111	136.0	Vertebrata indet.
M12	135.5	Odontoceti	112	135.5	Vertebrata indet.
M13	135.0	Odontoceti	113	135.0	Vertebrata indet.
M14	134.5	Odontoceti	114	134.5	Vertebrata indet.
M15	134.0	Odontoceti	115	134.0	Vertebrata indet.
M16	133.5	Odontoceti	116	133.5	Vertebrata indet.
M17	133.0	Odontoceti	117	133.0	Vertebrata indet.
M18	132.5	Odontoceti	118	132.5	Vertebrata indet.
M19	132.0	Odontoceti	119	132.0	Vertebrata indet.
M20	131.5	Odontoceti	120	131.5	Vertebrata indet.
M21	131.0	Odontoceti	121	131.0	Vertebrata indet.
M22	130.5	Odontoceti	122	130.5	Vertebrata indet.
M23	130.0	Odontoceti	123	130.0	Vertebrata indet.
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M26	128.5	Odontoceti	126	128.5	Vertebrata indet.
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M48	117.5	Odontoceti	148	117.5	Vertebrata indet.
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M63	110.0	Odontoceti	163	110.0	Vertebrata indet.
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M76	103.5	Odontoceti	176	103.5	Vertebrata indet.
M77	103.0	Odontoceti	177	103.0	Vertebrata indet.
M78	102.5	Odontoceti	178	102.5	Vertebrata indet.
M79	102.0	Odontoceti	179	102.0	Vertebrata indet.
M80	101.5	Odontoceti	180	101.5	Vertebrata indet.
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M88	97.5	Odontoceti	188	97.5	Vertebrata indet.
M89	97.0	Odontoceti	189	97.0	Vertebrata indet.
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M91	96.0	Odontoceti	191	96.0	Vertebrata indet.
M92	95.5	Odontoceti	192	95.5	Vertebrata indet.
M93	95.0	Odontoceti	193	95.0	Vertebrata indet.
M94	94.5	Odontoceti	194	94.5	Vertebrata indet.
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M96	93.5	Odontoceti	196	93.5	Vertebrata indet.
M97	93.0	Odontoceti	197	93.0	Vertebrata indet.
M98	92.5	Odontoceti	198	92.5	Vertebrata indet.
M99	92.0	Odontoceti	199	92.0	Vertebrata indet.
M100	91.5	Odontoceti	200	91.5	Vertebrata indet.



- ### GEOLOGY
- Quaternary deposits (aeolian deposits, thicker than 1 m)
 - Pisco Formation (late middle Miocene – Pliocene)
 - Cerro Colorado Upper Alloemember
 - Cerro Colorado Lower Alloemember
 - Chilcatay Formation (late Oligocene – early middle Miocene)
- ### Intra-Synthem Marker Beds
- T17
 - Ica-Chincha
 - Ica
- ### Lower Alloemember
- Paracas
 - Wari
 - Quechua
 - Tiwano
 - Nazca
- ### Normal faults
- Normal faults

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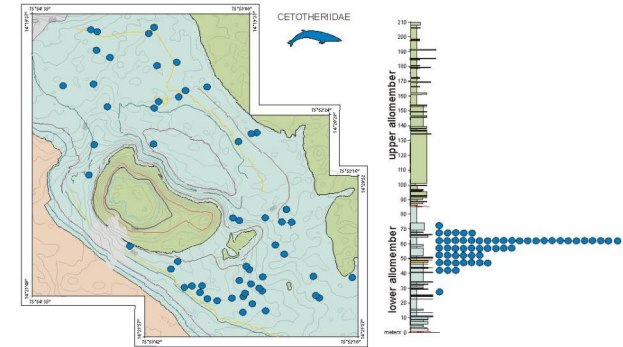
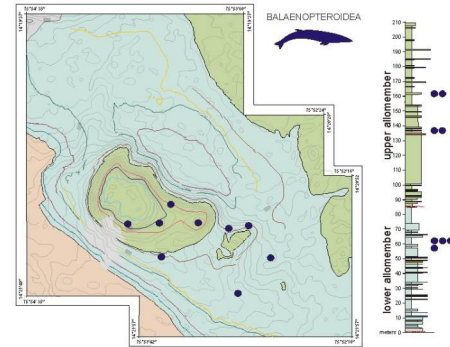
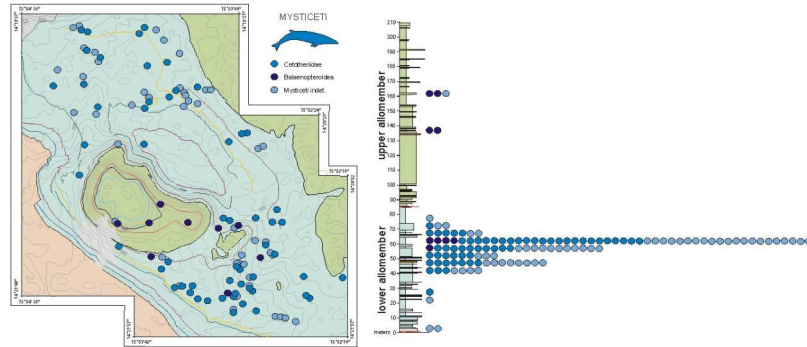
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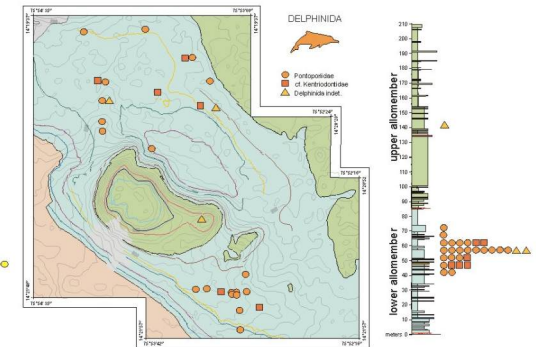
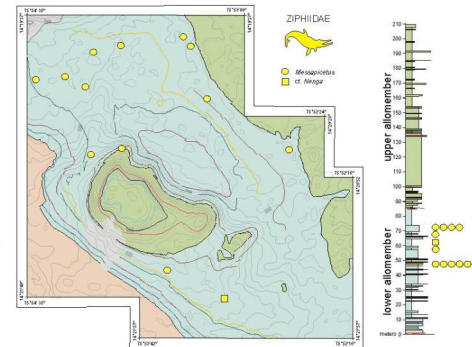
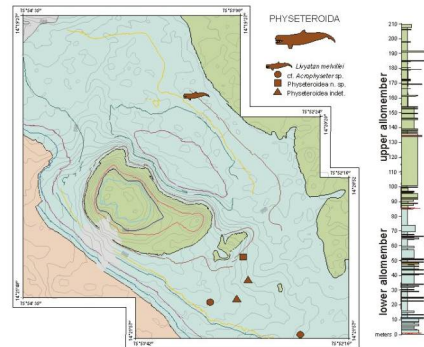
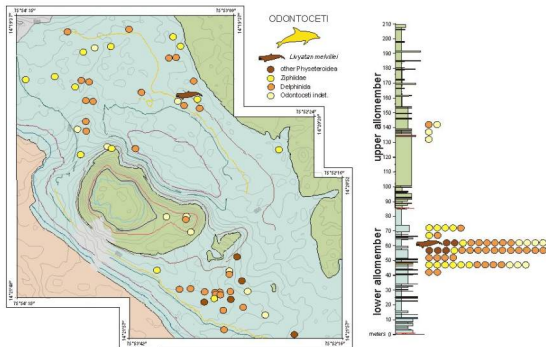
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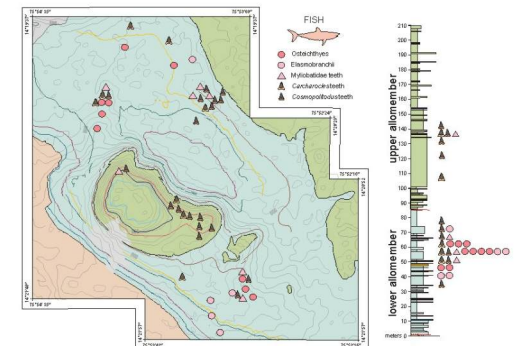
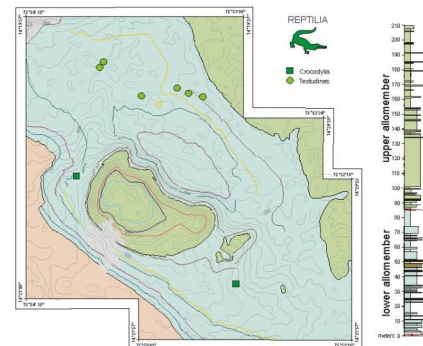
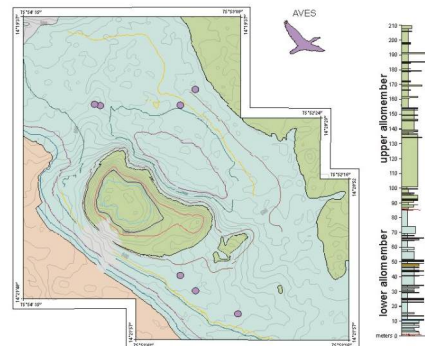
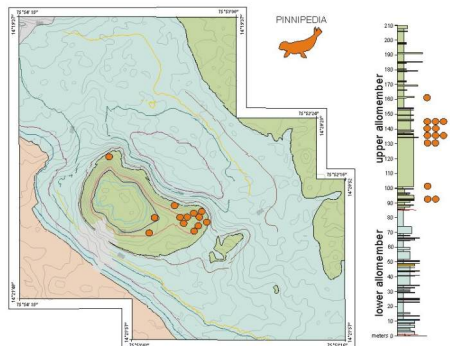
MYSTICETI



ODONTOCETI



OTHER VERTEBRATA



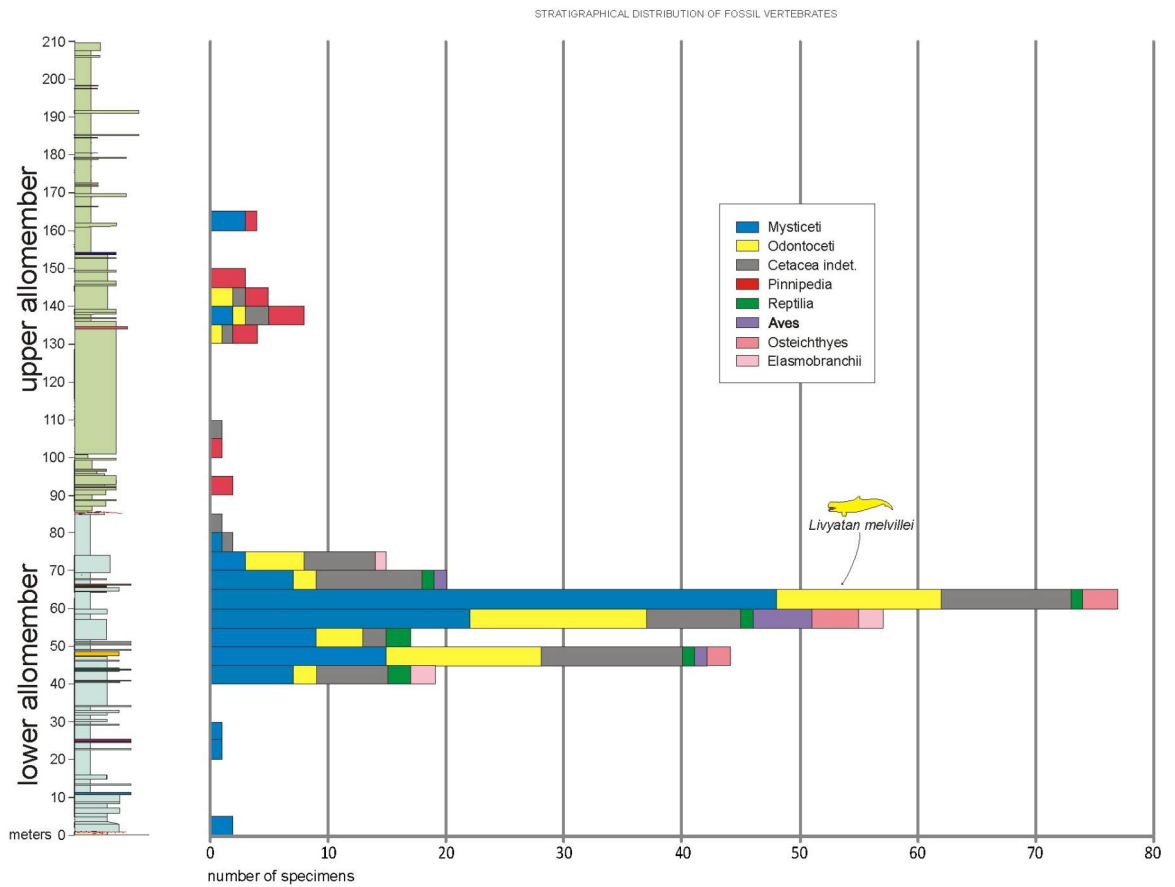
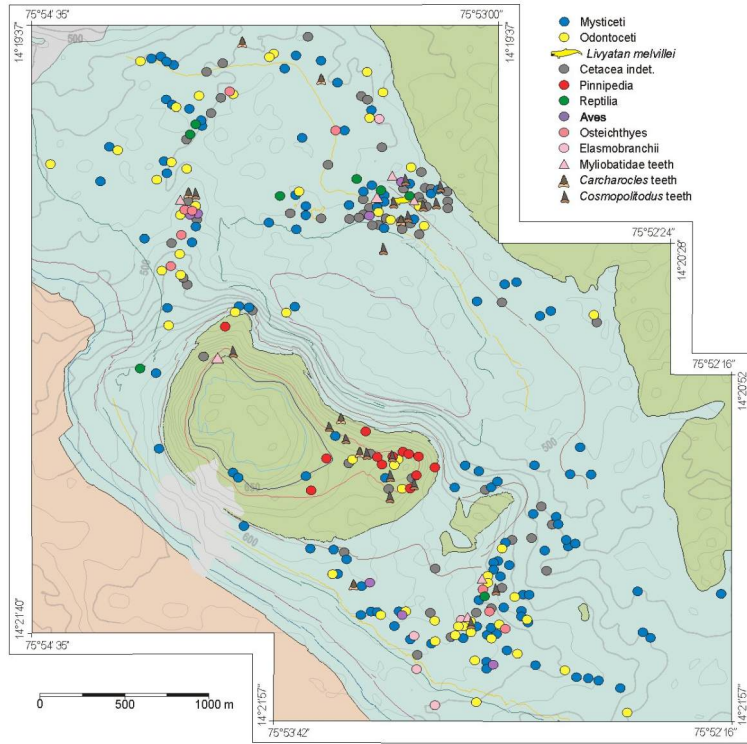
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Quaternary deposits (aeolian deposits, thicker than 1 m)

Pisco Formation (late middle Miocene – Pliocene)

Cerro Colorado Upper Allomember

Cerro Colorado Lower Allomember

Chilcatay Formation (late Oligocene – early middle Miocene)

Intra-Synthem Marker Beds

Upper Allomember

T17

Ica-Chircha

Ica

Unconformity

Lower Allomember

Paracas

Man

Quechua

Tiwanaoko

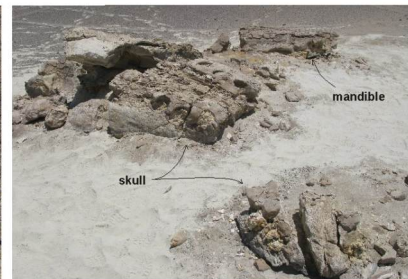
Nazca



Complete and articulated skeletons of a cetotheriid mysticete



Complete and articulated skeleton of a kentriodontid-like delphinoid



Skull and mandible of the holotype of the physeteroid *Livyatan melvillei*



Skull and partial skeleton of the sea turtle *Pacificchelys urbinai*



Associated shark teeth belonging to the same individual of *Cosmopolitodus hastalis*