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EVOLUTION OF THE NORTHERN ALXA BLOCK IN THE PALEOZOIC: CONSTRAINTS FROM GEOCHRONOLOGY, GEOCHEMICAL CHARACTERISTICS AND ZIRCON HF ISOTOPES OF GRANITOIDS

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The Alxa block is situated to the south of the CAOB, situated to the east of the Tarim block and west of the NCC. Voluminous intrusive and extrusive rocks outcrop in the northern Alxa block and adjacent southern CAOB. Most of them are thought to be related to the closure of the Paleo-Asia Ocean and subsequent collision [*Wu, 1993; Wu et al., 1998; Zhang et al., 2013; Dan et al., 2016*].

Traditionally, the northern Alxa block is proposed to consist of two tectono-magmatic belts, the Zongnaishan-Shalazhashan belt to the north (the north belt) and the Yabulai-Nurugong-Hongqueryulin belt to the south (the south belt) (e.g. [*Wang et al., 1992, 1994; Wu, 1993; Zheng et al., 2014*]). Based on previous studies and this study, zircon Hf isotope of granitoids in the north belt are generally depleted (εHf(t) is higher than CHUR) and the zircon Hf isotope of granitoids in the south belt are more enriched (εHf(t) is negative). This indicates that the granitoids in the two belts have different sources: the source for the north belt granitoids is generally juvenile and the source for the south belt granitoids consists of more old materials. Therefore, the north belt could not be a part of the Alxa block [*Shi et al., 2014a, 2014b; Zhang et al., 2015*].

According to the newly obtained geochronological data, most granitoids in the north belt are generated in

the Late Carboniferous to the beginning of the Triassic (e.g. [*Zhang et al., 2013; Shi et al., 2014a, 2014b*]), and granitoids in the south belt formed from the late stage of Early Paleozoic to the Late Permian (e.g. [*Li, 2006; Dan et al., 2016*]). It is noted that the a few Late Carboniferous to Early Permian Amushan Formation occurred in both belts. Possibly, subduction of the ocean plate between the two belts could start before the late stage of Early Paleozoic and the closure of the ocean could be finished before the Late Carboniferous. The pervasive granitoids in this area would be formed in a collisional setting.

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