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Cherts as geochemical markers of depositional conditions and Ocean Plate Stratigraphy

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Cherts are peculiar sedimentary rocks characteristic for their anomalously high SiO_2 content (> 90 wt. %) and matrix predominantly composed of microcrystalline quartz. They represent a volumetrically minor, but widespread lithology predominantly deposited on oceanic plates from the Archean to present and outstanding and widespread member of Ocean Plate Stratigraphy (OPS) formed by a progressive stacking of volcanic and sedimentary units on top of an oceanic plate. Here, we present detailed field observations and petrography combined with major/trace element as well as Sr–C–O isotopic compositions of exceptionally abundant and well-preserved cherts from the Neoproterozoic–Cambrian Blovice accretionary complex, Bohemian Massif. Two end-member types of cherts that are intimately linked to different depositional conditions can be distinguished: (1) ***Type I*** represents deep-water pelagic/hemipelagic cherts originated through the hydrothermal (~50–85 °C) precipitation of silica-rich gels with concurrent deposition of fine-grained terrigenous particles delivered as suspension by marine currents, whereas (2) ***Type II*** represents shallow-water hydrothermal (~60–90 °C) cherts locally showing stromatolitic textures deposited on the slopes of seamount volcanoes with at least some formed through the replacement of shallow-water lagunar limestones, with intercalation of evaporates. The combined Ce/Ce* and $d^{18}O$ systematics suggest that the **Type I** cherts were deposited at largely variable environment in terms of redox conditions (anoxic to oxygenated) depending on the proximity to the hydrothermal vent (temperature of formation). On the other hand, the **Type II** cherts were deposited in predominantly oxygenated environment. The obtained geochemical data together with spatial distribution of the **Type I** cherts within the reconstructed OPS suggest that their formation was closely related to the hydrothermal circulation of arc-related fluids at the outer swell of the subducted slab.