

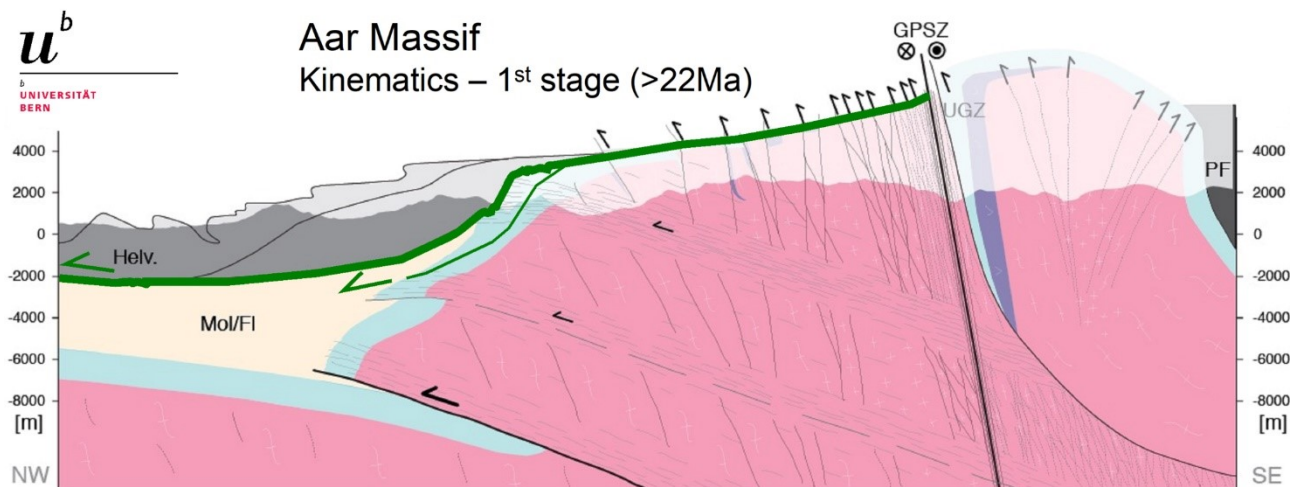
Seminario

Basement inversion of the European passive continental margin during Alpine collision: From nm-scale deformation processes to geodynamics

Martedì, 28 Marzo, 2023 – ore 16:30 Aula Arduino

Relatore: **Prof. Marco Herwegh**

University of Bern, Institute of Geological Sciences (CH)



This talk deals with the exhumation history of continental granitoid crust of the former European passive continental margin, by showing regional scale fault zone patterns, their link to microscale deformation processes and the mechanical implications based on rock deformation experiments. We use the External Crystalline Massifs of the Alps, which show a surprisingly well correlating deformation sequence from the Western to the Central Alps. Key element for the strong vertical exhumation component are steep reverse fault zones. Microstructural investigations indicate that these greenschist facies shear zones evolved under the presence of fluids aiming at fine-grained polymineralic mylonites. In agreement with previous findings, these shear zones can localize on the base of fractures. In addition, also shear zones with a pure ductile strain localization component exist. What are the reasons for these two distinct localization phenomena and what are their mechanical implications? HPHT Griggs rig experiments on pre- and non-pre-fractured ultramylonites reveal: (i) the formation of ultrafine-grained polymineralic mylonites as well as (ii) an identical final steady state flow stress for both cases, but (iii) much more localized deformation and (iv) lower finite strain necessary to reach mechanical steady state for pre-fractured samples. Most importantly, in both cases rock strength of the polymineralic ultramylonites are substantially weaker than quartz, which so far has been considered to represent the mechanically weakest component of the granitoid middle crust. In a final part, we propose that it is this weak rheology combined with the geodynamic constraints, which strongly affect the vertical component during EMC exhumation in a late-stage of Alpine collision.

Proponente: **Giulio Di Toro**