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Correlations of the blueschist facies metamorphism from the Heilongjiang Complex, NE China and the Suo belt, SW Japan Correlations of the blueschist facies metamorphism from the Heilongjiang Complex, NE China and the Suo belt, SW Japan

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The Jurassic accretionary terranes, which are characterized by high-P/T blueschist facies metamorphism, have been documented from the eastern margin of the Asian continent. Such high-P/T metamorphic evidence occurs from northeastern Russia via northeastern China to southwestern Japanese islands (Sengor et al., 1993; Isozaki, 1997; Taira, 2001; Wu et al., 2007).

High-P/T blueschists of the Heilongjiang Complex are exposed in northeastern China, and they consist mainly of epidote-glaucophane schists with minor amounts of garnet-barroisite schists and glaucophane aegirine-augite schists. The peak metamorphic conditions obtained for the Heilongjiang high-P/T metamorphic rocks vary from the epidote blueschist facies (320-550 C, 6-15 kbar; e.g. Bai et al., 1988; Zhou et al., 2009; Li et al., 2010a) to the epidote amphibolite facies (500-540 C, 10-12 kbar; Li et al., 2010b). U-Pb ages of 190-255 Ma for detrital zircons suggest that the protoliths of the Heilongjiang Complex are the early Mesozoic granitic batholiths (e.g. Zhou et al., 2009; Li et al., 2010c). Furthermore, the high-P/T Heilongjiang metamorphic rocks were developed by the subduction and collision of the Jiamusi Massif to the eastern border of Central Asian Orogenic Belt at the time of Jurassic period (145-190 Ma; Wu et al., 2007; Li et al., 2010c).

In the Japanese islands, Jurassic accretionary terranes occur as large-scale nappes that are tectonically sandwiched between overlying pre-Jurassic and underlying post-Jurassic sequences (e.g. Isozaki, 1997). The Suo metamorphic belt in southwestern Japan is characterized by blueschist facies metamorphism of 160-230 Ma in metamorphic age (Nishimura, 1998). The blueschists are predominantly made up of epidote-glaucophane schists with subordinate epidote-barroisite schists and sodic clinopyroxene-bearing phengite-epidote schists in the Suo belt, especially in the Gotsu and Masuda areas (e.g. Sengan, 1985). The peak metamorphic conditions preserved in the epidote-glaucophane schists are defined by the crystallization of porphyroblastic epidote, Na-amphibole (glaucophane and Mg-riebeckite), phengite (Si = 6.6-7.0 pfu), chlorite, hematite and titanites, suggesting the epidote-blueschist facies metamorphic conditions (430-530 C, 12-15.5 kbar). Additionally, the metamorphic facies series of the Suo schists of pumpellyite-actinolite facies through glaucophane schist facies to epidote amphibolite facies has been described by previous studies (e.g. Nishimura et al., 1998).

These facts suggest the similarities of both high-P/T blueschists from the Heilongjiang Complex, NE China and the Suo metamorphic belt, SW Japan, not only in the timing of metamorphism, but also in the metamorphic conditions. In this study, we therefore propose that the Heilongjiang high-P/T metamorphic rocks continued to the south, and the Suo metamorphic belt in southwest Japan is thus possible southern extension of the Heilongjiang Complex. The results reported here will contribute toward a better understanding of the Mesozoic tectono-metamorphic development of the eastern margin of the Eurasian continent.

References:

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