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How the Andean tectonics and dynamic topography shaped the landscape evolution in Amazonia: a numerical approach

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The Andean orogeny had a profound impact on the evolution of the Amazon drainage system, modifying the climate in South America and the influx of sediments to the interior and marginal sedimentary basins. Additionally, the subduction of the Nazca plate under the continent produced dynamic topography that perturbed the landscape and the generation of accommodation space in the interior sedimentary basins mainly in western Amazonia. Therefore, the correct interpretation of the geological evolution of the northern South America during the Cenozoic depends on the coupling of different geodynamic processes with the erosion of the continents, deposition in the sedimentary basins and the interaction with the evolving climate. Due to the great complexity of the different processes involved in the geological evolution of Amazonia, the use of numerical models is a natural way to treat this problem. The aim of this work is to present numerical scenarios for the formation and evolution of the Amazon drainage system taking into account surface processes along with geodynamic processes like Andean uplift, flexure of the lithosphere, and dynamic topography induced by mantle convection. We conclude that the Amazon drainage system was formed essentially by the asymmetric influx of sediments from the Andes, while the dynamic topography modulated the timing for the transcontinental connection between western and eastern Amazonia and the stratigraphic evolution of interior basins.

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