evolution and interplay of the above stated processes has been analysed along the MMF.

The kinematic analysis indicates a similar tectonic evolution for the MMF compared to the Vienna Basin and other strike-slip faults in the Eastern Alps. Four separate deformation phases could be distinguished, were the first three reflect lateral extrusion related tectonics but the last phase reflects tectonics controlled by the Pannonian Basin inversion. The thermochronological results indicate very scattered apatite fission track cooling ages, which vary between 50-4 Ma, but with an overall youngening trend towards the east. Complementary zircon fission track ages are between 90-53 Ma and also reveal a similar youngening trend to the east. Both the apatites and zircon cooling ages cannot be directly linked to lateral extrusion processes, as expected due to little vertical motion associated with extrusion. We rather suggest that the cooling ages are related to regionl denunadation with a tilt of the area as reflected by the youngening trend. To conclude, the results suggests that the tectonic evolution of the MMF is intrinsically related to processes that occur both in the Eastern Alps and the Pannonian Basin during the Miocene to recent time interval but that the regional cooling and uplift reveals a more complex tectonic evolution probably not directly linked to Miocene extrusion but deep-seated lithospheric processes.

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Lateral extrusion of the upper plate in response to subduction of a non-rigid continental plate; analogue modelling and application to the Eastern Alps.

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Novel lithospheric scale analogue models reveal the tectonic interplay between lateral extrusion and subduction processes. Traditionally, lateral extrusion tectonics are modelled by incorporating a rigid indenter triggering extrusion of a crustal wedge towards an unconstrained boundary at a high angle to the indentation direction [e.g., Ratschbacher et al., 1991; Rosenberg et al., 2004]. These models have been used to explain extrusion tectonics, as observed in the Eastern Alps, driven by northward 'indentation' of the Adriatic plate provoking extrusion towards the east where the east-directed opening of the Pannonian Basin acted as an unconstrained (weak) boundary. However, recent tomographic studies suggest that lateral extrusion is coeval with subduction of the Adriatic plate rather than lithosphere-scale indentation [e.g., Lippitsch et al., 2003].

We present a series of analogue models that refine the traditional extrusion model by including subduction of a non-rigid plate. To quantify the tectonic response of extrusion on subduction the models are compared to a reference model that is constructed according to the traditional setting. Besides testing compatibility between lateral extrusion and subduction processes, the model series also focused on gaining insights in the first order boundary conditions and mechanisms, such as: (a) variations in the mode of strain partitioning at the surface and in-depth in response to rheological variations, (b) the effect of different slab geometries, and (c) the timing of events, e.g. subduction prior to the activation of an extensional (unconstrained) boundary.

The experimental results emphasize that extrusion and subduction are compatible processes that can operate simultaneously. Furthermore, the models suggest that the extruding East Alpine lithosphere is weak but coupled, implying that lateral extrusion is a lithospheric-scale rather than a crustal-scale process.

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Exhumation of HP-LT units of the internal Briançonnais zone, new constraints from U-Th-Pb dating on allanite minerals and geodynamic implications.

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During the Alpine collision, the internal Briançonnais units have been extruded together with the Liguro-Piedmontais paleo-wedge. This early collisional stage strongly influenced the present day structure of the tectono-metamorphic units and marks the transition between continental subduction and collision. Consequently, it seems critical to document this early collisional stage and to constrain the Pressure-Temperature-time conditions at which it occurred. In order to study this subduction- collision transition, the Acceglio-Longet anticline (western Queyas) was selected and investigated. This continental unit, derived from a marginal rift shoulder, is made of crystalline basement with an extremely reduced Mesozoic sedimentary cover. The aim of this work is to investigate the tectono-metamorphic relationships between this unit and the oceanic Schistes Lustrés units which are thrust over it.

Metapelite from both continental and oceanic units exhibit similar mineral parageneses, with relics from the HP-LT stage (occurring at 450±25°C and 13.5±1.5 kbar in the Acceglio zone, see Schwartz & al., 2000) such as glaucophane and rutile partially replaced by greenschist phases such as chlorite and low-Si K-white mica. This latest assemblage is related to the eastward extrusion of the continental units. In details, the main foliation plane is underlined by chlorite + phengite + sphene ± amphibole and is overprinted by an oblique crenulation cleavage. This second fabric is underlined by the overgrowth of muscovite over phengite rims, new chlorite, albite porphyroblasts allanite and calcite. Quantitative X-ray