Quartz and fracturing, the main diagenetic events: Early Cambrian sandstones, Iran

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Lower Cambrian deposits are widespread in Iran. The siliciclastic Lalun Formation (Early Cambrian) sandstones are rich in quartz, feldspars, and rarely contain rock fragments. Petrographic analysis of ~200 sandstone samples from one section through the formation indicates that the grains are mostly quartz (monocrystalline and rarely polycrystalline), feldspars, and in some samples lithic fragments of chert, metamorphic and rarely igneous origin. Accessory minerals include mica, and heavy minerals that include zircon, tourmaline and opaque minerals are present in most samples. The sandstones have a wide compositional range from quartzarenite to arkose, feldspathic litharenite and rarely litharenite (chertarenite). They experienced diagenetic events that included compaction, cementation (mostly by silica) and grain fracturing. Based on petrological and geochemical studies, we interpreted their diagenetic history, which consists of early burial, deep burial and late stages. Based on plots of feldspar, total quartzose grains, and total unstable lithic fragments, they were derived from craton interior, transitional continental, and recycled orogen sources.

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