



ANCIENT ZIRCONS FROM GABBRO-PERIDOTITE COMPLEX OF THE MAR

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The sampled area is close to 14°45' within Logachev hydrothermal field. In this region there is a large geochemical anomaly fixed for basalts. Hydrothermal field is situated in the eastern border of the rift valley from 60-80 km to the south of the 15°20' fracture zone and is spatially connected with deep-seated rocks of gabbro-peridotite complex. They are observed at the slope of tectonic step in the eastern border of the rift valley. The gabbros are rather different in their composition: from troctolite gabbro to ore gabbro which characterizes different degrees of fractional crystallization. The rocks were metamorphosed under the wide range of temperatures and pressures - from granulite facies to green-schist facies, starting at the first stages of protolith formation. The highest temperature alterations with the plastic deformations at the background caused the formation of gneissic gabbros. Ultrabasic rocks of the region are represented by strongly serpentinized peridotites with the prevalence of dunite-harzburgite complex (95%) of tectonised mantle restites. Spinel harzburgites are characterized by very low content of Al and Fe and high Cr content of spinelides - 45-50 mol. % which evidence to a high degree of the primary mantle depletion. Five zircon grains of coarse fraction have been extracted from the gabbro-norite sample. The zircons are colorless transparent grains with elongation 1:2 and poor developed facets (except one grain), their size is about 200-300 mkm. All the grains have transparent gas-liquid inclusions; one grain has the inclusion of pyroxene. All the studied zircon grains are characterized by the absence of visual cores, blocks and zoning. The weight of the grains varies within 10-14 mkg, U and Pb content appeared to be rather low 30-40 ppm and 6-15 ppm, correspondingly. All the grains are characterized by high common Pb content: 206Pb/204Pb ratios are in the interval 18.36-18.66. There was constructed Pb-Pb

isochron on the four points of studied zircon with the age corresponding to 3476 ± 510 Ma (MSWD=0.4). High error of the age estimation is caused by rather limited variation of $^{206}\text{Pb}/^{204}\text{Pb}$ ratio in the studied zircons and a comparatively high error in determination of Pb isotope composition. Zircon age calculations on the base of U-Pb systematics have been complicated by high share of common Pb and uncertainty of its isotope composition. Correction of the measured Pb isotope composition to the common Pb according the model (Stacey, Kramers, 1975) for the 0 age appeared to be unacceptable due to the measured Pb isotope composition was less radiogenic than the model Pb isotope composition. The discordia built over four points has the upper interception with the concordia corresponding to 3094 ± 47 Ma and the lower interception 2.7 ± 4.8 Ma (MSWD=0.7) if the Pb/U isotope ratios of the studied zircons were corrected on the common Pb according model isotope composition of 3.0 b.y. old Pb. All zircon points are close to the lower interception. Having used model composition of common Pb with the age of 3476 Ma for correction the upper and lower interceptions correspond to 3523 ± 26 and 0.4 ± 3.1 Ma (MSWD=0.3, n=4). If we use for correction the whole-rock gabbro-norite Pb isotope composition ($^{206}\text{Pb}/^{204}\text{Pb}=18.187$, $^{207}\text{Pb}/^{204}\text{Pb}=15.475$, $^{208}\text{Pb}/^{204}\text{Pb}=37.918$) the corresponding age estimations will be 3299 ± 500 and 11 ± 13 Ma (MSWD=5.8, n=5). In spite of considerable age estimation uncertainty it is obvious that zircon points lie on the discordia the upper interception of which is within the limits of 3.0-3.5 Ga and the lower one is close to zero value. According to zircon morphology and position of analytical points close to the lower interception, the age of zircon crystallization corresponds to the age of gabbro-norite crystallization and is within the limits of the first millions of years. Common lead was captured in the process of zircon crystallization, perhaps, by mineral and fluid inclusions. But there is a small share of inherited zircon substance with the age of 3.0-3.5 Ga in the composition of the studied zircon. Thus, the discordia itself obtained by us is interpreted as a result of mixture of newly formed young zircon with some share of Archean zircon presented in each studied crystal. The findings of ancient zircons (1.7 Ga) in the MAR gabbros have been previously described in the sample of deep drill hole 925DR from the rift valley $23^{\circ}20'N$ (Pilot et al., 1998). These zircons were also characterized by high content of common lead and were discordant. But the discordia built for these zircons had the lower interception corresponding to 490 Ma which evidenced to the fact that those zircons had been inherited. The most plausible interpretation of the ancient zircon discovery in the MAR is the preserving of zircons from the continental blocks during the ocean opening at the shallow-level of slow circulating upper mantle cells (Pilot et al., 1998). The alternative interpretation suggests the possibility of migration and preservation of continental blocks during its movement along transform fractures (Bonatti et al., 1996).