

ALPINE AND HIMALAYAN CONTINENT-CONTINENT COLLISION: DIFFERENT OR NOT?

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Both the European Alps and the Himalayan chain essentially resulted from the closure of an ocean basin and subsequent collision of major continental plates. In the Alps, the thinned margin of the northern (European) plate, the oceanic realm (together the Penninic realm) and the thinned margin of the southern (Adriatic) plate (Austro-Alpine realm) all underwent S-directed subduction. Mid- to upper crustal rocks of the pre-Alpine basement of the continental margins, now in imbricate nappe piles, were transformed to eclogites, eclogitic micaschists and jadeite-bearing metagranites with much being overprinted by later (Leptontine) greenschist to amphibolite facies assemblages. Presently exposed rocks have been exhumed from depths of 70 km (Austro-Alpine) to 100km (Penninic), as confirmed by the finding of coesite in both basement and cover rocks, in incredibly short times (after 50 Ma). In the Himalayan belt, S-directed imbricate thrust slices of Indian plate basement rocks and its Permo-Mesozoic cover show HP amphibolite and local (sometimes coesite-bearing) eclogite facies assemblages overprinted at higher T and lower P. Again, only a very short time (10-15 Ma) was available for eclogite formation and exhumation. In both areas, lower crustal series must have been detached before the metasediments and granites, with their minor enclosed metabasites, were exhumed. The lack of lower crust and the stacking of mid/upper crust would have added to buoyancy forces - aiding rapid exhumation of the coesite-bearing series - as well as increasing radiogenic heat production to drive the thermal overprint in the Alps and granite production in the Himalaya.