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**EARLY MIOCENE CLIMATE ESTIMATIONS IN PATAGONIA: THE CASE
OF PICO QUEMADO, ÑIRIHUAU FORMATION (EARLY-MIDDLE
MIOCENE)**

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Abstract

The climate during the early Neogene in Patagonia is characterized by the increase of the average temperatures until the mid-Miocene Climatic Optimum. However, the terrestrial paleoclimate of southern South America during this period is unclear. Therefore, a physiognomic analysis on the Pico Quemado (Ñirihuau Formation, lower-middle Miocene) megaf flora was realized. Three types of analyses were performed: 1) Leaf Margin Analysis (LMA); 2) Leaf Area Analysis (LAA); and 3) a CLAMP analysis (Climate Leaf Analysis Multivariate Program) with two different dataset. The LMA and CLAMP predicted an estimated a Mean Annual Temperature of $10.4 \pm 2.1^{\circ}\text{C}$, $8.5 \pm 2.1^{\circ}\text{C}$ and 7.2 ± 1.4 respectively. The estimations of Mean Annual Precipitation were of 123.7 ± 21.2 cm. Through the CCA, other parameters were estimated, i. e. Cold Mean Month Temperature ($-3.3 \pm 3.8^{\circ}\text{C}$, $1.6 \pm 1.6^{\circ}\text{C}$); Warm Mean Month Temperature ($17.4 \pm 3.3^{\circ}\text{C}$; $14.1 \pm 1.2^{\circ}\text{C}$); Mean Growing Season Precipitation (121.9 ± 42.6 cm.; 78.1 ± 42.6 cm.); Precipitation of the Three Consecutive Wettest Months (116.2 ± 15.3 cm.; 88.5 ± 15.3 cm.); and Precipitation of the Three Consecutive Driest Months (40.2 ± 19.8 cm.; 54.1 ± 19.8 cm.). From these results, the Pico Quemado megaf flora can be characterized as having a cool temperate climate, with moderate precipitations and the

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