
Effect of lithosphere elastic properties on subsidence induced by sediment load in the Ganges Brahmaputra Meghna Delta (Bangladesh).

Adrien Henry^{*1}, Celine Grall¹, Serine Madji², Nicolas Tharaud², Christopher Carchedi³, James Gaherty³, Steve Goodbred⁴, Michael Steckler³, Melanie Becker¹, Mikhail Karpytchev¹, and Eric Chaumillon¹

¹Littoral ENvironnement et Sociétés – La Rochelle Université, Centre National de la Recherche Scientifique – France

²La Rochelle Université – Université de La Rochelle : Laboratoire Droit et Management LITHORAL, IAE La Rochelle, Université de La Rochelle – France

³Lamont-Doherty Earth Observatory – États-Unis

⁴Vanderbilt University [Nashville] – États-Unis

Résumé

The Ganges Brahmaputra Meghna Delta (GBMD), in Bangladesh, is the world greatest delta in term of sediment discharge. Today the cumulated sediment discharge of the Ganges, the Brahmaputra and the Meghna Rivers is > 1200 Mt/yr. Despite this large amount of sediment supply, the GBMD is a low-lying area sensible to marine submersion and relative sea level (RSL) rise. Although variable, the RSL in this region is rising at ~ 3 -7 mm/yr in average and land subsidence is the main contributor of the RSL rise. Sediment compaction is an important source of land subsidence ($\sim 2/3$) while sediment isostasy represents the rest ($\sim 1/3$). However, estimations of these processes at enough good resolution still need to be carry on.

Recent research efforts now permit better evaluating regional land subsidence and the contribution of sediment isostasy to it. On one hand, a high-resolution (~ 20 km) model of sedimentation allows to update the sediment load history over the last glacial cycle. On the other hand, the regional structure and elastic properties of the lithosphere in the GBMD may be deciphered according to a recent passive seismic survey.

The GBMD is lying at the transition in between the Indian Ocean and the Indian craton, on a thin transitional crust, bounded by the Indo-Myanmar convergent margin. Sediments are actively trapped since several 10 Ma ago and as a result, the shallow part of the lithosphere is made of ~ 20 km of metamorphosis marine old sediments and paleo-deltaic deposits. The Earth's model thus greatly differs from global 1D Earth's model such as PREM.

We have computed the land subsidence induced by sediment load since the last glacial cycle in this region. We focus on exploring the sensibility of the land subsidence to the earth's model used and present these sensibility results in the light of previous models in this region.

Mots-Clés: Delta, subsidence, RSL, geodynamics

*Intervenant