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An exposed slab window margin: the eastern part of the Neoproterozoic Baikal-Muya belt, Russia

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A series of dykes and small laccolith-type magmatic bodies of tonalite, trondhjemite, granodiorite and granites marks the final stage in the geological history of the Baikal-Muya belt in an adjacent area of the Siberian craton. These bodies intrude granulite-enderbite-charnokite complex, as well as troctolite Tonkiy Mys massif. These high-silica (SiO_2N56%), high alumina ($Al2O_3$>15%), pyroxene or and amphibole bearing granitoids, with Na2O>4%, high Sr (>400 ppm), low Y (<7 ppm), high Sr/Y(>35), low Yb (<1), and are geochemically similar to adakites. The same structural position was defined for granites showing K2O=4.5% and K2O/Na2O=1,4. The tonalites of this complex collected f yielded the U-Pb zircon age of 591±3 Ma (LA ICP-MS data). Previously obtained age estimate for the enderbites is 617±5 Ma [Amelin et al., 2000]. Three samples of enderbites and gneisse provided U-Pb zircon ages fallen into the time span between 603-620 Ma. The Slyudinskii massif of high-Ti gabbronorites spatially related to the enderbite-granulite complex was crystallized 618±61 Ma ago [Makrygina et al., 1993]. The published data obtained for the massif (585±22 Ma [Makrygina et al., 1993]) show that troctolite-gabbro massifs crystallized simultaneously or insignificantly later than granulite-enderbite complex at upper levels of the lithosphere. Rocks of these massifs and the gabbro-granulite-enderbite series formed at lower levels have been joined during a stage of tectonic activity and intruded by adakites 591±3 Ma ago. High tectonic activity also reflected in deposition of the coarse clastics occurred in a lower part of Kholodnenskaya suite and contemporary formations.

The following events can be reconstructed for the eastern part of the Baikal-Muya belt. Formation of the heterogeneous accretional orogenic structure (tectonic collage), with ophiolites and remnants of earlier formed Neoproterozoic island arcs and related complexes [Izokh, 1998; Rytsk, 2001; Shatskii et al., 1996], was substantially completed about 600-620 Ma ago. Cessation of the subduction was probably the first stage of collision process between the Siberian craton and the Baikal-Muya tectonic collage, that resulted in oceanic slab break-off, and emergency of an asthenosphere (slab) window. Indicator complexes of an upper edge of the window we consider to be granulites intruded by adakites veins 591±3 Ma ago. The evolution of the marginal basin of Siberian craton had been terminated at least in one of its segments in the late Neoproterozoic, and shelf-type deposition gave place to accumulation of coarse-grained sediments in the mountain valleys (Kholodnenskaya suite and coeval formations). The tectonic setting in the north of the present-day Australian shelf (Timor Island) can be used as a modern analogue to the reconstucted junction between the Neoproterozoic Siberian marginal (shelf) basin and the adjacent mobile belt.

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