GC23D-1278: Isostasy and Sea-Level Rise in the Mississippi Delta Region

The Mississippi Delta and surrounding Gulf Coast region is home to a dense population and contains large centers of economic activity, making coastal flooding a cause for concern. The relative sea-level (RSL) rise in the area is determined by both land subsidence and sea-surface height change, both of which are influenced by glacial isostatic adjustment and sediment isostatic adjustment. We apply a surface loading model to the region that considers both of these processes. Our numerical model solves the sea-level equation given an ice history, sediment erosion and deposition history, and a set of rheological parameters to describe the Earth's deformational response (Dalca *et al*, *Geophys. J . Int.* (2013) **194,** 45–60). Such a model has recently been applied to the Indus River Basin and Arabian Sea (Ferrier *et al*, *Earth Planet. Sci. Lett.* (2015) **416,** 12–20). This is the first study to apply the model to the Gulf Coast region using a realistic sediment redistribution history.

We compare model output to Holocene RSL records to determine preferred Earth model parameter values and thus quantify the contributions of sediment, ice and ocean loading in this region. Our best-fitting model is used for two applications: (1) to remove the contribution of isostasy to GPS-based measurements of vertical land motion to infer the contribution of model-neglected processes such as compaction, and (2) to determine the contribution of isostatic processes to future local RSL rise and compare this signal to that from other processes, including modelled effects of ocean warming/circulation and land ice mass changes.

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