

 LANDSCAPE EVOLUTION

# Establishing connections

The Amazon basin is the largest drainage system in the world, connecting the Andes in the west to the equatorial Atlantic Ocean in the east. Development and growth of the Amazon drainage system throughout the Cenozoic likely had a strong influence on biodiversity and global climate. However, the relative roles of dynamic topography (topography generated by variations in the buoyancy of the underlying mantle) and surface processes (including orogeny, flexural isostasy and sediment redistribution) on the evolution of the basin, and

development of a transcontinental river system, remain unclear.

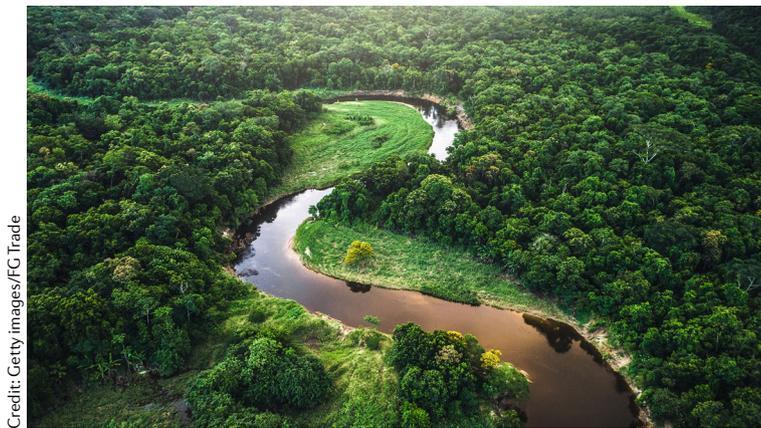
Tacio Cordeiro Bicudo from the University of São Paulo, Brazil, and colleagues developed numerical models to simultaneously test the influence of tectonic uplift, surface processes and dynamic topography on the landscape evolution of the Amazon basin. Models indicate that dynamic topography is not required to form a transcontinental river system, with propagation of the Andean sedimentary wedge from west to east able to generate a consistent eastward drainage of the

basin into the equatorial Atlantic by ~5 Ma. Dynamic uplift and subsidence can, however, modulate the time at which transcontinental drainage is established, by changing the volume of interior sedimentary basins and modifying the height of drainage divides. In addition, dynamic topography plays a pivotal role in the development of mega-wetlands in the central Amazon (for example, the Pebas mega-wetland in the Miocene).

The landscape evolution of northern South America is vital to one of the most biodiverse areas on Earth. More accurate constraints on changes in dynamic topography in northern South America throughout the Cenozoic will provide detailed insights into the exact age at which transcontinental drainage is established, which is critical for understanding the biological and ecological changes that occurred in the central Amazon during this time.

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**ORIGINAL ARTICLE** Bicudo, T.C. et al. Reappraisal of the relative importance of dynamic topography and Andean orogeny on Amazon landscape evolution. *Earth Planet. Sci. Lett.* <https://doi.org/10.1016/j.epsl.2020.116423> (2020)



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