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Syntectonic felsic magmatism in the Karakoram fault Zone, Eastern Ladakh, India: Some new constraints on its age of initiation

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In the eastern part of Ladakh, the dextral strike-slip Karakoram Fault Zone (KFZ) bifurcates into two strands called as Pangong Strand and Tangtse Strand. The region bounded by these two strands is called the Pangong Transpression Zone (PTZ) and it consists of migmatite, orthogneiss, calc-alkaline granites and a pluton of two-mica leucogranite called as the Darbuk Pluton. Mesoscopic foliation of all the major litho-units of PTZ is steeply dipping to near vertical with a strike ($\sim$140º -150º) parallel to the regional trend of the KFZ. Mylonites indicate a dextral, top-to-the south sense of shear. Mesoscopic evidences also suggest that deformation/re-mobilization of the orthogneiss and crystallization of two-mica granites is synchronous. There are also evidences of repeated tectonic activity along the KFZ even after the solidification of the two-mica granite and injection of different generations of felsic veins. . Anisotropy of Magnetic Susceptibility (AMS) reveals concordant mesoscopic and magnetic fabric for the orthogneisses. However, the magnetic fabric of the two-mica granites at the centre of the Darbuk Pluton is oriented at a high angle to the regional trend of the KFZ. U-Pb geochronology of zircons from the hornblende bearing mylonitised diorite gives a crystallization age of 63.6$\pm$1.5 Ma and also shows population of younger zircons at $\sim$27 Ma and $\sim$15 Ma. One two-mica granite sample from the Darbuk Pluton gives a crystallization age of 21.9$\pm$0.6 Ma and younger population at 19.6$\pm$0.6 Ma. These findings imply that non-coaxial deformation in the KFZ started as early as $\sim$27 Ma ago and it has experienced repeated deformation events till at least $\sim$15 Ma. The Darbuk Pluton is syntectonic with this deformation event and has emplaced in a dilational zone within the PTZ. It is inferred that the KFZ in eastern Ladakh initiated at $\sim$27 Ma, much earlier than previous works suggest.