



Anthropogenic Impact on Sediment Transport in the Mississippi River

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Many of the most prominent deltas in the world are suffering from sediment starvation and subsidence due to human alteration of the upper catchments. The Mississippi River Delta is not immune to these problems which are accentuated by the addition of dams and artificial levees diverting sediment from the delta and coast throughout the last century. The Missouri, Ohio, and Arkansas Rivers have historically supplied most of the suspended sediment load to the Lower Mississippi over the last 60 years, with the Missouri being the largest single contributor. While suspended sediment load plays an important role in floodplain and delta construction, the transport of coarser sediment is also important to a healthy coastline. Very little data exists to constrain how coarser sediment is mixed and transported down the Mississippi despite its invaluable importance to the coastal beaches and barrier islands. Using traditional provenance tools it is possible to study both the coarse and fine load of the modern Mississippi River to quantify transportation and mixing models. This, in turn, will demonstrate human impact on both the suspended and bedload of the Mississippi and its tributaries.

This study uses apatite rare earth element geochemistry and zircon U-Pb dating in conjunction with Sr-Nd isotope ratios and clay mineralogy to interpret the transportation of both fine and coarse sediment within the modern Mississippi and its tributaries. These data are preliminary and are part of a larger study that will determine anthropogenic impact on the aggradation of the modern delta floodplain over the last 1000 years.