The provenance investigation and its tectonic significance of Cretaceous sandstone in the Kuqa Basin: New insights from detrital Muscovite geochemical compositions, $^{40}Ar/^{39}Ar$ and zircon U–Pb dating

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The clastic rocks in sedimentary basins recorded the information of its adjacent mountain uplifting and tectonic evolution. The Muscovite geochemical compositions, $^{40}Ar/^{39}Ar$ ages, and Zircon ages of Cretaceous sandstone in Kuqa basin were employed to solve orogenic evolution of source terrains. The Cretaceous sandstone from the Kuqa basin contain five zircon populations, 460~401Ma, 353~315Ma, 304~276Ma,163~152Ma and some Precambrian basement Zircons, among which the zircons with dominant age peaks are 460~401 Ma (more than 50%), suggesting the provenance supply is mainly resulted from denudation of the Tianshan (including the southern margin of the Central Tianshan). Muscovites from Cretaceous sandstone are phengites, which has less Si content than them from blueschist and eclogite at the southern margin of the Central Tianshan, suggesting the pressures in detrital phengites were lower than those preserved in blueschist and eclogite of the present Tianshan. The $^{40}Ar/^{39}Ar$ phengite age of 396.6 Ma from Cretaceous sandstone is consistent with the ages of 419~310 Ma from the high pressure-low temperature rocks in Tianshan, which indicated during Cretaceous the high pressure-low temperature rocks had been exhumed at surface and served as the provenance for Kuqa basin. It has been concluded that during Cretaceous the high pressure-low temperature rocks were higher in elevation than the Haerke Mountain which located between the Kuqa basin and the high pressure-low temperature rocks, however, the present geomorphology of the Tianshan indicated that the high pressure-low temperature rocks had lower elevation compared with the Haerke Mountain, which was more likely caused by differential uplift and exhumation of Tianshan in Cenozoic. In addition, the detrital zircons ages of 163~152Ma suggested the possible magma activity in late Jurassic in Tianshan area.