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# Age and geological history of the transcontinental Amazon River revisited by provenance of Cenozoic sedimentary rocks of the Amazon Fan basin (Brazil)

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## Résumé

Reconstructing the geological history of the Amazon River and its drainage basin is fundamental for understanding the mechanisms that control the vertical movement of the northern part of South America and the origin of Amazonian biodiversity. However, it remains a challenging problem for geoscientist because of the absence of suitable sedimentary record. Here, we present the first U-Pb zircon ages of Paleogene to pre-Pleistocene sedimentary rocks of the Amazon Fan Basin obtained from industrial wells. Associated with major and trace element concentrations and Sm-Nd isotopic data of leached clays, we document the provenance of Paleogene to Pleistocene sedimentary rocks of the Amazon Fan Basin. We show that the Paleogene sedimentary rocks are cratonic in provenance with very negative Nd(0) values (-20.1 to -19.1) and Mesoproterozoic (1.5-1.3 Ga), Stonian (~1 Ga) and Brazilian Orogen zircons sourced by the Amazon craton, the Gurupi belt and the Borborema Province. We document the existence of an Andean transcontinental Amazon River at ca. ~14.3 Ma based on Maximum Likelihood and Maximum Depositional ages and the

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\*Intervenant

presence of Paleozoic zircon sourced by the Andean Eastern Cordillera. Combined with our Nd(0) values of Miocene sediments and previous studies, we suggest that a that an Andean transcontinental Amazon did exist between 18.3 and 14.3 Ma, during or before the development of the Amapá carbonate platform. To explain the presence of Andean detritus in the northern part of the Amazon Fan, we suggest that the North Brazil Current was already active in the Early-Middle Miocene. It also follows that the Early to Middle Miocene Pebas system of Western Amazonia was temporally connected with the Atlantic Ocean suggesting that it may considered as permeable biogeographic system. The Early Pliocene and Pleistocene Amazon Fan Basin sediments contain significant contributions of discordant zircons and Brazilian Orogen zircons (500-700 Ma) in addition to Andean zircons indicating that the Borborema province remain one of the main sources of the Amazon Fan during the Neogene. Finally, we conclude that the Amazon River and its drainage Basin may be much younger than previously thought.

**Mots-Clés:** Amazon, Brazilian Equatorial Margin, Provenance, zircon U, Pb dating, Sm, Nd isotopes, Foz de Amazonas