



Birth of the Amazon River and stages of development: New evidence from the Amazon Fan (Foz do Amazonas, Late Miocene to Present)

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The Amazon Fan (Foz do Amazonas basin, offshore Brazil) is widely accepted to be a product of the sedimentary input delivered by the Amazon River into the Foz do Amazonas basin. Therefore the geological record in the Fan can reveal the timing of birth of the Amazon River as a transcontinental river and its subsequent development. So far the only indication for the age of the initiation of the submarine fan and, consequently, for the onset of the transcontinental Amazon River came from the Ceara Rise in the deep sea, while information from the Fan itself remained undisclosed and debated. In recent years however, new biostratigraphic and isotope analyses from wells in Foz do Amazonas basin provided exact ages and provenance for sediments of the Neogene section where the Fan is located.

The Neogene geological record in the Foz do Amazonas basin is characterized by a succession of siliciclastics-carbonate-siliciclastics (base to top). The biostratigraphic analyses showed that the first sediments of the uppermost siliciclastic succession are as old as the nannofossil biozone NN10d (11.1-10.7 Ma, early Tortonian, Late Miocene). In addition, sedimentary provenance studies revealed that these are the first sediments with an Andean signature. This led us to interpret the onset of the transcontinental Amazon River anytime between 11.1 – 10.7 Ma. Over time the River went through 3 stages of development: 1) 11.1 to 6.8 Ma; 2) 6.8 to 2.3 Ma; and 3) 2.3 Ma to Present.

The present magnitude was attained only in last phase.

The birth of the transcontinental Amazon River and sediment accumulation in the Amazon Fan is a direct result of the Miocene tectonics in the Andes (Quechua orogeny); of the Tortonian global sea level drop; and also coincides with the Miocene global climatic cooling.