



CSPG Structural Division

New insights on the late Cenozoic exhumation history of the southeastern Canadian Cordillera

Speaker: Dr. Eva Enkelmann

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ABSTRACT

The long narrative of the Southern Canadian Cordilleran geology mostly ends in the Eocene with the development of metamorphic core complexes in the Omineca Belt and the last phase of thrusting in the eastern Foreland belt. But what happened after the Eocene? We present new low-temperature thermochronology data from along the Rocky Mountain Trench (RMT) near Valemount BC and the Columbia River Fault near Revelstoke BC. These new data are integrated with published thermochronology data and field observations that collectively suggest several phases of late Cenozoic fault reactivation and rock exhumation occurred since the Eocene. The RMT is an impressive long valley that stretches from Montana across entire British Columbia and separates the Foreland belt (Rocky Mountains) from the Omineca belt (Columbia Mountains) in the Southern Cordillera. At depths the RMT coincides with a sharp change in crustal thickness that possibly represents the limit of the ancient continental margin. We suggest a new tectonic model of late Cenozoic deformation where the high gravitational potential drives Oligocene–Miocene orogenic collapse that stretches the upper crust towards the surrounding regions. This driving force creates a stress field with vertical σ_1 , which can easily reactivate steeply dipping structures such as the RMT and the Columbia River Fault in the Omineca Belt and near the trench. In contrast, the shallower dip of thrust faults within the Foreland Belt may be unfavourable to slip and explain the general lack of young extension and the overall higher topography in the Rocky Mountains.

BIOGRAPHY

Dr. Eva Enkelmann is an Associate Professor at the Geoscience Department of the University of Calgary. She was born and raised in Germany where she earned a PhD at the Technische Universität Bergakademie Freiberg. For her thesis she studied the exhumation history of the Qinling orogen located at the northeastern margin of the Tibetan Plateau and conducted experiments to further develop the fission track dating method. She continued her research as a postdoctoral scientist at Lehigh University (USA) where she worked in the eastern Himalayas and started working in the Northern Cordillera in southeast Alaska and southwest Yukon. Prior to her 2017 arrival in Calgary Dr. Enkelmann held faculty positions at the University of Tübingen (Germany) and at the University of Cincinnati (USA). She is the head of the Geo-and



Thermochronology laboratory at the University of Calgary and an expert in fission track, (U-Th)/He dating and multi-method dating of detrital material.

