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Lateral and Frontal Structure of the Dun of Dang (Siwalik Belt, Western Nepal) – Geodynamic Correlation with a 3D Numerical Model of a Critical Wedge Taper

POSTER

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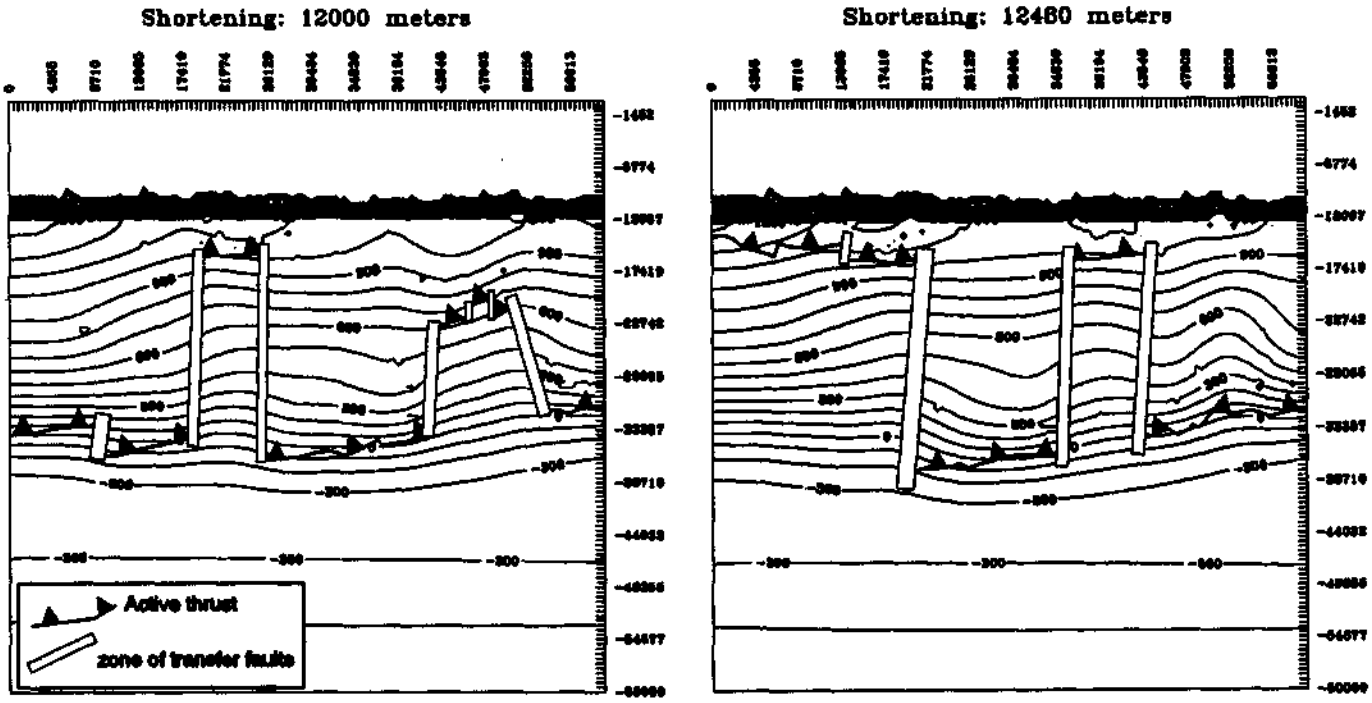
The Siwaliks foreland basin fringes the Himalayan range along more than 2000 Km. In Nepal, several thrusts are defined in this basin. From North to South several thrusts outcrop:

1) the M.B.T., thrusting over the Siwaliks sediments.
2) the Main Dun Thrust (M.D.T.).
3) the Main Frontal Thrust (M.F.T.).

In western Nepal, the M.D.T. can be divided in two major thrusts which outcrop in the Bheri valley (M.D.T. 1) and in the Babaï valley (M.D.T. 2). Each of them thrusts over Upper Siwaliks sets (Pliocene-Pleistocene). The M.F.T. comes into contact with the Quaternary of the Teraï plain. A virgation of the structures that displaces southward the M.D.T. 2 is shown in the western part of the dun of Dang. Therefore this area is displaced piggy back by the M.D.T. 2.



Topographic maps and active thrusts after 12 and 12.48 Km of shortening. In an accretionary wedge in steady state, different thrusts may be actived in same time and create zones of transfert.

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A 3D numerical modelisation is proposed to study the evolution of an intracontinental accretionary wedge. It is based on the couple of a kinematic forward model, a mechanic model, an isostatic compensation model and an erosion / sedimentation model. This modelisation shows that during its evolution, an accretionary wedge reaches successively two states: a transitional and a steady state. During the first one, the tectonic evolution is managed by geometric and mechanic parameters and a forward and / or a backward propagation sequence occurs. The steady state is a continuous of the basal decollement propagation and of internal thrust reactivation. The geometric parameter which controls the evolution is the local topography induced by the couple of tectonic history of each tectonic sheet and erosion / sedimentation. Nevertheless one part of the wedge may prompt the basal decollement and another part may prompt a more internal tectonic sheet creating by this way some zones of transfer faults. The structure of the western part of the dun of Dang and the overthrusting of M.D.T. 1 & 2 on Upper Siwaliks sediments is explained by a pre-localised deformation controlled by the geometry of the underlying flat at the beginning of the deformation and its solicitations by several events during the steady state tectonic evolution of the foreland basin.

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