EGU2020-12681
https://doi.org/10.5194/egusphere-egu2020-12681
EGU General Assembly 2020


# Late Cretaceous – early Paleogene tectonic evolution of the Central Pamir inferred from the geochemical features of the Bartang volcanics

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The Pamir orogen in Central Asia has formed by the amalgamation of several Gondwana-derived terranes and their accretion to the southern Eurasian margin in the Mesozoic. Later on, the crust of the Pamir orogen was strongly deformed and uplifted as a result of the Cenozoic India-Asia collision. The deformation of the Pamir orogen, which resulted in shortening, crustal thickening and exhumation of deep crustal rocks within the gneiss domes of the Central and Southern Pamir makes the area an ideal site for studying the India-Asia collision and its paleogeographic and climatic effects. To account for today's 70-km-thick crust of the Pamir orogen and more than 400 km of convergence accommodated in the Pamir, pre- and syn-collisional processes have been proposed including, continental subduction, delamination, extrusion and oroclinal bending of the Pamir arc. However, testing these models requires constraints on the pre-collisional state of the Pamir lithosphere and its tectono-magmatic evolution. During most of the Cretaceous, the southern Pamir terrane was a site of a widespread arc-related magmatism, which resulted in the formation of many plutons and a volcanic suite of intermediate to acidic composition, whereas the central Pamir terrane lacked any sign of magmatic activity. However, in the late Cretaceous to early Paleogene (78 – 61 Ma) a less widespread magmatic activity in the western part of the Central Pamir resulted in the formation of the Bartang mafic to intermediate volcanic and volcaniclastic rocks. We report here the geochemical and Sr-Nd isotopic features of the late Cretaceous – early Paleogene Bartang volcanics. This volcanic suite bears geochemical and radiogenic isotope features that differ from the arc-related southern Pamir igneous rocks. Mafic basalts that comprise the lowest portion of the section exhibit MORB-like pattern with slightly

depleted light rare earth elements (LREE) and large ion lithophile elements (LILE). Further up in the section this pattern shifts towards an arc-related pattern with enriched LREE and LILE. The $87Sr/86Sr_i$ isotope ratios are lower (0.705335 – 0.706693) than those from the southern Pamir igneous rocks (0.706915 – 0.711105) and epsilon Nd values exhibit ratios close to mantle domain, ranging between -0.7 and -2.7, with the lower part of the section showing less negative values then the upper. In contrast to the Bartang volcanics, the southern Pamir igneous rocks exhibit more negative epsilon Nd values (from -4.7 to -13). The relatively low initial 87Sr/86Sr isotope ratios and slightly negative epsilon Nd values of the Bartang volcanic rocks together with the trace elements pattern that shifts from MORB-like to arc-related indicate mixing of two magmas derived from depleted and enriched mantle sources, with the latter inheriting the arc-related pattern from the subduction stage. Alternatively, the arc-related pattern could be derived through contamination of the primary magma by the crustal material. These features, compared to the southern Pamir arc-related igneous rocks, also indicate that the tectonic setting in the Pamir changed during the late Cretaceous from a continental arc to a within-plate extensional setting.