



## **Sediment supply as a driver of river evolution in the Amazon Basin**

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The Amazon represents the only large river basin in the world where there is a sufficient range of sediment supplies and a lack of engineering controls to assess how sediment supply drives the evolution of meandering rivers. Despite recent analytical advances (Asahi et al., 2013; Pittaluga and Seminara, 2011), modern theory does not yet identify or explain the effects of externally imposed sediment supplies, a fundamental river characteristic, on meandering river evolution. These sediment supplies would be radically reduced by the construction of large dams proposed for the Amazon Basin (Finer and Jenkins, 2012). Here, we demonstrate that the sediment loads imposed by their respective drainage basins determine planform changes in lowland rivers across the Amazon. Our analysis, based on Landsat image sequences, indicates that rivers with high sediment loads draining the Andes and associated foreland basin experience annual migration rates that are on average four times faster than rivers with lower sediment loads draining the Central Amazon Trough and shields. Incidents of meander cutoff also occur more frequently along the rivers of the Andes and foreland basin, where the number of oxbows in the floodplains is more than twice that observed in the floodplains of the Central Amazon Trough and shields. Our results, which cannot be explained by differences in channel slope or hydrology, highlight the importance of sediment supply in modulating the ability of meandering alluvial rivers to reshape the floodplain environment through river migration.

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Finer, M., Jenkins, C.N., 2012. Proliferation of hydroelectric dams in the Andean Amazon and implications for Andes-Amazon connectivity. *PLOS One*, 7(4), e35126.  
Pittaluga, M.B., Seminara, G., 2011. Nonlinearity and unsteadiness in river meandering: a review of progress in theory and modelling. *Earth Surface Processes and Landforms*, 36(1), 20-38.