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The Telmen granitic complex in the Tarbagatai block, which is located in the northern part of Central Mongolia. Granitic rocks in the Tarbagatai block seem to have been emplaced at least three distinct periods during Paleozoic. Here we reported geochemical and geochronological data on that complex, which belongs to the Ordovician –Silurian (O-S) ages igneous rocks in the Tarbagatai block.

The Telmen complex composed of granite-granodiorite and gabbro-diorite suites, which intruded into a basement rock of granite gneiss. Petrography indicates that similar mineral assemblage comprising plagioclase, alkali-feldspar and quartz, biotite, hornblende and muscovite. Accessory minerals include apatite, zircon, ilmenite and titanite.

These rocks are geochemical characterized by metaluminous ($A/CNK = 1.0-1.1$) nature with SiO_2 content varying from 53.06 to 72.25 wt.% and mostly high-K calc-alkaline to calc-alkaline series, and I-type felsic rocks. The Telmen granitoids are shown enrichments in LREEs, depletion in heavy rare earth elements (HFEEs) ($LREE/HREE = 4.053$, $(La/Yb)_N = 9.15$, and weak positive or normal Eu anomalies ($Eu =$) on a chondrite normalized rare earth element (REE) diagram. A primitive mantle normalized trace element spider diagram indicates that these rocks are enriched Ba, K, Pb and Sr in large ion lithophile element elements (LILE) and depleted in high field strength elements (HFSEs) such as Nb, Ta, and Ti. Zircon U–Pb dating reveals Telmen granites were emplaced in late Silurian (421–419Ma).

The middle Paleozoic Telmen granitic rocks have trace element features e.g., Nb–Ta depletions, which indicate that these rock units were emplaced in a convergent-margin setting and typical of lower continental crust. Therefore, the complex geochemical data shows that volcanic arc tectonic setting, moreover continental arc array setting display on Nb/Yb versus TiO_2/Yb diagrams.

Regional geologically, based on geochronological and our geochemical data inferred that the granitic complexes correspond formed in arc collision/transitional setting from syn-collision to