

PP31D-0534 Geochemical Composition of Terrestrial Deposits From Arid Intermontane Environments of the Late Paleozoic Ice Age

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 08:30 - 12:20

 Hall B-C (Poster Hall) (Convention Center)

Abstract

The Lower Permian Vrchlabí Formation was deposited in the Krkonoše Piedmont Basin of the Czech Republic during the Autunian (297–299 Ma) when global climate was characterized by a prolonged cold phase of the Late Paleozoic Ice Age and when terrestrial environments shifted toward more arid conditions as atmospheric pCO₂ decreased. The Rudník Horizon of the lower Vrchlabí Formation is a well studied interval that records extensive lacustrine deposition. However the fine-grained redbed interval that underlie this interval are less well studied. In order to contrast the geochemistry of these redbed arid climate facies with the deposits formed during inundation by the Rudník lacustrine system, we analyzed 17 fine-grained samples of varying lithology using XRF and LOI analysis from a detailed section through ~100m outcrop exposure of red beds near the down of Vrchlabí. These samples represent 5 different facies: 1) featureless maroon reddish mudstone, 2) pedogenic red-brown-orange mudstone, 3) gray laminated shale, 4) pedogenic gray mudstone and 5) yellow laminated siltstone. Facies 5 produced substantially different results from the others, having the highest LOI (~21%) compared to 8.8–12.3% for all other facies, and lower AI overall than the other facies (13% compared to 18–20%). Facies 5 is interpreted to represent a paludal mudstone that experienced calcite precipitation during deposition. Chemical Index of Alteration (CIA) was highest for Facies 1 (70.1) and this facie also exhibited the highest Ti/AI (0.04) and is consistent with highly weathered sediment influx and could represent a loessite. Facies 3 and 4 show similar average CIA values (63 and 69, respectively); this is interpreted to indicate that Facies 3 formed from less chemically weathered sediment that served as the parent material which was then subject to weak pedogenesis to form Facies 4. In contrast, Facies 2 showed much lower average CIA value (57). This is interpreted to suggest pedogenic carbonate was precipitated, which also would have caused the overall higher Ca/AI (0.38) for Facies 2 compared to the other facies, including the red beds of Facies 1 (0.09). Altogether these results suggest variable sediment influx under variable environmental conditions prior to the development of the Rudník lacustrine system.

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