



Tectonic and thermal evolution of the Cuevas-Hualfin paleosurface constrained by apatite fission-track and U-Th-Sm/He thermochronology

Sebastian Zapata Henao (1), Edward Sobel (1), Cecilia Del Papa (2), and Andrea Jelinek (3)

(1) University of Potsdam, Institute of Earth and Environmental Sciences, Germany (szapatah@gmail.com), (2) Cicterra, CONICET-University of Cordoba, Cordoba – Argentina, (3) Universidade Federal do Rio Grande do Sul, Porto

The Sierras Pampeanas province is located in the Central Andes between the 26°S and 31°S. This region is characterized by basement-cored ranges bounded by high angle faults. Paleosurfaces have been described on top of the basement highs of the Sierras Pampeanas; these are called the “Pampean peneplains.” The origin of these surfaces have been interpreted in several ways: as landscape remnants of a single Paleozoic surface, preserved by 300 Ma of slow and continuous erosion until the Late Miocene, when the surfaces were deformed and uplifted; other models suggest an episodic origin during the Mesozoic, associated with different climatic cycles combined with tectonic quiescence or crustal extension. The Sierra Cuevas-Hualfin is a range with 800 m of local relief located within the Campo-Arenal intramountain basin. On the west side of the range, a 20 km wide an erosional surface is preserved. This is unconformably overlain by 3 km of Miocene sedimentary cover. Samples were collected from the top of this erosional surface and processed for apatite fission track (AFT) (9) and for apatite Helium (AHe) (5). The AFT results yield similar Cretaceous ages with shortened track lengths, and the AHe data show widespread ages ranging between 50 and 100 Ma. The ages are indistinguishable between the different AFT samples, consistent with the assumption that this surface represents the same Miocene structural level. The AFT and AHe samples were modeled as belonging to a single structural level, in order to define a precise thermal history. Preliminary results suggest that the Cuevas Hualfin paleosurface experience a fast Cretaceous exhumation and remain cold (above 60 degrees) until the Miocene. This surface was reheated beneath the sedimentary deposits and exhumed during the Pliocene. We interpret that this surface was formed by 100 Ma of slow erosion rates between the Cretaceous and the Miocene. Our data is in agreement with the models suggesting that the “Pampean Peneplains” were formed at different times, and in shorter periods during the Mesozoic.