

Exhumation of Neogene gneiss domes between oblique crustal boundaries in south Karakorum (northwest Himalaya, Pakistan)

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ABSTRACT

In southeast Karakorum (northwest Himalaya, Pakistan), kilometric size migmatitic domes were exhumed in a context of north-south shortening during Neogene times. The domes are characterized by a conical shape, and ductile deformation criteria indicate both radial expansion and extrusion of the migmatitic core relative to the surrounding gneisses. Most of the domes are aligned along the dextral, strike-slip Shigar fault that is parallel to the N130°E Karakorum fault. Along the Shigar fault, exhumation of the domes is mainly vertical with a slight dextral component.

We propose that the high temperature exhumation of the domes is due to diapiric ascent of the molten mid-crust helped by the compressive regime. The localization of the initial diapir was controlled by crustal-scale vertical structures parallel to the Karakorum fault. The later stage of exhumation in mid to low temperature conditions was related to the uplift and erosion of the whole southeastern Karakorum by crustal-scale east-west folding. In south Tibet, the westward prolongation of south Karakorum, Neogene crustal melting is also supported by geophysical data and volcanism, but mid-crustal rocks have not been exhumed. This difference between the amount of exhumation in south Karakorum and south Tibet could be related to the transpressive context of south Karakorum inducing a strain partitioning between the N130°E faults and east-west folding. Such partitioning produces heterogeneous uplift

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