



Isotope and chemical age of the Greater Caucasus basement metamorphic rocks

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It is widely accepted that metamorphic basement of the Greater Caucasus is essentially Proterozoic [i.e. Gamkrelidze & Shengelia, 2005]. New results of geochronological study, mainly on magmatic zircon, contradict this opinion [Somin, 2007; Somin et al., 2007a, b, c and references therein]. To precise age of metamorphism we tried to apply CHIME method on monazite [Suzuki, Adachi, 1991]. The facility consists of Tescan SEM VEGA II xmu equipped with EDS Energy 400 and WDS Wave 500 from Oxford Instruments. This system and analytical protocol for monazite analysis are close to described by Slagstad [2006]. Samples of three metamorphic units were used with purpose to investigate their PT conditions and chemical composition of accessory monazite, xenotime and zircon. In the Blyb Complex Ky-bearing St-Grt-Bt schist was studied. Temperature calculated using Grt-St and Grt-Bt thermometers are 550-600 oC at 10 kb. Because xenotime absence and very low Y₂O₃ content in monazite, temperature determination on Mnz thermometer was impossible. Isochron chemical age of monazite is 288±24 Ma. In the Gondary Complex the Sil-bearing Grt-Bt gneiss was studied. Temperature calculated using Grt-Bt thermometer and Grt-Pl-Sil-Qtz geobarometer correspond to 610 oC at 4 kb. Monazite thermometer [Pyle et al., 2001] indicates temperature range 533-640 oC for three samples. Monazite chemical age is 303±31 Ma, zircon of leucosome yields SHRIMP age 321-288 Ma. In the Makera Complex the And-Bt-Ms and Grt-Bt-Ms metapelites were examined. Temperature calculated using Grt-Bt thermometer and Grt-Pl-And-Qtz geobarometer correspond to 500 oC at 2,5 kb. Monazite thermometer indicates average temperatures 293-433-447 oC. Two isochrones correspond to 239±28 Ma and 282±19 Ma.

Our results of monazite dating are close to the U-Pb zircon data although not similar being some younger. Therefore conclusion on Precambrian metamorphic events in the studied complexes of the Greater Caucasus is erroneous. These complexes independently of baric type seem to be formed roughly synchronously during Variscan epoch.

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