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Syn-collision Hairhan layered intrusion, Lakes Zone, Western Mongolia

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In the structure of the Lakes Zone of Western Mongolia, which is reconstructed as the Early Cambrian island arc (Lakes island arc terrane), there are several groups of contiguous space gabbroic intrusions, merged in Hirgisnuur complex. The largest (70 km2) is Hairhan intrusion, located in the central part of the Lake Zone in the Bumbat-Hairhan ridge. The structure of the intrusion disturbed by later tectonic movements and the subsequent formation of Cambrian granitoids Tohtoginshil complex. The structures of the body are two groups of rocks: layered series and marginal facies, fragmentary spread to the periphery of intrusion. Gabbronorites of marginal facies have intrusive contacts with the sedimentary rocks of Early Cambrian age Burgastay formation.

The marginal facies, apparent thickness which is 1.5 km, is composed primarily of non-olivine gabbronorites in which there is trachytoid and sometimes bedding. Layered series composes the central part of the Hairhan intrusion, the direction of layering has a northwest strike, coaxial with the long axis of the intrusion. The lower part of the layered series consists mainly troctolites with minor olivine gabbroids. The upper part of the layered series consists mainly of olivine gabbro, troctolite occur here less frequently also observed small schlieren anorthosites. Of particular interest is the horizon taxitic gabbro and being above it - the horizon orbicular gabbro at the top of the layered series.

The rocks are widely manifested magmatic disruptive and plastic deformation - both macro and micro levels. They are expressed in the collapse of layering of elements in small folds of varying amplitude (typically to a few tens centimeters), often passing into areas and zones taxitic disruption. The greatest number of these structural elements characteristic of the upper part of the layered series, including the orbicular gabbro and troctolites taxitic horizons. These features indicate intensive tectonic processes that accompanied not only direct intruding, but also the further formation of the magmatic body.

Considering we have obtained petrochemical and geochemical data can be summarized that the rocks Hairhan intrusive are of low-Ti and high-Al gabbroic rocks, characterized by Th-U, Zr-Hf, and Ta-Nb minima, a moderate enrichment of LIL-elements and a maximum of Sr, which indicates the source of the melt, associated with island arc related setting. Marginal facies rocks are characterized by increased amounts of TiO_2, K2O, P2O5, and more Fe#. The spectra of the REE distribution have identical shape, and differ only by the concentration of the elements. The dating of rocks by SHRIMP-II on single grains of zircon showed age 511 ± 12 Ma, which are reported by other researchers of Lakes Zone indicates the formation of Hairhan intrusion in the settings of island arc accretion to the Proterozoic Baidrag block of Central Mongolia.