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## Revisiting the INDEPTH-I Deep seismic profile in Himalayan Orogen: Constraints on structure and leucogranites emplacement

Ramon Carbonell<sup>1</sup>, **Hongqiang Li**<sup>1,2</sup>, Rui Gao<sup>2,3,4</sup>, and Zhanwu Lu<sup>2,3</sup>

<sup>1</sup>Geosciences Barcelona, GEO3BCN-CSIC, Barcelona 08028, Spain

<sup>2</sup>Key Laboratory of deep earth sciences and technology of ministry of natural resource, Chinese Academy of Geological Sciences, Beijing 100037, China

<sup>3</sup>Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China

<sup>4</sup>School of Earth Sciences and Engineering, Sun Yat-Sen University, Guangzhou 510275, China

In the first phase of the International Deep Profiling of Tibet and the Himalaya the INDEPTH project an over 90 km long deep seismic reflection profile was acquired. This was an interdisciplinary program of geophysical and geological studies focus to increase the understanding of the internal architecture and mechanics of the Himalaya-Tibet region. Reprocessing of INDEPTH-I deep seismic reflection image resolves the South Tibetan Detachment System (STDS) as composed by few laterally displaced ramp structures. These can be interpreted to be structurally related to the outcropping gneiss domes. The STDS is recognized as complex extensional shear zone most probably coeval with the emplacement of the leucogranitic bodies. Geologic data indicates that the latter are pre-, syn- and post- kinematic with the deformation and, are generally controlled by the system of detachment faults (including the STDS). The interpreted STDS is broken up, and the individual segments are tilted revealing compressional deformation. Underneath, and down to 42 km depth, two prominent high amplitude, multi cyclic, north dipping events are imaged: the Tethyan Himalayan Sequence (THS) and, the Greater Himalayan Sequence (GHS). Above the GHS the north-dipping reflection fabrics appear imbricate and are seldom interrupted by weak/transparent zones. The existing geological knowledge and, the geometrical relationships (unraveled by the internal architecture constrained by the seismic image suggest that the transparent areas in the GHS could be indicative of leucogranite emplacements. Thus, the latter can be interpreted as the product of rapid exhumation of the upper GHS together with magma along the High Himalayan Thrust (HHT), repeated in-situ remelting due to strain heating by exhumation of the lower GHS and Lesser Himalayan Sequence (LHS), and extension of the South Tibetan Detachment System (STDS). This mechanism is consistent with interpretation of seismically transparent zones as the seismic response of granitic plutons.