

ABSTRACT SUBMISSION

Day

Sediment Deposition and Carbon Sequestration in the Atchafalaya River Basin, Louisiana, USA

Richard H. Day¹, Cliff R. Hupp², Lamar F. Hale³, Daniel E. Kroes², Charles R. Demas⁴, Thomas W. Doyle¹

¹ U.S. Geological Survey, Lafayette, LA (USA) (richard_day@usgs.gov)

² U.S. Geological Survey, Reston, VA (USA)

³ U.S. Army Corps of Engineers, New Orleans, LA (USA)

⁴ U.S. Geological Survey, Baton Rouge, LA (USA)

Riverine wetlands are recognized for trapping sediment; recent studies indicate they may also be important sinks for carbon. The Atchafalaya River Basin, the largest contiguous forested bottomland in the United States (3584 km²), receives 30% of the combined flows of the Red and Mississippi Rivers. Open water lakes within the basin are filling rapidly (> 50,000 hectares since 1917) and forested wetlands are being covered by layers of sediment. Deposition rates were measured from cores taken within lakes and marker horizons established within forested wetlands in the central Basin. Suspended sediment is monitored at four sites: two upstream near the confluence of the Red and Mississippi Rivers, and two downstream near the mouth of the Basin. Deposition was analysed for particle size, loss on ignition, and total carbon. More than 3.4 m of deposition has occurred in some lakes over the past 87 years. Deposition rates within forested wetlands, from allochthonous and autochthonous sources, vary from trace amounts to over 100 mm/yr with an average of 15 mm/yr. This forested wetland potentially traps 4.3 billion kg/yr of sediment, based on the average deposition rate and the average annual inflow to the Basin (3024 m³/s), which inundates approximately 40% of the bottomlands. Percent organic material at forested sites ranged from 1.7% to 69% with an average of 10%. Thus, an estimated 435 million kg/yr of organic material may be deposited within the forested wetlands of the Basin, suggesting forested bottomlands may play an important role in global carbon cycling.