



Late Holocene depositional variability and provenance in the lower Ganges-Brahmaputra delta

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The Sundarbans is one of the largest coastal wetland sites in the world, extending over an area of approximately one million hectares of the western delta of the Ganges and Brahmaputra (G-B) rivers. The western delta has not been directly fluvially sourced, due to the eastward shift of the Ganges. This western extent of the delta is considered abandoned with sediments derived from dominant estuary-tidal dynamics, with sediment source unknown. In this study, sediment cores from the Indian Sundarbans were examined for grain-size distributions (GSDs), mineralogy through X-ray diffraction (XRD), and geochemistry with X-ray fluorescence (XRF). Chemical weathering, transport, and hydrodynamic sorting processes all affect the internal facies composition. The West Bengal Sundarbans has been examined extensively and found to reveal intensively weathered, terrestrial sediment derived from the Ganges River. There is a predominance of quartz and mica with clay minerals, with quartz interpreted as G-B Rivers draining the Himalayas during low-relief tropical weathering. Kaolinite formation is derived from feldspar and muscovite mica with kaolinite the product of intense chemical weathering. Lithofacies through GSDs are indicative of a muddy tidal flat environment with aggradation and fining-up in sizes. Mineralogy and geochemistry has revealed that the TMF in the late Holocene is still considerably influenced by regional sedimentary provenance of the Ganges River.