



ESSP-SG1: Sesión General Estratigrafía y Sedimentología

Stratigraphy and paleontology of Caragua, Arica and Parinacota regions, Chile, part 2: biostratigraphy and geochronology of the late Miocene sedimentary sequence

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The Late Miocene syntectonic sedimentary sequence exposed in Caragua can be subdivided into three informal lithostratigraphic units. Unit 1 and Unit 2 are interpreted as seasonal alluvial and fluvial arid environments, whereas the upper Unit 3 documents proximal fan systems. Good exposures of all three units are visible at Caragua (max. thickness of ~150 m), but only Units 2 and 3 crop out in the Tignamar river valley (~100 m thick). Fossils are restricted to Units 1 and 2 and include twelve fossil mammal species and one bird, here termed the Caragua Fauna. In Unit 1, fossils are exhumed from gravitational flows and include the notoungulates *Caragatypotherium munozi* and cf. *Hegetotherium cerdasensis*, a new species of octodontid rodent, and cf. *Prolagostomus* sp. (Chinchillidae). At Tignamar valley, the fossils derive from fluvio-alluvial systems of Unit 2 and include seven species: *C. munozi*, *H. cerdasensis*, a potential toxodontoid, *Epipeltephilus caraguensis* (Peltephilidae), a new euphractine armadillo, a ground sloth, and a macraucheniid litoptern. *C. munozi* is the most frequent species at both localities, ranging from the lower half of Unit 1 to the top of Unit 2. Shared elements like *Hegetotherium cerdasensis*, also support a rapid deposition of the sedimentary pile along the basin. Geochronological control was achieved by U-Pb LA-ICPMS dating of detrital zircons from Unit 1 at Caragua, and from the Copaquilla-Tignamar (CT) tuff in the Tignamar river valley. This latter regional marker level crops out at different stratigraphic highs along Unit 3, always located above the fossiliferous horizons. Sandstone collected from the base of Unit 1 yields a maximum depositional U-Pb age of 11.39 ± 0.01 Ma. The CT tuff yields a sanidine $^{40}\text{Ar}/^{39}\text{Ar}$ crystallization age of 10.368 ± 0.018 Ma, and a zircon U-Pb age of 10.35 ± 0.09 Ma. The association of fossils and new dating corroborate rapid sedimentation between 11.4 to 10.4 Ma. Assuming a constant depositional rate and considering the variable stratigraphic position of the CT tuff, we estimate a minimum sedimentation rate of ~54 m/my and a maximum of ~120 m/my. This is higher than recently proposed for the late Miocene in the region but concordant with present depositional rates. The drastic sedimentological and paleontological change between Units 1-2 and Unit 3 suggests an important shift in base level conditions and sediment accommodation, mostly related to a major uplift of the Western Cordillera.