

GENESIS OF SEDIMENTS: EXOGENIC VS. ENDOGENIC DRIVING FORCES

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The ultimate control on erosion is the rate at which rocks are weathered and transformed into solutes and particles small enough to be transported. Weathering is dependant on temperature, availability of moisture, plant cover and relief. Detrital sediment is carried from land to the sea by three agents, rivers, glaciers, and winds. Dissolved sediment is carried by rivers and groundwater. The shoreline is an arbitrary boundary within the detrital sediment transport system, which extends from a site of origin across areas of temporary storage to a site of long-term deposition. The most important of the agents moving sediment across the land is river transport, estimated to be in the order of 20×10^{12} kg of sediment annually at present. Analysis of drainage basins indicates that relief and runoff are the most important factors in determining the detrital sediment load of rivers. The geology of the drainage basin is the most important factor controlling the dissolved load. The competence of rivers to transport detrital sediment is governed by the volume flow, gradient, and the sediment load itself, whereas the dissolved load is largely unaffected by these factors. Today, most large rivers are fed by snowmelt in highland areas, runoff from rainfall in the drainage basin, and groundwater inflow. Along the river course, water is lost to evaporation and groundwater infiltration, particularly affecting the transport of the detrital load. Detailed understanding of these processes through time will require integration of climate, soil-development, and transport models.