The formation and deposition of fluid muds on the Louisiana continental shelf

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The purpose of this work is to identify sedimentary processes that govern formation and deposition of fluid muds on the western Louisiana continental shelf. According to published literature, fluid mud is established when cohesive fine-grained sediments are suspended and transported near the bed in concentrations greater than 10g/l. The conditions

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that allow for the formation of fluid mud typically involve a high sediment supply, and trapping of that sediment near a boundary, such as a shoreline. On the Chenier Plain, near the western edge of the Mississippi Delta (Louisiana, USA, and the location of this proposed study), the exact mechanisms and environmental conditions that combine to create conditions ideal for fluid mud formation and accretion remain poorly understood.

A number of studies on the Chenier Plain and other locations worldwide have been conducted to better understand fluid mud dynamics and deposition. In 1989 the AmasSeds project (A Multi-disciplinary Amazon Shelf SEDiment Study) identified fluid mud deposition along the inner and mid-shelf near the Amazon River. During this study, peak deposition rates were related to river discharge. Mud transport seemingly occurred near-bottom rather than at surface. During the later STRATAFORM program, on the Eel River, many of the processes observed were similar to those on the Amazon shelf. It was noted that dense mud flows remained close to the sea bed and that accumulation was related to high sediment discharge and intense wave re-suspensions.

For this study, geological and oceanographic data were collected during three cruises on the Louisiana shelf in February-April of 2007. Data collection has been organized into time series observations, coinciding with different phases of river discharge. During each of these cruises, core samples were retrieved from the seabed along transects perpendicular to the shoreline. From each core, samples for X-radiography and sediment analyses were taken. The X-radiography trays were scanned for density analysis and then X-rayed for stratigraphic interpretation. Sediment samples are being analyzed for grain size and Beryillium-7 content, to relate sediment deposition patterns to patterns of wave action and river flow. It is anticipated that the results of this work will provide some new insights into sedimentary and oceanographic processes governing fluid-mud dynamics.