Calculating rates of ductile thrusting

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The ductile interiors of mountain belts, key to our understanding of orogenic processes, are often exhumed from mid-crustal levels by ductile shearing. The Sikkim Himalaya presents some of the best exposures of a ductile shear zone in the world. The Main Central Thrust (MCT) is a major Himalayan structure that has accommodated a large amount of movement during India-Asia convergence. In Sikkim, a duplex beneath the thrust has folded the MCT into a dome. This structural configuration allows a novel method for determining rates of processes by exploiting the late-stage folding of the MCT (figure 1).

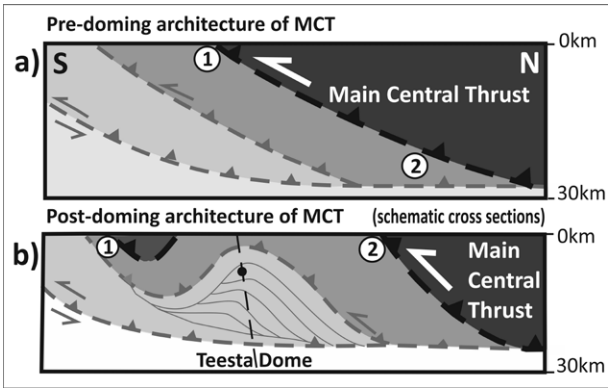

Figure 1. Illustrates a schematic cross-section before (a) and after (b) folding of the MCT. Both the two marker locations (1 and 2) are currently at the surface (b), prior to folding location 2 lay at depth (a). Therefore the age of peak metamorphism at 2 is likely to be younger than at 1, assuming metamorphism is contemporaneous with thrusting. The age difference between samples taken from locations 1 and 2 can be used to calculate a rate of thrusting.

The timing of metamorphism of rocks formed at equivalent metamorphic grades across the MCT (1 and 2 on figure 1) has been determined from U-Th-Pb monazite geochronology. The data show significant differences in the timing of metamorphism in the northern and southern exposures of the MCT in Sikkim, consistent with the figure 1 model. Rates of thrusting from initial calculations (~1cm/yr) appear slower than reported in earlier studies. This approach is the first to exploit folding of a major fault to calculate rates of ductile thrusting at a mid-crustal level.

Geochemistry of Nowdouz potassic volcanic rocks, the sample for early cenozoic potassic magmatism in NW Iran

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The studied area is situated at 47°16´– 47°23´East and 38°20´– 38°23´North between Meshkinshahr and Ahar cities, NW Iran. Despite the importance of the potassic volcanic in geology of Iran and good studies done on it, yet there is no clear information from the history of the this volcano rocks. In this article we will attempt a review of past research results, new data (field, petrography and geochemical). In addition by using the geo-chemical data, we discuss the origin and tectonic position. This area is part of Azarbaijan structural zone. High intensity alteration systems have effected on this rocks that argilice and silica zones are importance of them. Geochemical characterization and magma series show that composition on Nowdouz volcanic rocks are basalt, leucitite, tephrites and phonolitic tephrites. Many samples are in alkalic range. A general trend are observed toward increasing alkalinity with decreasing of SiO_2.Main oxides and rare earth element characterization confirm the fractionation of assemblage of olivine, pyroxin, plagioclases based on the decreasing of MgO,CaO, FeO_t and MnO with decreasing of SiO_2 and increasing of Rb/K , Sr and also decline of Sc with increasing of SiO_2. Fairly regular linear trends in major and trace elements in SiO_2 represent the same magma reservoir for rocks of this area. Although there is a enrichment of Large Ion Lithophile Elements and depletion in High Field Strength Elements. However with survey of geodynamical models for potassic magmatism , it seems that this area, based on idea of Arabian plate sub ducting under Iranian plat in late cretaceous and geochemical feature, are comparable with postcollosion related magmatism patterns.

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