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Regolith in the sediment routing system: a view from tropical shields

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Production and remobilization of regolith are key processes controlling the availability of clastic sediments and solutes for river systems. Over the shields of the tropical belts, thick lateritic regolith mantles were repeatedly produced by weathering and remobilized by mechanical erosion during the Cenozoic (e.g., Figure 1). Shields represent continental surfaces of very large areal extent (ca. 60 % of the emerged lands) and have been influenced by repeated widening of the inter-tropical climatic zone during the Cenozoic. In this contribution, we show how integrated quantitative investigation of landform-regolith evolution processes, from the landscape scale to that of tropical shields, contributes to the understanding of the long-term (1-100 My) dynamics of non-orogenic surfaces and their clastic delivery to the world ocean. Such an approach allows (1) reconstructing landforms, regional topography, drainage networks and catchments through time, (2) quantifying the evolving continental denudation and clastic sedimentary yields of shields, (3) estimating the mineralogical and granulometric nature of such yields to be delivered to continental margins' basins and (4) evaluating the links between drainage evolution and sedimentary yields. Such outcomes are based on the study of the West African sub region, which hosts a dense distribution of dated and regionally correlated regolith-landform markers. Methodology involved (1) regolith-landform mapping on a local (1-10 km) and regional (100-1000 km) scale, (2) geomodeling assisted construction of paleolandscapes and regional paleotopographies and (3) compilation of petrological and physical characteristics of regolith.

Results from West Africa open new perspectives on intercontinental regolith correlations as well as on the evaluation the global causes and consequences of tropical shields' regolith production, stripping and exports over Cenozoic timescales.



Figure 1: Dismantling of a weathering profile in the Kongoussi area (North Central Burkina Faso, West Africa) making regolith available for the drainage network at each rainy season.

