

The Monsoon Erosion Pump

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Understanding the factors controlling the flux of materials from land to oceans has key implications for global biogeochemical cycling and the links between the sedimentary record and landscape evolution. Monsoonal climates are recognized as prodigious sediment producers but conflicting proxy reconstructions limit assessing their influence on land-sea material transfers at various timescales. Here I discuss the concept of a monsoon erosion pump based on terrestrial and oceanic records reconstructed from recent Indian National Gas Hydrate Program and IODP drilling in the Bay of Bengal, Arabian and Andaman Seas. From millennial to orbital to tectonic timescales, these records suggest that vegetation land cover interacts and modulates the regime of erosion and weathering under perennial but variable monsoonal rain conditions. Under this new proposed interpretation the Indian monsoon exhibits two distinct flavours during the Cenozoic that can be largely explained by its heartbeat, or astronomical forcing. This erosional regime is mediated by the global glacial state and attendant sea level and by limiting conditions imposed by the paleogeography of Asia.

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