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"INFLUENCE OF INHERITED INDIAN BASEMENT FAULTS ON THE EVOLUTION OF THE HIMALAYAN OROGEN"

Thursday, January 23, 2020, 11:30 AM
Advanced Research Complex, Room 233
25, Templeton Street

Jeudi le 23 janvier , 11h30
Complexe de Recherche Avancée, Pièce 233
25, Templeton Street

Understanding the interplay between pre-existing crustal faults (termed here inherited basement faults) and mountain building processes is imperative to fully understand earthquakes in and away from active mountain fronts. The Himalayan system is an ideal natural laboratory to study this link because of its unrivalled preservation and recent evolution, which consequently limits tectonic overprinting and enables the distinction between Himalayan and pre-Himalayan deformation. Northeast-trending Indian basement faults, which bound three orogen-perpendicular paleotopographic ridges of Precambrian Indian basement south of the Himalaya, extend to the base of the Indian lithosphere and to the northern extent of the Indian lithosphere underneath Tibet. These lithospheric-scale faults contribute to a multitude of changes expressed along the length of the Himalaya as they were repeatedly reactivated. This lecture will discuss the reactivation history of these inherited faults, as recorded in along-strike changes in the pressure-temperature evolution of the metamorphic core of the Himalaya, as lateral ramps and/or along-strike sediment thickness variations in the foreland fold–thrust belt, and in the present-day partitioning of Indian intraplate and Himalayan seismicity. The talk will also explore future graduate research directions that will involve: investigation of intraplate active tectonics related to basement fault reactivation away from the Himalayan front; reconstruction of the foreland fold-thrust belt using seismic data; field and lab investigations to assess along-strike variation in strain, metamorphic peak conditions, and exhumation of the Himalayan metamorphic core; numerical stress modelling linking present-day seismicity, stress trajectories, and basement faults; and dynamically-scaled centrifuge analogue modelling of deformation.

Laurent Godin (Ph.D. Carleton) is a professor in the Department of Geological Sciences & Geological Engineering at Queen's University (Kingston). He specializes in structural geology and continental tectonics, with a special focus on the evolution of orogenic belts, namely the Himalayan-Tibet system where he has been actively working since 1994. In addition to mountain belt research, he conducts research on basement fault reactivation, seismicity and stress partitioning in continental interiors through numerical and analogue modelling and various geophysical approaches.

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