



Early Cretaceous tectono-magmatic activity and tectonic implications along the Sulu Orogenic Belt—case study of the Dashan complex

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The tectonic extension of the eastern Eurasian continent during the Early Cretaceous resulted in widespread occurrence of metamorphic core complexes, wide rifts and related magmatic emplacement, among which the Dashan complex of the Jiaonan orogenic belt is a typical example. The complex is a complex massif of several types of granitic rocks. The core of the complex is composed of massive porphyry-bearing biotite-hornblende granitoid without any evidence of ductile deformation. Mylonitized augen quartz monzonite and granodiorite constitute the margin of the complex. A transition zone is composed of porphyritic biotite-hornblende monzonite with weakly orientated K-feldspar phenocryst and mafic microgranular enclave. The foliations along the northwestern margin of the complex dip to NW at with dip angles of about 38°, and along the southwestern and northeastern margins to SE with dip angles of about 45°. Stretching lineations are constantly plunging WNW-ESE with pitch angles between 10° and 40°, which is consistent with the orientation of lineations in the other regions in eastern China. The granites, porphyritic monzogranite and the mafic microgranular enclaves in monzogranite are dated of ca. 126 Ma. The similarities in ages of crystallization of the monzogranite and its MME's implies the existence of magmatic mixing processes. Meanwhile, the mylonitized augen quartz monzonite and granodiorite along the margins of the complex possess crystallization ages of 129.8 ± 1.1 Ma and 132.7 ± 2.8 Ma, respectively. The petrographical zonation, structural characteristics and the systematical zircon U-Pb geochronology of the granitic rocks may suggest that the Dashan complex has experienced multistage emplacement under the same tectonic extension setting. In despite of the location of the complex near the Tanlu fault zone, the remarkable consistency of the orientations of stretching lineation of the Dashan complex to those from the other parts of the eastern China area implies that the Dashan complex was not affected by the Tanlu fault. Early Cretaceous tectonic extension of the lithosphere led to detachment faulting along the eastern Eurasian continent. During the formation of the Dashan complex, the detachment of the crust along the southwestern end of the Sulu orogenic belt was gave rise to partial melting of the lower crust, emplacement of the magmas, and possibly local addition of materials with mantle signatures.