

Biostratigraphic Evolution of the Southwestern Edge of the Neuquén Basin (Lower-Middle Jurassic), Chile

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The Neuquén Basin corresponds to one of the most studied basins in the world because it has one of the main hydrocarbon reserves in South America. This, has been defined as a retroarc basin, developed on continental crust, and originated by the thermo-tectonic collapse behind a stationary magmatic arc during the Late Triassic (Mpodozis and Ramos, 1989). Its geological evolution ranges from the Late Triassic to the Neogene, presenting a sedimentary control both eustatic and tectonic.

In Chilean, deposits associated with this basin emerge from the SE of Lonquimay, which have been grouped in the Nacientes del Biobío Formation (De La Cruz and Suárez, 1997). In this study, a detailed stratigraphic analysis was carried out in the sections between the Lolén, Pacunto (Lonquimay Cordillera), Pino Solo and Tralihue rivers (Principal Cordillera) in order to determine the depositional environment. In both sectors a facies, petrographic and geochronological analysis were carried out (U-Pb zircon detrital data). In addition, the paleontological material of ammonites was reviewed in literature and in some collections made in previous campaigns in addition to a palynological study.

Six main facies are recognized: a) black mudstone, b) alternances of mudstone and heterolytic sandstones, which suggest a prodelta environment. These facies predominantly emerge at the base of the Lonquimay Cordillera and in much of the Principal Cordillera. In the upper part of the sequences present in the Lonquimay Cordillera, facies of c) massive and laminated mudstone are also recognized, d) mudstone with climbing ripples and slumps, suggesting a deep turbiditic marine environment. These facies are interdigitated at the base of the sequence, while towards the ceiling a general transgression is evident. Finally, in the top of the sequence e) angulated polymictic conglomerates f) channel sandstones with crossed stratification, interpreted as an environment of submarine channel with high contribution of volcanic material.

Throughout the sequence the present ichnology is very scarce, presenting paleophycus only in some levels of black mudstone with little ichnabundance, evidencing a possible stress due to high sedimentation rate due to the proximity to the volcanic arc. In addition, compared to that described by Argentine literature, there is a clear decrease in the abundance in the sector, which would suggest a much more restricted environment to the west of the basin.

The interdigitation of prodelta facies between the Lonquimay Cordillera and Principal Cordillera suggests a depocenter in the northern part of the study area.

Paleogeographic and paleoclimatic conditions are still under study.

Mpodozis, C; Ramos, V. 1989. The Andes of Chile and Argentina. In: Geology of the Andes and its relation to hydrocarbon and mineral resources (Erickson, G.E., Cañas M.T. and Reinemund, J.A.; editors), Circum-Pacific Council for Energy and Mineral Resources, Earth Science Series: Vol. 11, p.59-90. Houston, Texas.

De la Cruz, R.; Suarez, M. 1997, El Jurásico de la cuenca de Neuquén en Lonquimay, Chile: Formación Nacientes del Biobío (38-39°). Revista Geológica de Chile 24 (1): 3-24.