

# Boletín de la Asociación Latinoamericana de Paleobotánica y Palinología

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## XIV International Palynological Congress X International Organisation of Palaeobotany Conference



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de Paleobotánica  
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#### NEW INSIGHTS ON ASSOCIATED PALEOZOIC TO CENOZOIC FLORAS AND PALYNOFLORAS FROM GONDWANA

Mercedes di Pasquo, Roberto Iannuzzi & Paulo A. Souza

## A Late Early Pliocene Marine Incursion in the Madre de Dios Basin, Peruvian Amazon

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The Neogene evolution of the Amazonian landscape is highly debated especially the number and existence of marine incursion in Western Amazonia. Combined biostratigraphical and sedimentological analysis carried out in the Pebas-Nauta Formations, Madre de Dios Basin (Sub-Andean zone and foredeep depozone) yield enough evidence to suggest for the first time an episode of marine influence in the late Early Pliocene. This holistic contribution is a collaborative project of the IRD advanced Amazonian research program and doctoral thesis sponsor. The results from 15 surface productive samples of four stratigraphic sections SE-NW oriented in the Madre de Dios basin, and from base to top surface-ordered sand and shale samples, are as follows: Puerto Maldonado (MD-325/MD-51), Santa Rosa (MD-208/MD-13), Inambari (MD-204C), and Pongo de Coñeq (Section 1: MD 244/MD-246). The 13/15 analyzed samples have revealed autigenic pyrite, *Miliammina*, *Bathysiphon*, *Trochammina* and *Haplophragmoides* facies, which suggest marginal marine sedimentation and oligohaline - lower mesohaline (about 2-16 ppt) environment, common in salt marshes and most mangroves. All samples show the same palynofacies containing abundant cuticles among the phytoclasts and palynomorphs dominated by Poaceae and pteridophytes spores (*Cyathidites*, *Laevigatosporites*, *Polypodiisporites*, *Equisetum*), fungi spores, and bryophytes. Additionally, some samples revealed specific features such as: MD-325/MD-51 present crabs (ichnofacies), *Oedogonium* algae, *Tetraploa* and *Potamomyces* (fungi) and some proximate dinoflagellate morphotypes related to estuarine tidal type environment. MD-13/MD-208 contains *Oedogonium* algae, *Tetraploa* and *Potamomyces* (fungi) and pyrite in the spore-pollen. MD-244/MD-246 yielded *Deltoidospora* aff. *adriensis* and *Potamomyces*. MD-204C

yielded *Verrucatotrilites*, *Deltoidospora*, *Pteridaceae* and algae (*Pediastrum*, *Oedogonium*) and angiosperms (*Cecropia* and *Poaceae*). *Deltoidospora adriensis* suggests a mangrove swamp with anoxic bottom. The recovered marker species in these sections (e.g. *Cyatheacidites annulatus*, *Cingulatisporites laevigatus*, *Nijssenosporites fossulatus*, *Grimsdalea magnaclavata* and *Bombacacidites baculatus*) indicate (7.15-3.4 Ma) age for studied outcrops, and the first record of chironomidae and species of *Potamomyces* and *Tetraploa* in MD-51/MD-325, MD-13/MD-208, MD-244/MD-246 outcrops, support a Neogene age. However, the presence of *Alnipollenites-Echitricolporites* association (*Alnipollenites verus* and *Echitricolporites mcneillyi* in MD13/208 and *Alnipollenites* forms (Pliocene-Pleistocene), in MD-51/MD-325 and MD-204C, as well as a dating in MD-204C (biotite Ar/Ar 3.45 Ma) indicate a late Early Pliocene. The holistic analysis of the sections allowed us to document a marine incursion into a Neogene cycle. Reworked palynomorphs due to erosion of the Andean range and the influence of its mountainous flora (*Clavinaapertura microclavatus*, *Cecropia*, *Podocarpus*), are also evinced in almost all samples.

**Keywords:** Late Early Pliocene, palynology, benthic foraminifers, Southern Peruvian Amazon basin, Marine incursion

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