



(U-Th-Sm)/He age-elevation profiles from the Adamello Complex (Southern Alps, Italy)

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Alpine landscapes are developed through the complex interplay between tectonics and climate. Age elevation profiles of low temperature thermochromometers provide high-resolution, near-surface exhumation rates that can be used to characterize climate or tectonic forcing. In particular, these rates can be used to constrain the rate of surface relief development in response to climatic and/or tectonic events. In this study we present the first apatite (U-Th-Sm)/He ages for two vertical profiles from the Adamello Complex.

The Adamello complex is the largest of the Periadriatic intrusions and is located at the intersection of the Periadriatic Fault System (locally called the Tonale line) and the Giudicarie line. More than seven kilometers of overburden has been removed since its emplacement in the Late Eocene-early Oligocene and modern overall relief is over 2 km. This makes it an ideal location to determine the role and magnitude of known tectonic events (Giudicarie phase shortening in the Tortonian) and superimposed erosional events driven by climatic or other external environmental conditions (Messinian Salinity crisis and Neogene glaciation).

The ages determined in this study span the Miocene and record initially slow exhumation followed by accelerated exhumation at approximately 10 Ma. These ages combined with fission track data from previous studies in the area were modeled using a 3-D heat conduction model including topographic relief and erosion (Pecube (Braun, Computers and Geosciences, 2003)). The best-fit model simulates a discrete rapid exhumation event between 10-8 Ma assuming the modern topography. This exhumational event corresponds with structural evidence for a period of transpressional activity along the South Giudicarie line associated with the change of the Adria-Europe convergence vector (Castellerin et al., Mem.Soc.Geol.It., 1993).

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