

GEOCHEMICAL CHARACTERIZATION OF OFFSHORE DEPOSITS IN A MIXED SILICICLASTIC-CARBONATE MARINE RAMP

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The aim of this contribution is to analyze the inorganic geochemistry and to evaluate proximal-distal compositional variations in late Valanginian – early Hauterivian offshore fine-grained deposits of a mixed (siliciclastic-carbonate) marine ramp (Neuquén Basin, Argentina). Three stratigraphic sections (550-650 m thick) of the Pilmatué Member (Agrio Formation) were logged in a north-south transect of 17 km. A total of 120 samples were processed for geochemical analysis using a handheld X-ray fluorescence equipment (Nitton XL3 Analyzer Thermo Scientific). The elements used for this characterization were: SiO₂, TiO₂, Al₂O₃, Th and Zr, as detrital supply proxies; CaO and Sr as proxies of carbonate productivity; and V, Cr, Co, Cu, Mo and Ni as redox proxies. The obtained results show significant compositional variations both in lateral and vertical direction. The southern (proximal) section is enriched in elements with detrital affinity, while those sensitive of carbonate productivity are more abundant in the northern (distal) sector. Analysis of siliciclastic proxies demonstrated the presence of two main sources of detrital components: one enriched in heavy minerals and with a slightly coarser (silty) grain size (rich in TiO₂ and Zr, and depleted in Al₂O₃), and the other enriched in aluminum and representative of very fine-grained (clay rich) siliciclastic deposits. Analysis of temporal evolution of the record shows an increase in siliciclastic components towards the top of the succession, which is attributed to progressive raise in terrigenous contributions during the progradation of the ramp system in a highstand stage. The analysis of carbonate proxies revealed the presence of favourable conditions for carbonate productivity in distal (north) sectors as well as in the mid-lower section, associated with the transgressive stages of the system. The redox proxies indicate that low levels of oxygenation prevailed in the distal sectors (north) and in the lower and middle sections of the unit, coincident with the maximum productivity of carbonates. Thus, during the transgressive stage, the input of oxygenated water and terrigenous supply was remarkably deficient. In contrast, the subsequent highstand conditions favoured the activity of marine currents which allowed redistribution offshore of terrigenous components, an increase in the oxygenation of waters (low concentrations of redox sensitive elements), and a significant decrease in carbonate productivity.