Project collaborators/cooperators

Mead Allison (TULANE)	stratigraphy, geophysics
Bernie Coakley (TULANE)	stratigraphy, geophysics
Chuanmin Hu (USF)*	remote sensing/plume dynamics
Frank Muller-Karger (USF)*	remote sensing/plume dynamics
Jack Kindinger (USGS)	stratigraphy, geophysics
Keith Kvenholden (USGS)	organic geochemistry
Tom Lorenson (USGS)	organic geochemistry
Sid Mitra (USGS)	organic geochemistry
Brent McKee (TULANE)	inorganic geochemistry
Franco Marcantonio (TULANE)	inorganic geochemistry
Antonio Mannino (USGS)	organic geochemistry
Bill Orem (USGS)	organic geochemistry
Bob Rosenbauer (USGS)	inorganic geochemistry
Peter Swarzenski (USGS)	inorganic geochemistry/geochronology

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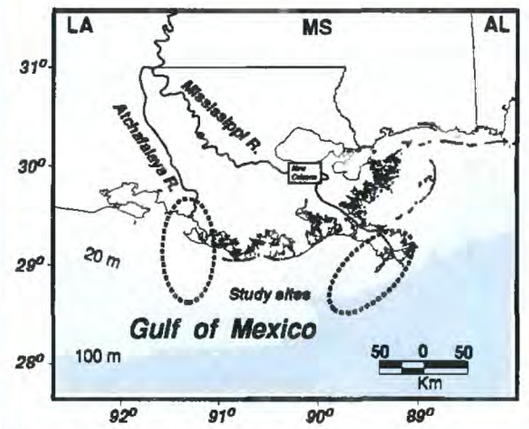

Fig. 5. Site location map.

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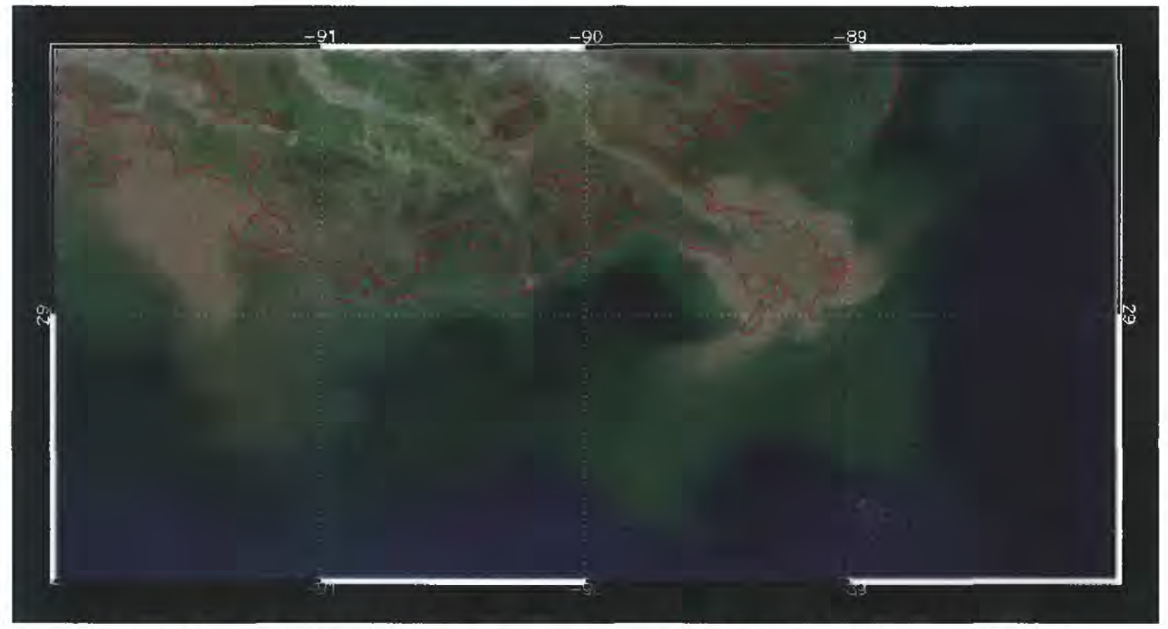
Evaluating Basin/Shelf Effects in the Delivery of Sediment-Hosted Contaminants in the Atchafalaya and Mississippi River Deltas – a New U.S. Geological Survey Coastal and Marine Geology Project



SeaWiFS sediment plume image of the Mississippi/Atchafalaya River deltas during Cruise 1 (USF data).

Project Summary:

This project responds to the demand to better understand and assess lower Mississippi sediment-hosted pollutant accumulation, deposition, and transport to the Gulf of Mexico. We have chosen to compare the storage and delivery of environmentally relevant contaminants (i.e., polycyclic aromatic hydrocarbons (PAHs), pesticides, nutrients, and trace metals) in both the lower Atchafalaya and Mississippi River systems, two systems in which the same riverine load is processed quite differently. Such a strategy allows us to directly target the variable effects of river and shelf sediments as a controlling mechanism for the fluvial delivery of contaminants to the Gulf of Mexico. We will also reconstruct and evaluate a complete historical inventory of these pollutants in this heavily industrialized corridor by looking at the geochronological record within shallow sediments. Results will be used to assess the environmental impact of sediment-hosted contaminants and will be evaluated in a comprehensive hydrogeologic context (i.e., what is the role of subsidence, erosion, river discharge in the ultimate delivery of these pollutants to the Gulf of Mexico?).

Project Objectives and Strategy:

The Mississippi River tracks an ancient mid-continental rift valley as it drains 41% of the 48 conterminous United States. Suspended-sediment concentrations have been decreasing in the mainstem Mississippi (Fig. 1) from the 1950s to present due to dam/reservoir construction and erosion-sensitive agricultural practices. The yearly mean discharge of ~ 580 km^3 of water and 200 million metric tons of suspended sediment to the Gulf of Mexico (Fig. 2) place this river system well within the top 10 largest rivers of the world. The Mississippi River receives a significant proportion of its water budget from the Ohio River, but the Missouri River contributes the majority of suspended particles (Meade, 1996). This bi-modal influx of water and sediment yields only a loose relationship between discharge and suspended-sediment concentration (Fig. 3A,B) in the mainstem river. A three-year record at Tarbert Landing, MS, indicates that usually much more than 70% of the suspended load consists of fines –

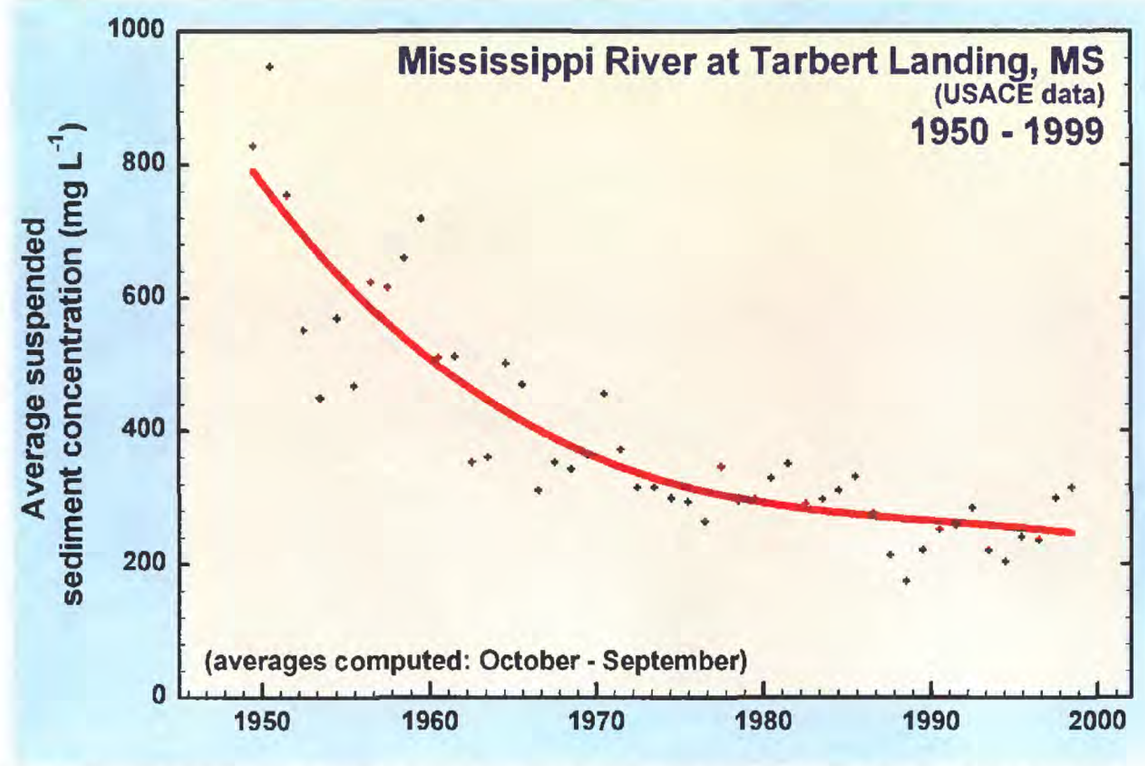


Fig. 1. 50 years of suspended sediment concentrations in the mainstem Mississippi River at Tarbert Landing, MS (USACE data).