



Can apatite fission track ages from modern trench sands reflect the dynamics of the upper plate? – Preliminary results from the Southern Chile Trench

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Detrital apatites from Southern Chile trench sediments between 46° and 30°S were dated by fission track means. We address the question, whether the lateral age segmentation of the ocean floor and hence its variable mechanical behavior and thermal structure is reflected by a variation of the latitudinal denudation pattern of the overriding South American plate and its sedimentary input into the trench. Age differences in the lower plate oceanic crust are due to the angle of the spreading ridge with the subduction zone and the offset of the ridge by several transform faults. Crustal ages increase from zero at the southernmost limit of the study area to >40 Ma in the N.

Modern sand samples from trench and trench fans were collected by gravity coring, the latter being preferentially targeted. Within these fans the material is derived from a limited onshore drainage system and has not undergone mixing processes as intense as found within the trench

Preliminary results show an increase in age from the Chile Triple Junction (CTJ) northwards. Apatites from lower Pleistocene samples from ODP Leg 141 in the vicinity of the triple junction show a distinct 9 Ma peak. This population is in line with the late Miocene peak detected in an earlier study, and can tentatively be ascribed to the collision of the first segment of the Chile rise in the Golfo de Peñas region resulting in a focused pulse of local forearc uplift. Ages further N (Chacao Fan and Tolten Fan) repeatedly show a late Miocene peak, but due to a high volcanoclastic input into the trench the youngest peak age is only poorly constrained.

At the Biobío Fan (36.5°S) an inferior 9 Ma signal is still present, but is accompanied by two, more prominent Cretaceous populations, which are thought to be derived from the Coastal cordillera. The northernmost sample off the coast of the drainage area of Rio Limari (30.5°S) yields exclusively Cretaceous ages. At this latitude, there is no present-day volcanic activity in the hinterland. Input of volcanoclastic material from areas further S, transported in the axial channel of the Southern Chile Trench, is blocked by the Juan Fernandez ridge at approximately 33°S.

In addition to further ages from the trench, first data from the littoral are shown and compared with the data from the trench and with published onland fission track ages. This data set will be used to test the generally made assumption of zero transport time of eroded material. Only identical ages within all three settings would support this widely used concept.