Paleozoic Subduction zone beneath the Hexi Corridor, NW China Revealed by the Deep Seismic Reflection profile

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The Hexi corridor is located to the north of the Qilian Shan and to the south of the GobiAlashan block. The Hexi corridor is thought to be a narrow foreland basin genetically related to thrust loading of the North Qilian Shan. Geologists usually focused on the Cenozoic sediments of the Hexi corridor in order to study the uplift mechanism and age of the Qilian Shan but ignored the deep structure beneath the Hexi corridor and the pre-Cenozoic evolution of the Hexi corridor. In order to reveal the deep structure of the North Qilian Shan and the Hexi corridor, we acquired a 200 kmlong deep seismic reflection profile in 2016, funded by the Geological Survey Project, China (DD20179342) and the National Natural Science Foundation (41774114). The profile starts from the south near Yeniugou, crosses the Hexi corridor, and ends in the southern part of the Alashan block to the north. The profile was recorded with a Sercel 428 XL acquisition system using 12 m long linear arrays of 12 geophones deployed every 40 m, the shots with 36 km, 96 km and 500 km were deployed with spacing at 280 m, 1000 m and 5000 m respectively, the single hole was drilled 25 m deep, and the recording length was 30 s. After detailed processing including tomography statics, crooked line binning, minimum phase conversion, dynamic equalization, spiking deconvolution, velocity analysis, normal moveout mute, surface consistent residual statics and poststack migration, the stack section was finally obtained. Unexpectedly, besides a south-dipping reflector beneath the Moho of North Qilian Shan orogenic belt, a north- dipping reflector was found beneath the Moho of the Hexi corridor. The paleomagneitism of Carboniferous sediments in the Hexi corridor imply that the Hexi corridor was part of the North China block (Huang et al., 2001), Thus, we think that the norh-dipping reflection presents the Paleozoic footprints of the northward movement of the North China block and the sealing of the Central Asian Oceanic Belt. This new view would shed a light on the Paleozoic regional evolution of the Hexi corridor and the North Qilian Shan, and it urges us to reconsider the tectonics of northwest China.