

Asymmetrical Sediment Input to Rift Margins - Role of Pre-rift Drainage

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The controls on the location of major sediment inputs to rift margins are investigated using source-to-sink analysis of modern drainage data into rifts of various ages. While the influence of pre-rift structures and asymmetry of rift-related tectonic structures is acknowledged, we also highlight the importance of pre-existing drainage direction on the distribution of sediment into rift settings. Capture of catchments during syn-rift times forms large drainage basins and river systems that are able to maintain erosion through evolving rift topography. This is observed to result in asymmetry depending on the orientation of the rift axis to the pre-existing drainage. Other factors such as structural asymmetry, regional lithological and climatic variations also play a role.

Given that the locations of major sediment inputs to rift basins are very stable over time, understanding the asymmetries of rift margins is important in establishing both rift and drift-related sediment input histories. In particular, we suggest that the asymmetrical nature of sediment input to rifts is common and cannot be explained entirely by tectonic factors. The major exploration implication is for the delivery of sand into rift basins and eventually passive margins.