propagation rate had also decreasing trend in time. Delamination-related volcanism was synchronous with final stages of the collision, as it was in the case of Eocene-Oligocene "Alpine delamination".

Kinematics of the Periadriatic Fault in the Eastern Alps: evidence from paleostress analysis, fission track dating and basin modelling

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New kinematic data along the eastern part of the Periadriatic Fault (PF) in the Eastern Alps, show polyphase kinematic patterns due to a succession of distinct deformation phases. The PF and related structures mark a first order tectonic boundary between the Austro-Alpine and the South Alpine units that differ in style and timing of deformation in metamorphic conditions.

Initiation of the future PF may have been occurred during Oligocene break-off of the subducted lithosphere where tonalitic magmas intruded in a continuous belt along the future PF within a wrench zone controlling the location of the future PF.

Depth determinations using the Al-in hornblende barometry yielded c. 5-6 Kb. The deformed metamorphic basement units of the Gailtal metamorphic complex, Eisenkappel zone and Palaeozoic carbonate complexes of the Southern Alps (Eder unit, Devonian) show E-W striking mylonitic foliation and mineral stretching lineation gently plunging to the east. High ductile strain affected Periadriatic plutons after emplacement, as the PF acted as a „stretching fault" during transpressive N-S shortening, leading also to exhumation of the Periadriatic tonalites. Rheological and frictional properties and fluid pressure allowed a deformation on plutons that lengthen in the slip direction while strike-slip accumulated.

Subsequent brittle deformation led to changing convergence directions within a transpressive regime. These stages include:

(1) Early Miocene N-S directed contraction caused transpressional structures expressed by N-directed thrusts and S-directed backthrusts, NW-striking dextral faults (R faults), and NE-trending sinistral faults (R' faults).

(2) Late Miocene top-to-NW nappe stacking N of the PF (e_3 NW-SE, e_1 subhorizontal). The final overthrust of Karawanken Mountains during Miocene, which form a positive flower structure, also includes flexure of the northern foreland, and formation of a narrow Sarmatian to Quaternary foreland basin, the Klagenfurt Basin.The final NNW-directed overthrust of the Karawanken mountains onto the foreland is depicted by several NW-SE striking dextral tear faults and NW- to NNW-directed thrust planes in Upper Tertiary sediments.

2D-numerical modelling of crustal flexure and strength profile calculations were carried out in order to calculate the effective elastic thickness and shape of the Austro-Alpine crust underneath the basin using Bouguer anomaly data (Steinhauser et al., 1980, Meurers, pers. comm.). The best-fit models gave very low effective elastic thicknesses for the bending plate of between 1.7 and 0.9 km. Estimated bending moment and vertical shear forces alone create too shallow deflection, so additional horizontal forces (horizontal forces approx. -1.5 kbar) must be estimated.

The low effective elastic thicknesses indicate that only the a small part of the lithosphere supports the regional isostatic response to the load by the Karawanken Mountains. The lithosphere to north of the Karawanken Mountains is characterised by crustal thicknesses of between 40 and 45 km and elevated heat flows. Rheologic models for this lithospheric configuration indicate a strong decoupling of upper crust, lower crust and mantle and generally low strengths for the lower crust and mantle. This strength distribution suggests that only the upper crust elastically supports the topographic load and lower crust and perhaps mantle deformed by ductile flow. Ductile flow of the lower crust is also supported by the absence of a crustal root beneath the Karawanken chain (Steinhauser et al., 1980).

Data derived from apatite fission track dating on samples north and south of the PF show Miocene or Oligocene cooling ages. These range from 36.5 ± 1.5 to 31.7 ± 1.9 Ma for South Alpine Werfen Formation in Slovenia, and 12.8 ± 0.9 to 13.1 ± 1.4 Ma for tonalites between Lesach Valley, the Karawanken Mountains and the Pohorje massif north of the PF. Confined track length distributions from all samples indicate different cooling histories. Mean track lengths are confined to the range of 11,46 to 13,38 µm. The track length distribution from the South Alpine Werfen Fm. has shorter tracks which indicates that the sample spent a longer time in the upper part of the partial annealing zone (approx. 100° C).