EGU2020-6781
https://doi.org/10.5194/egusphere-egu2020-6781
EGU General Assembly 2020

Structural thermochronology along geophysical transects through the Alps

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Changes in the deep lithosphere (e.g., slab break-off or a switch in subduction polarity) potentially result in orogen-wide structural reorientations and changes in the pace and location of exhumation and Earth surface processes. In this project we combine bedrock thermochronology and balanced cross sections with thermo-kinematic modelling to reconstruct the cooling and exhumation history along geophysical profiles crossing the Central and Eastern Alps. Available thermochronological data together with new apatite and zircon (U-Th)/He ages taken along the NFP-20E, TRANSALP and EASI profile is used to test and improve existing across-strike, orogen-wide balanced cross sections. This 'structural thermochronology' method yields reliable information about the structural and kinematic evolution of the Alps since continental collision. As an example, thermochronological data along TRANSALP can be fitted with a kinematic model suggested by balanced cross sections and both datasets suggest a general shift from pro- to retro-wedge deformation, potentially related to a switch in subduction polarity.