Geosciences

The Quaternary Outcrops of Punta Hermengo (Buenos Aires Province, Argentina): Magnetostratigraphy, Biostratigraphy and the Loss of Paleontological Heritage

Esteban Soibelzon, Eduardo P. Tonni, and Juan C. Bidegain

➤ **Keywords**: Mammals, Pleistocene, Pampean region, South America

Punta Hermengo (38° 17′ 13.8″ S, 57° 50′ 14.9″ W) is located near Miramar city on the coast of the Buenos Aires province (General Alvarado County).

The first reference to the geology and paleontology of this locality is by F. Ameghino (1908), who studied the sea cliffs exposed in Miramar, particularly from a paleontological point of view. Subsequently, this locality was the subject of numerous scientific contributions (for a summary see Soibelzon et al. 2006, 2009).

Kraglievich (1952) established a lithostratigraphic scheme for the sediments exposed along coastal cliffs between Mar del Plata and Miramar. In his scheme, Punta Hermengo is categorized as Plio-Pleistocene sediments (Vorohué, San Andres, Miramar, and Arroyo Seco geological formations).

The natural evolution of the landscape in the area is characterized by erosion of the cliff ledge and filling in of the bays, causing change in the coastline and finally a regular retreat of the coastline. This dynamic is highly modified by anthropic alteration (extraction of sand, urbanization, artificially fixed dunes, etc.) (Cenizo et al., in press).

The geological and magnetostratigraphic profile presented here is exposed at the "Vieja Farola" (Old Lighthouse) of Punta Hermengo and consists of eight units, but unfortunately the basal units are currently impossible to access (see below). Two discontinuities (d1 and d2) divide the profile into three major sections (Figure 1: I, II, III), and this sequence can be followed along

Esteban Soibelzon and Eduardo P. Tonni, División Paleontología Vertebrados, Museo de La Plata, Facultad de Ciencias Naturales y Museo, UNLP, Paseo del Bosque s/n, B1900FWA La Plata, Argentina; e-mails: esoibelzon@fcnym.unlp.edu.ar eptonni@fcnym.unlp.edu.ar

Juan C. Bidegain, CIC-LEMIT, calle 52 entre 121 y 122, B1900FWA La Plata, Argentina; email: jcbidega@yahoo.com.ar

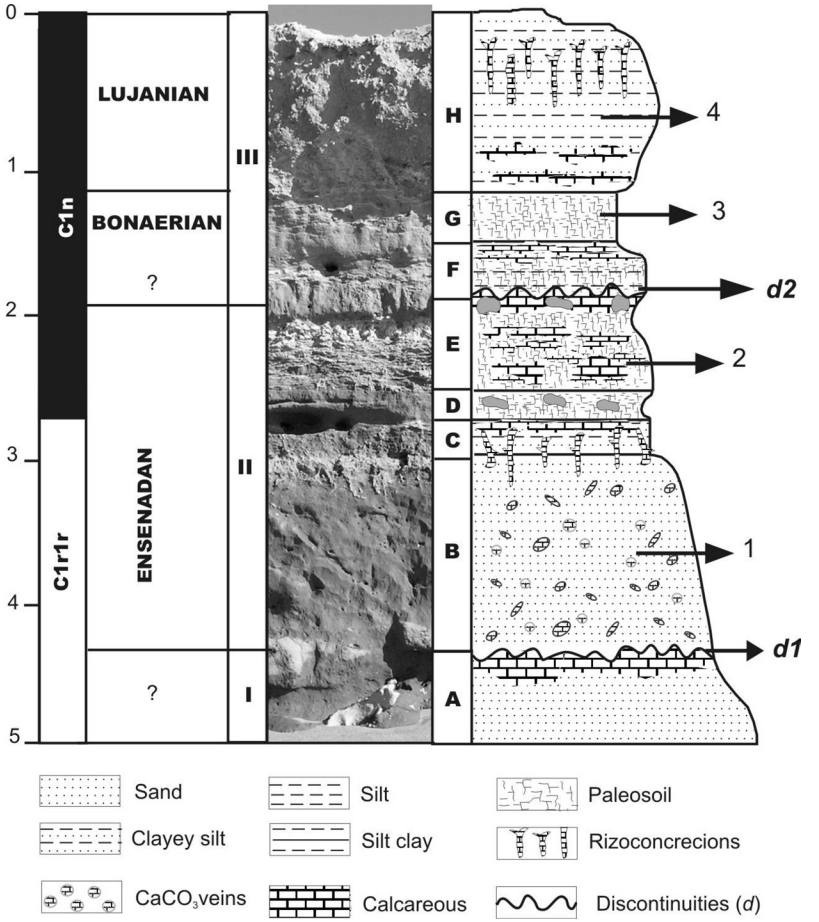

Figure 1. Geological and magnetostratigraphic profile of Punta Hermengo showing the three major sections (I, II, III), eight main geological units (A–H), the two discontinuities (*d1* and *d2*), and the provenance of the fossils remains. **1,** *Mesotherium cristatum;* **2,** *Arctotherium angustidens;* **3,** *Ctenomys kraglievichi;* **4,** *Equus* (*A.*) *neogaeus.* Vertical scale is in meters.

the coast for at least 2000 m. The base of unit A is only exposed during very low tide, and it constitutes the abrasion plains (Figure 1). A brief lithological description of the Punta Hermengo profile was provided by Soibelzon et al. (2009).

The lower half of the profile (section II, units B–E) contains Ensenadan fauna (lower to middle Pleistocene, Cione and Tonni 2005; Soibelzon et al. 2008). Overlying this is unit G, which includes Bonaerian fauna (middle Pleistocene), and unit H, which contains Lujanian fauna (late Pleistocene/early Holocene). Biostratigraphically these units are characterized by *Mesotherium cristatum* and *Arctotherium angustidens* (Ensenadan), *Ctenomys kraglievichi* (Bonaerian) and *Equus* (*Amerhippus*) *neogaeus* (Lujanian). These

finds partially correspond to those of Tonni and Fidalgo (1982) and Soibelzon et al. (2006) because here we recognize one more lithostratigraphic unit and one biostratigraphic stage (Bonaerian).

From a magnetostratigraphic point of view, units A–C are of reversed polarity and correspond to Chron C1r1r (c. 0.90 to 0.78 million years ago). Units D-H are of normal polarity and correspond to Chron C1n (< 0.78 million years ago).

In addition, it is important to note that the southern Punta Hermengo geological sequence is interrupted by numerous palaeochannels that hinder horizontal and regional correlations. Consequently, identifying the eight units becomes challenging. While units A, B, and H and the two discontinuities (d1 and d2) are clearly identifiable throughout this region, units D to G are individually indistinguishable to the south of "Vieja Farola" of Punta Hermengo. There they are integrated into two major units as unit D+E and unit F+G. It is also important to mention that in the southern area of Punta Hermengo, unit B contains *M. cristatum* remains, which allow us to determine the Ensenadan age for these unit.

The Punta Hermengo profile was used for comparison and correlation with other associations, not only at a regional level but also at a continental level. Unfortunately, the authorities of General Alvarado County placed quartzite blocks parallel to the cliffs to protect against erosion and retreat; consequently all sampling efforts and collection of new paleontological specimens were frustrated due to the impossibility of accessing to section I (those containing Ensenadan fauna) (more details in Cenizo et al., in press). With the loss of this important historical and natural place, the cultural heritage, part of the bulwark that gives a sense of identity and pertinence to the community, will disappear.

The authors thank Mr. Carlos Canelo and family from Miramar, for help during fieldwork, and Germán M. Gasparini for critical reading of the manuscript. Yamile Rico drew the profile of Punta Hermengo. We also thank the Agencia Nacional de Promoción Científica y Tecnológica, the Comisión de Investigaciones Científicas de la Provincia de Buenos Aires, the Consejo Nacional de Investigaciones Científicas y Técnicas and the Universidad Nacional de La Plata for their financial support.

References Cited

Ameghino, F. 1908 Las Formaciones Sedimentarias de la Region Litoral de Mar del Plata y Chapalmalán. *Anales del Museo Nacional de Buenos Aires* 10(3):343–428.

Cenizo, M. M., Soibelzon, E. y Tonni, E. P. in press Patrimonio paleontológico perdido. El caso de Punta Hermengo (Miramar, Buenos Aires). *Revista del Museo de La Plata.*

Cione, A. L., and E. P. Tonni 2005 Bioestratigrafía Basada en Mamíferos del Cenozoico Superior de la Provincia de Buenos Aires, Argentina. *Relatorio del XVI Congreso Geológico Argentino* XI:183–200.

Kraglievich, J. L. 1952 El Perfil Geológico de Chapadmalal y Miramar, Provincia de Buenos Aires. *Revista del Museo Municipal de Ciencias Naturales de Mar del Plata* 1:8–37.

Soibelzon, E., A. A. Carlini, E. P. Tonni, and L. H. Soibelzon 2006 *Chaetophractus vellerosus* (Mammalia: Dasypodidae) in the Ensenadan (Early-Middle Pleistocene) of the Southeastern Pampean region (Argentina). Paleozoogeographical and Paleoclimatic Aspects. *Neues Jahrbuch fur Geologie und Palaontologie - Monatshefte* 12:734–48.

Soibelzon, E., F. J. Prevosti, J. C. Bidegain, Y., Rico, D. H., Verzi, and E. P. Tonni 2009 Correlation of Late Cenozoic Sequences of Southeastern Buenos Aires Province: Biostratigraphy and Magnetostratigraphy. *Quaternary International* 210:51–56.

Soibelzon, E., E. P. Tonni, and J. C. Bidegain 2008 Cronología, magnetoestratigrafía y caracterización bioestratigráfica del Ensenadense (Pleistoceno inferior-medio) en la ciudad de Buenos Aires. *Revista de la Asociación Geológica Argentina* 63 (3):421–29.

Tonni, E. P., and F., Fidalgo 1982 Geología y Paleontología de los Sedimentos del Pleistoceno en el Área de Punta Hermengo (Miramar, Prov. de Buenos Aires, Rep. Argentina): Apectos Paleoclimáticos. *Ameghiniana* 19(1-2):79–108.