

Paleoclimatic estimations in the Upper Cretaceous of Magallanes Region, Southern South America

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The Cerro Guido – Las Chinas complex is the most diverse fossil-bearing sequence with an Upper Cretaceous age in Chile. At least the last five million years before the K/Pg boundary are recorded in approximately 1 km thickness. A broad variety of environments, from an offshore to a deltaic alluvial fan, with at least 4 marine transgressions, provide a unique opportunity to test the paleoclimatic models in high latitudes using both continental and marine proxies. Two localities are analyzed here: the oldest, Casa Nano, represented an interior and shallow neritic environment, the other, El Puesto, was part of a shallow prograding system finishing with a delta alluvial fan, overlain by a marine transgression. In Casa Nano sequence, the presence of foraminifers assigned to *Heterohelix* and *Pseudotextularia* (cf. *Pseudotextularia elegans*) indicates a tropical to subtropical affinity. In addition, we present results obtained from univariate and multivariate foliar physiognomic methods to estimate paleoclimate: Leaf Margin analysis (LMA), Leaf Area Analysis (LAA) and CLAMP (Climate Leaf Analysis Multivariate Program), with mean annual temperature reconstructions (MAT) between 14,9–16,1°C. At latitudes over 50°S (estimated paleolatitude 53–54°S) such temperatures point to a hothouse world. In contrast, at the El Puesto locality, the presence of *Haplophragmoides walteri*, an epifaunal benthic foraminifer, is used as an indicator of hyposaline deltaic environments, from cold-temperate waters. The cold environment is also conspicuous in the LMA and CLAMP analyses of this section, resulting in MAT between 6,9–8,6°C, indicating near icehouse conditions. Different dating methods have estimated an age of ~69 Ma for El Puesto and 77–78 Ma for Casa Nano. Our results thus suggest icehouse conditions in the early Maastrichtian. According to the general paleogeography of the southern South America and northern tip of the Antarctic Peninsula for the Campanian-Maastrichtian interval, the existence of a submerged mountain range, surrounded by shallow marine waters, connecting both continents, is a very plausible explanation for the apparition of ephemeral land bridges due to glacioeustacy, which would have permitted a biotic exchange between the two continents.