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# Numerical simulation of drainage reversal of the Amazon River during Andean orogeny

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The uplift of Central and Northern Andes occurred concomitantly with an important reorganization of the drainage pattern in Northern South America. During the Early Miocene, the fluvial systems that flowed from the Amazonian Craton toward the sub-Andean basins and northward to the Caribbean were replaced by a megawetland, the Pebas system, covering a large fraction of the Western Amazonia. In the Late Miocene the Pebas system progressively disappeared and gave place to the transcontinental Amazon River, connecting the Andes and the equatorial Atlantic margin. A previous work suggested that the reversal of the Amazon River and the disappearance of the Pebas system were driven by dynamic topography promoted by mantle convection. Based on numerical models that couple surface processes, flexural isostasy and crustal thickening due to orogeny, here I propose that the response of the surface processes to the uplift of the Central and Northern Andes, along with the flexural isostasy of the lithosphere, can explain the drainage reversal of the Amazon River during the Miocene without invoking dynamic topography induced by mantle convection. In addition I observed that the existence, the permanence and the size of a megawetland in Northern South America is controlled by the rate of crustal thickening in the orogeny, the rate of erosion and, mainly, the efficiency of the sediment transport through the drainage basins during the Andean uplift.