

Late Ordovician–early Silurian transition recorded in the Argentine Precordillera: insights from C, N, Hg isotopes and enhanced-Hg chemostratigraphy

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C_{org}, N and Hg-isotope chemostratigraphy from three sections that straddle the Ordovician–Silurian boundary (OSB) in Argentina was examined: Los Baños de Talacasto and Cerro La Chilca (Central Precordillera) and Villicum (Eastern Precordillera). At the Los Baños de Talacasto section, Darrivilian limestones of the San Juan Formation are unconformably overlain by Hirnantian basal chert pebbly conglomerates of the La Chilca Formation, and the Sandbian and Katian are missing. At the Cerro La Chilca section, the Hirnantian Don Braulio Formation is covered by Hirnantian–Rhuddanian siliciclastics of the La Chilca Formation, and the Katian is missing. At Villicum, Hirnantian siltstones/shales with calcareous lenses bearing *M. persculptus* are overlain by Hirnantian–Rhuddanian mudstones and Rhuddanian ironstone/shales of the Don Braulio Formation.

At the Cerro La Chilca section, positive $\delta^{13}\text{C}_{\text{org}}$ shift and Hg spike were recorded in black shales of the Sandbian Los Azules Formation, coeval with $\delta^{199}\text{Hg} \sim 0\text{‰}$ which suggests that Hg was perhaps loaded by Sandbian volcanism. Coeval discrete positive $\delta^{13}\text{C}_{\text{org}}$ shift, Hg spike and $\delta^{199}\text{Hg} \sim 0\text{‰}$ in the Late Hirnantian (*M. persculptus* graptolite biozone) in the three sections seem to record the LOME pulse 2 event when volcanism possibly caused warming and anoxia. A Hg spike right above the OSB level at the Baños de Talacasto and Villicum sections is coeval with slightly positive $\delta^{199}\text{Hg}$ values and this Hg enrichment is maybe related to a runoff increase after a glaciation period.

At the Cerro La Chilca section, $\delta^{15}\text{N}$ values are all positive in the Sandbian Los Azules Formation, suggesting less intense water-column denitrification. Negative $\delta^{15}\text{N}$ values in the LOME pulse 2–OSB interval suggest denitrifying conditions. In the

other two sections, all values are negative between the LOME pulse 2 and the OSB. In the Don Braulio Formation, negative $\delta^{15}\text{N}$ values at the LOME pulse 2 level are replaced upsection by positive ones in the early Rhuddanian. The pattern of odd-MIF Hg isotopes in the Hirnantian was probably influenced by coeval volcanism, glaciation and sea-level drop while that in the Hirnantian–Rhuddanian was influenced by sea level rise.