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Volcaniclastic-alluvial sedimentation interaction in the Tordillo Fm., Upper Jurassic, Neuquén Basin (Argentina): An approach for paleogeographic and tectonic development.

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The Neuquén Basin is a Mesozoic back-arc basin located in central-western Argentina and eastern Chile and today incorporated into the Andean retro-arc foreland basin. The Upper Jurassic Tordillo Formation at the northern Neuquén Basin, Argentina, was developed during a generalized subsidence with still clear fault influence that followed a Late Triassic-Early Jurassic rifting phase. Although this formation comprises a multi-stage suit of predominantely alluvial sediments that is heterolithic in nature, aeolian and volcaniclastic sediments are also present.

Volcaniclastic sediments are mainly andesitic in composition where subaerial pyroclastic flows and fallout deposits (and their remobilised sediments) are common. They are interbedded with fluvial braided and meandering sediments showing a clear interdependence. Sediment supply in the Neuquén Basin was markedly influenced by the uplift and later subsidence controlled by the magmatic activity. Explosive volcanic eruptions coupled with sporadic high rainfall events led to transportation and accumulation of large quantities of coarse volcaniclastic debris, including dm-scale blocks.

Defined volcaniclastic facies include pyroclastic and epiclastic deposits of both primary and secondary origin. Pyroclastic deposits include flow and fall deposits, this latter with bombs and lapilli deposits. They are massive or show sequences. These latter normally show erosive base and are represented by 0.4 to 0.8m in thickness of reverse, normal and normal-reverse grading in which traction structures as lamination and cross-bedding appear. Associated flame, load and scour structures are also common at the top of the sequences. All of these deposits are related to a range that varies from subaerial to shallow water in origin. Some of those of shallow water may have resulted from the accumulation of decelerating turbulent suspensions of low density currents.

Available detailed information from the evolution of the Neuquén Basin during the episodes without marine deposition is still scarce, particularly for the late Jurassic. This determines great limitations for reconstructing that evolution within a paleogeographic, magmatic and tectonic context. This study gives some clues for a better understanding of these aspects.