Quaternary sedimentation and subsidence history of the Lower Mississippi Delta defined by an industry-grade 3D seismic survey

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We present data from an industry-grade seismic volume located over 800 km² of Breton Sound, LA that images the Quaternary stratigraphy of this section of the Mississippi Delta. Using the upper 1 km of this volume we mapped 9 regional seismic horizons which are used to constrain sedimentation patterns over varying time intervals. We analyze spatial and temporal changes in sedimentation pattern to determine the influence of the regional subsidence pattern on the evolution of the Mississippi Delta. Specifically, this data is used to determine a stratigraphic integral scale – the thickness of strata required for individual depositional events to average to basin-scale stratal patterns. For this region of the delta we estimate a stratigraphic integral scale of 400 m, which is approximately equal to 200,000 years. Next, we quantify the tendency of deltas to aggrade via compensational stacking. Data from the Mississippi Delta is compared to a Gaussian random walk model with no compositional stacking and a Gaussian random walk model with complete compensation at every time step.