Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05739, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05739
EGU General Assembly 2008

ENSO forcing of sedimentary processes in two tropical fluvial dispersal systems

Rolf Aalto

Department of Geography, University of Exeter, Exeter UK (rolf.aalto@exeter.ac.uk / Fax: +44 1392 253342)

This presentation summarizes results from ongoing studies of two archetypal river-floodplain systems that border the region of the central tropical Pacific Ocean responsible for the El Niño/Southern Oscillation (ENSO). The first example, the Fly-Strickland fluvial dispersal system in Papua New Guinea (PNG) comprises the largest river basin in Oceania, ranking among the top 25 rivers in the world for water and sediment discharge, at 189×10^9 m^3 yr^{-1} and 85 Mt yr^{-1}, respectively. Because the tectonically active, tropical watersheds of Oceania may account for almost half of the global sediment flux to the ocean, the impact of climate oscillations on sedimentary processes is of particular interest here. The second example, the Beni-Mamore system in the Bolivian Amazon supplies the vast majority of sediment and water to the Madeira River, in turn the largest contributor of the ~ 1 Gt $yr^{-1}$of sediment discharged by Earth's largest river. In both cases, these enormous discharges are associated with biogeochemical fluxes also of global significance, and ENSO may strongly modulate the rates and mechanisms for construction of lowland river floodplains and basin infilling. In both PNG and Bolivia, the majority of the sediment is delivered from the rapidly eroding mountain headwaters during the cold phase of the ENSO oscillation, with much of this sediment accumulating across the extensive lowland floodplains during distinct episodic events – despite the fact that the floodplains are seasonally inundated most years. In particular, the episodes of most rapid transfer of sediment mass from the active orogeny to the lowland depocenters appear to occur during cold-phase ENSO events that immediately follow strong warm-phase ENSO conditions. The rates, timing, and mechanisms for sediment delivery and accumulation will be

presented and compared for these two prominent dispersal systems.