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CENOZOIC RIFT MAGMATISM IN THE VALLEY OF LAKES BASIN, CENTRAL MONGOLIA

by

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Cenozoic, partly also Mesozoic, basaltic volcanism is concentrated in a relatively small approximately S-N striking corridor in Central Mongolia between 98° and 104°E (KEPEZHINSKAS, 1979). It extends from China up to Siberia. The Valley of Lakes Basin is positioned within this corridor and is well known for its basalt layers in Paleogene and Neogene sediments.
We distinguished three coherent basaltic layers of variable thickness: The oldest basalt (I) erupted between 31 and 32 Ma (early Oligocene). Mineralogically the basalt consists of a dense groundmass and microphenocrysts of zoned Fo-rich olivine, diopsidic clinopyroxene and various feldspars. Basalt (II) is restricted to the very north and northwest of the mapped area and shows an age of 27 to maximal 29 Ma. Mineralogically it is identical with basalt I. Both can be classified as basalts, trachybasalts and some even as tephrite/basanite. In their trace element distribution they show typical intraplate patterns. Basalt (III) is also found mainly in the north with an age of 12 - 13 Ma (middle Miocene). This flow is mineralogically and geochemically different from the former. The amount of olivine is smaller and there are predominantely alkalifeldspars and ternary feldspars present. It can be classified as (basaltic) trachyandesite. The trace element distribution is also compatible with an intraplate environment, but there are some differences to the basalts (I) and (II). Elements such as Ba, Nb, Y, Sc and Cr are depleted in trachyandesites compared with former basalts.
Geochemically the basalts resemble OIBs with high Nb/U ratios and low Pb for basalts (I) and (II). Basalt (III) has a significantly lower Nb/U ratio thus indicating some contribution by the continental crust. The eruption centers of basalt (I) are closely associated with an Oligocene fault (Del fault) and those for basalt (III) most likely with the Bayan Hongor fault (Miocene). Both faults, active in the Tertiary, are subparallel to the recently active Ikh Bogd fault towards the south and demonstrate the longlasting rifting process in the Valley of Lakes.

References

KEPEZHINSKAS V V.(1979): Cenozoic Alkaline Basaltoids of Mongolia and related deep inclusions. Joint Sov.-Mong. Sci.-Res. Geol. Exped. Transact., 25: 311p.