



Neogene vegetation development in the Amazon Basin: evidence from marine well-2, Foz do Amazonas (Brazil)

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Origen and development of the highly diverse Amazon tropical forest has mostly been inferred from continental sites. However, sediment records in the marine Foz do Amazonas Basin can provide important information to better understand the influence of the Andes uplift and climate change on its plant biomes evolution since the Neogene. Sediment analyses of samples from BP-Petrobras well 1 and 2, drilled in the Amazon Fan, allowed to infer the onset of the transcontinental Amazon river and the fan phase during the middle to late Miocene (c. 10.5 Ma). As part of the CLIMAMAZON research programme we performed pollen analysis on the 10.5 to 0.4 Ma time interval. 76 ditch cutting samples of the upper 4165 m sediments of well 2 permitted us to infer changes in floral composition in the Amazon Basin. The palynological spectra across this interval (nannofossil based age model) include pollen, fern spores, dinocysts and foram lignings. When possible pollen and fern spores were grouped in four vegetation types: estuarine, tropical, mountain forest and high mountain open treeless vegetation. Pollen is generally corroded and reflects the effects of sediment transportation while reworked material is also common. Good pollen producers such as Poaceae, Asteraceae and Cyperaceae are common and reflect indistinctive vegetation types particularly those associated to riverine systems. *Rhizophora/Zonocostites* spp. indicate "close-distance" mangrove development. Tropical forest biomes are represented by pollen that resemble Moraceae-Urticaceae, Melastomataceae-Combretaceae, Sapotaceae, *Alchornea*, Euphorbiaceae, Rubiaceae, Bignoniacae, *Mauritia* and Arecaceae. *Myrica*, and particularly sporadic occurrences of fossil fern spores like *Lophosoria*, and *Cyathea* suggest the development of a moist Andean forest in areas above 1000 m. First indicators of high altitudes appear in the last part of late Miocene with taxa associated to current *Valeriana* and particularly *Polylepis*, a neotropical taxon currently growing along the Andean fluvial system on altitudes between c. 2000 up to c. 4800 m. *Alnus* is an important Andean forest taxa since Pliocene. In summary, the Neogene palynological record of the Amazon Fan strongly reflects and confirms the influence of the uplift of the Andes and its transcontinental character from late Miocene onwards.