

Provenance, detrital zircon U-Pb geochronology and tectonic consequences of Late Cretaceous-Eocene turbiditic sequences of Azerbaijan Province, NW Iran

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Turbidites in the Azerbaijan Province, Northwest Iran, represent an accretionary wedge formed in the Mesozoic-Cenozoic Tethys. Two types of turbiditic sequences are identified: (1) Pyroclastic turbidites are mostly in the south and in the west and (2) terrigenous turbidites in the east of the study area. We determined the provenance, the sandstone framework and the heavy mineral assemblages of Late Cretaceous-Eocene deep marine sandstones. Geochronological and geochemical study including LA-ICP-MS U-Pb ages and in-situ Hf isotopic compositions of detrital zircons are also presented.

300-400 point counts following the Gazzi-Dikinson method in each thin section of 13 sandstones define litharenites and feldspathic litharenites. Sandstone framework compositions reveal a continental magmatic arc as main source of detritus.

200-300 heavy mineral grains were identified and counted in 12 samples. Heavy mineral suites include (1) ultra-stable minerals (zircon, monazite, tourmaline, rutile and sphene) in terrigenous turbidites, derived from granitic continental crust sources, (2) metastable minerals delivered from variable metamorphic-grade source rocks (epidote group, garnet, staurolite, chloritoid, andalusite, glaucophane), (3) pyroxene-rich source in the pyroclastic sandstone and (4) chromian-spinel from ultrabasic rocks. Heavy mineral assemblages confirm a continental magmatic arc source and Cr-spinel reveal ultramafic rocks, likely ophiolite, as a subsidiary source. Glaucophane in only one sample indicates high-pressure/low-temperature metamorphic rocks in the detrital source areas.

The first appearance of Cr-spinel in Late Cretaceous sandstones indicates that erosion of ophiolites (most probably the nearby Khoy ophiolite) occurred at that time. The euhedral to anhedral shape of detrital zircon crystals suggests short transport distances from source to sink. This implies that the magmatic arc was located in the proximity of the study area.