Geophysical Research Abstracts
Vol. 17, EGU2015-9461, 2015
EGU General Assembly 2015

Interaction between Cenozoic fault activity and sediment influx in the Arctic region: new thermochronologic data and seismic study

Maelianna Bigot-Buschendorf (1), Frédéric Mouthereau (2), Charlotte Fillon (3), Nicolas Loget (1), Loïc Labrousse (1), Philippe Werner (4), Matthias Bernet (5), and Todd Ehlers (6)

(1) UPMC University Paris 06, France (maelianna.bigot-buschendorf@upmc.fr), (2) GET, Toulouse, France, (3) Instituto de Ciencias de la Tierra "Jaume Almera" CSIC, Barcelona, Espana, (4) Total SA, E&P Exploration New Business 2, Paris La Défense, France, (5) ISTerre, CNRS, Grenoble, France, (6) Universität Tübingen, Geodynamik,Tübingen, Deutschland

The Alaskan Brooks Range and its canadian counterpart, the British Mountains result from the Meso-Cenozoic collision of the Arctic continental margin with accreted volcanic arcs and adjacent continental terranes.
Because of its location and known potential for oil industries, more attention has been brought to this area for the last few years. While the timing of collisional events, duration, and rates of exhumation associated with mountain building is now better understood, the causes of these exhumation events are still largely unknown.
Published constraints and our present data are consistent with progressive cooling from 105 to 25 Ma, with rates of exhumation constant across the range until 35-25 Ma. From 35 Ma onwards, exhumation likely slowed in concomitance with underplating/duplexing in the inner part of the belt (Doonerak window) and activation of the northernmost thrust.
The earliest cooling stage (from 100 Ma) marking the onset of the Brookian orogeny is recorded by a low order coarsening upward sequence in the foreland. On the contrary, the latest stage of cooling (at 35 Ma) is not linked to the construction of the range but more likely due to a reorganization of the wedge possibly related to changes in the regional climatic or geodynamic boundary conditions.
First, we aim at reconstructing the time-temperature evolution of the British Mountains by combining new (U-Th)/He and fission-tracks ages on zircon and apatite ; our first thermochronological data in the British Mountains show ages ranging from 110 to 25 Ma from range to basin. These data will permit to reconstruct the thermal history of the British Mountains and its basin, and to estimate the exhumation rates associated to the main unities.
Then, we also examine the role of climate during the Tertiary period. Some markers indicate a climate change at this period which could be registered in the sedimentation. Therefore we determine the part of climate by analyzing seismic lines in the Beaufort Sea, and in the ANWR (Arctic National Wildlife Refuge), north to the NEBR (North Eastern Brooks Range). The volume of Cenozoic sediments deposited in the basin area is then compared to the minimum amount of sediments eroded upstream from the McKenzie and Colville drainage basins.