



Very first pulse of deformation at 9 Ma in the Central Indian Basin.

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Widespread intraplate deformation between India and Australia is distributed in a roughly equatorial zone from Chagos Laccadive near the Carlsberg and Central Indian Ridge to the Wharton Basin offshore Sumatra. ODP Leg 116 drillings dated several unconformities recorded in the 2 km thick Bengal Fan sediments at the heart of this diffuse deformation zone (the Central Indian Basin) where a dense E-W reverse fault network accommodates N-S intraplate compression. The deepest identified unconformity in the ODP area has been related to a Miocene onset of deformation dated at 7.5-8 Ma.

New seismic data acquired in 2000 just west of the NinetyEast Ridge offers unprecedented level of details in the sedimentary pile. Although there is a 10° longitudinal distance between the two sites, their distance to the common Bengali sediment source is similar and we recognize the equivalent Miocene, Pliocene and Pleistocene unconformities detected at the ODP site. Below the main Miocene unconformity, we systematically found an older Miocene unconformity pointing to an early onset of deformation. Flattening these unconformities, we clearly show that only the older one leads to horizontal pre-deformation horizons and original basement topography with horsts and basins. The dense 3 km spaced small offset fault network may have been active since this early onset of deformation and later abandoned around 7.5-8 Ma as a result of progressive localization on more widely, still active spaced faults, as described in one of our previous study.

Older ODP seismic profiles actually also show the same but tenuous unconformity below the main one. Using ODP core datations this unconformity can be dated at 9 Ma. The timing of this very first pulse of moderate deformation is in good agreement

with the latest finite kinematic study of Merkuriev and DeMets (2006). They determined a slowing down of India/Somalia and Capricorn/Somalia motion until 11-9 Ma followed by a steady motion, that they relate to the restoration of force balance following an excess resisting force at the Himalayan chain. The 7.5-8 Ma acceleration of deformation can then be related to a decoupling of the subduction driven Australia and the still resisting India, as proposed in our instantaneous kinematic study of the composite plate (Delescluse and Chamot-Rooke 2007).