

# From anatectic melt to S-type granite: direct observation from migmatites in a contact aureole of Miocene Tokuwa I-type granitoid

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Migmatites and anatectic melt-derived S-type granite developed in a contact aureole of the Miocene Tokuwa I-type granitoid, central Japan. Thermally metamorphosed rocks exhibit gradual transition from hornfels through metatexite to diatexite and finally to cordierite-bearing S-type granite. They show the systematic changes in mineral, whole rock and Sr-isotopic compositions as a function of distance from the intrusive contact. The peak metamorphic condition is estimated to be less than 3.7 kbar and greater than 664 degree centigrade for the migmatite on the basis of mineral stability relationships. The garnet-biotite and garnet-cordierite geothermometers yield P-T conditions of 636-690 degree centigrade at 2.5-3.5 kbar for the garnet-bearing migmatite at the intrusive contacts.

The leucosome in the diatexite has similar chemical compositions to the melts obtained in the melting experiments of quartzofeldspathic gneiss at shallow crustal pressure condition (~3 kbar). The leucosome, the diatexite and the experimental melts show a linear chemical trend, which is interpreted as a melt extraction trend of ~35% from the source rock composition. The cordierite-bearing S-type granite is a hybrid rock formed by mixing of the anatectic melt segregated from the migmatite (~35%) and a residual melt derived from the host I-type granitoid magma (~65%).