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Frequency changes of tropical cyclones during the last century recorded in a canyon of the northern Bay of Bengal

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Frequent cyclones originating in the Bay of Bengal and landfall to the southern delta of the Ganges and Brahmaputra are well recorded in sediment cores from a canyon which deeply incises into the shelf and ends at the foreset beds of the submarine Ganges Brahmaputra delta. The large sediment supply by the two rivers during the monsoonal floods forms temporary deposits on the inner shelf, which are mobilized by waves and currents during the passage of cyclones. The resulting sand-silt-clay suspension forms high-density water masses, which plunge from the inner shelf into the shelf canyon, where they deposit graded beds evenly draping the broad canyon floor. A simple model was used to rank the historical known cyclones according to their capacity to transfer sediment from the submarine delta into the canyon. In a 362 cm-long sediment core ranging from the year 1985 to 2006, 48 graded beds can be correlated with the observed 41 cyclones. The cyclonic impact on the sediment transport has decreased by a factor of three during the last decade. The highest cyclonic impact occurred during the seventies. Compared to the sediment transfer by cyclones, the input by tidal currents and monsoonal floods is negligible. Thus cyclones are the dominating process for mobilizing and distributing sediment on the Bangladesh shelf and probably also on all shelf areas, which lie in the track of tropical cyclones.