

Geoindicators for river and river-valley monitoring in the humid tropics

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Geoindicators for rivers and river valleys in the humid tropics are suggested that could indicate local, regional, or global environmental change during observational periods of up to a century. Principal observations suggested are monitoring of water and sediment discharges. Such observations can be enhanced with measures of stream-channel change and records of large floods, and can be extended to longer time scales by combining them with lower-resolution proxy records of late-Holocene environmental characteristics. The rates of erosion and storage of the erosion products on hillslopes, bottomlands, and in channels are sensitive to environmental change and are measurable by geoindicator observations. Among the observations suggested to detect sediment storage are direct examination of stream channels, coring and augering of alluvial deposits, and the use of soil pits and clay pads. Recovery of charcoal from bottomland deposits permits the dating of the deposits and may identify change in fire frequency and sediment yield. Source areas for sediment and change in source owing to altered natural or induced erosion rates can be identified by analyses for dissolved solids in streamflow and the size distribution and mineralogy of stored channel and flood-plain sediment. Methods to measure erosion or storage on hillslopes include erosion stakes, mass-movement pins, painted-rock lines, cliff-recession markers, and repeated measurements of hillslope profiles. New monitoring programs, which should be coordinated with existing ones, will provide valuable geoindicator data.