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Fluvial environments at Lake Pebas' southern margin (SE Solimões Basin, Western Amazonia, Brazil; Middle/Late Miocene)

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In Miocene times a vast system of interconnected lakes and wetlands evolved in Western Amazonia, which is subsumed as "Lake Pebas". This enormous inland water system shaped north-western South America for millions of years and acted as considerable dispersal barrier for terrestrial taxa between the Guyana shield and the northern Andes. Aquatic biota like molluscs and ostracods faced spectacular speciation events within this long-lived wetland and provide model cases for studying evolutionary processes linked to, e.g., ecological changes or geographical isolation. Whereas the general development of this amazing ecosystem is well established, several fundamental questions concerning palaeogeography, depositional environments and stratigraphical correlation remain a matter of impetuous debate. Marine intercontinental pathways between the western Caribbean and the Parana Basin through Amazonia are proposed and discussed. Likewise, the frequency, timing and effects or even the existence of marine ingressions into the sedimentary environments of this huge and hardly accessible region is still disputed. In the course of an Austrian-Brazilian project dealing with the evolutionary pattern of a widely occurring and biostratigraphically important ostracod lineage (Cyprideis), several outcrops around Eirunepé (Juruá region, Amazonas state, Brazil) were sedimentologically investigated to obtain basic data of the sedimentary environment. The outcrops are located along the cut banks of the Juruá (Pau D'Alho, Morada Nova, Aquidabã, Remanso) and the Tarauacá River (Torre da Lua, Barro Branco), a few kilometres east respectively south of Eirunepé. The total thickness of the Solimões Formation, which consists of deposits of "Lake Pebas", is estimated to range in the order of several hundreds of metres in that area. However, due to restricted outcrop conditions in Amazonia surface investigations are limited to the uppermost few decametres of Neogene sediments and lateral facies architecture studies are restricted as well. Detailed facies analyses are still missing in this region, which is supposed to be located at the south- eastern margin of "Lake Pebas". The sedimentary record of observed outcrops comprises channel-fills of different orders and origin and sediments of flood basin settings. Fine- grained abandoned channel-fills are documented as well as sandy-silty crevasse-channel and point bar deposits. Within the overbank environment successions of greenish to pale red coloured, intensively mottled paleosols with root casts occur frequently, occasionally also calcrete horizons can be found. Sandy or pelitic layers, rich in carbonaceous matter (including tree trunks) and vertebrate remains refer to swampy environments within the floodplain. Massive to poorly laminated pelites with plentiful mollusc faunas indicate the formation of shallow floodplain lakes or are associated with abandoned channel-fills. Alternations of rhythmically stratified laminated clays/silts and ripple- bedded sands partly represent fine-grained point bar sediments and crevasse-splay deposits. Altogether the investigated sections document various subenvironments of a suspension-load dominated fluvial system. Based on these results, the development of an extensive, deep and stable lake can be excluded as well as any marine influx.

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