Large rotations of large blocks can only be accommodated by thrust planes, as rotation between vertical faults would create major space problems. Differential rotations should be expressed in differential shortening across the Alpine thrusts. As available shortening estimates of the Subalpine Molasse are far too small to be compatible with paleomagnetic data, we re-examined several cross sections.
The southernmost part of the autochthonous Molasse is deformed into an anticline an top of a triangle zone at depth, which is replaced by a foreland-facing fold east of Lechbruck. The southerly adjacent Subalpine Molasse of Western Austria is formed by a varying number of slices that show a synclinal geometry and pass laterally into horses separated by SSE-dipping thrusts. The basal thrust superimposes these slices out-of-sequence onto the foreland Molasse and therefore truncates the passive backthrust on top of the triangle zone. The thrust at the base of the southernmost slice superimposes the deepest part of the foreland sequence onto intermediate parts. Seismic sections show that this slice sits on top of a major upper footwall flat and the northerly adjacent slice is a footwall imbricate. The footwall flat reaches far south beneath tectonically higher units. The northern duplex slices are frontal hanging-wall imbricates of a major thrust sheet. Out-of-sequence thrusts dissecting the southernmost slice cut down to the basal detachment and stack older thrusts. An older triangle zone forms the contact to the tectonically higher Helvetic and Flysch nappes, which is exposed at Grünten (Allgäu), but also indicated by an apparently undisturbed stratigraphic profile across the frontal Helvetic thrust (Marienstein gallery, Bavaria), which probably is a passive backthrust .
The age of triangle zone formation at the tectonic front of the Alps is constrained by southward wedging and onlap of Middle to Late Miocene (16-7 Ma) deposits against the triangle zone. The end of tectonic activity is not constrained, because the youngest deposits still dip 15° to the NNW. Out-of-sequence thrusting of the northernmost Molasse slices onto the triangle marks the end of foreland propagation and the onset of internal thickening of the orogenic wedge during the Tortonian. Apatite fission track dating in a well penetrating the southernmost Molasse slice in Eastern Switzerland revealed more than 1 km exhumation relative to the more northern slices postdating the Early Pliocene (4.7 Ma), which was related to thrusting (Cederbom et al. 2007). It shows that out-of-sequence thrusting started to propagate further into the Alpine orogen in the Pliocene.

Cederbom, C., Schlunegger, F., Sinclair, H. D. & Van Der Beek, P. (2007): What can the Swiss Molasse basin tell us about the Late Neogene development of the Alps? - Abstr. 8th WAGS Davos, 10-11, Bonn.

Age-dating catastrophic rockslides in the Alps

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In carbonate-lithic rockslides, the hitherto undocumented phenomenon of diagenetic cementation of the sturzstrom deposits is used to determine proxy ages of rockslide events by $^{234}U/^{230}Th$ disequilibrium dating of cements. Large-scale rockslides exceeding 10^6 m^3 in volume not only are a major process of mountain erosion and orogenic mass balance but, in densely populated regions such as the Alps, also represent a major threat to humans and facilities. Establishing the distribution of rockslides in time is a prerequisite of hazard assessment for future events and for a better understanding of potential triggers, such as climatic change or phases of enhanced earthquake frequency. The ages of many rockslides of the Alps, however, still are poorly constrained.
Our preliminary investigations of major carbonate-lithic rockslides of the Alps revealed that indeed *nearly all* of them contain pockets, thicker crusts and patches wherein the rockslide material underwent cementation into a breccia. As already proven for the Fern Pass rockslide (Austria), breccia cement can provide a proxy age of the sturzstrom event by dating the cement with the $^{234}U/^{230}Th$ disequilibrium method. A cross-check of the U/Th age with ^{36}Cl surface exposition ages underscored the validity of the U/Th age, and showed that the U/Th age constrains the comparatively wide error range of exposition dating (Ostermann et al. 2007). The common phenomenon of cementation in rockslide deposits to date is practically unknown to the geoscientific community. Our preliminary data strongly suggest that these cements may be routinely used for U/Th proxy-dating the events. In addition, different 'generations' of cement as distinguished by petrographic analysis may provide time constraints on the further post-depositional development of a rockslide mass. The U/Th disequilibrium method has recently been successfully applied to age-date cements of Quaternary deposits of the Alps, such as talus breccias, fluvial conglomerates and spring tufas. In the frame of a new FWF-Project, age determination of selected rockslides shall be done by both U/Th dating of cements and by surface exposition dating with cosmogenic radionuclides. Exposition dating has the advantage to provide the 'direct' age of the rockslide event, yet the resulting ages are fraught with wide 2ó standard errors. Combining surface exposition dating with U/Th dating of cements thus has the potential to arrive at more precise proxy ages of rockslides than can be achieved by a single method alone.

Ostermann, M., Sanders, D., Prager, C., Kramers, J. (2007): Aragonite and calcite precipitation in „boulder-controlled", small-scale diagenetic systems on the Fern Pass rockslide (Northern Calcareous Alps, Austria): implications for absolute age-dating of catastrophic mass failures. - Facies, **53**: 189-208.

Das Verhalten und die Stabilität von TiO_2 Nanopartikeln in aquatischen Systemen.

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Titandioxid Nanopartikel (TiO_2 NPs) sind sowohl für die Industrie und für die Wissenschaft von wachsendem Interesse. Dies ist nicht zuletzt auf ihre besonderen Eigenschaften zurückzuführen und finden somit Anwendung in Kosmetika, Farbe und in der Wasseraufbereitung. Nanopartikel (1 nm-100 nm) zeichnen sich durch eine große, zum Teil modifizierte spezifische Oberfläche aus. TiO_2 NPs besitzen die Eigenschaft an ihrer besonders großen Oberfläche reaktive Sauerstoffspezies (ROS) zu bilden, die sich potentiell negativ in der Umwelt und auf Organismen auswirken. Der Verbleib und das Verhalten von TiO_2 NPs in der Umwelt ist stark von ihrem Aggregationsverhalten abhängig. Die Aggregation bzw. Stabilität in Gewässern wird durch das Vorhandensein unterschiedlicher Substanzen (z. B. Ionen, organische Substanzen), deren Konzentrationen und dem pH Wert bestimmt. In diesem Zusammenhang haben wir die Persistenz von TiO_2 NPs in unterschiedlichen aquatischen Systemen getestet. Hierfür wurde eine Test-Matrix mit sich verändernden Parametern wie Ionenstärke, Ionenzusammensetzung, Zugabe von organsicher Substanz und Variation des pH Wertes entwickelt. Die Aggregation, bzw. Stabilität der Partikel in Suspension in verschiedenen Milieus wurde mittels dynamischer Lichtstreuung und Laser-Doppler-Anemometrie auf Partikelgröße und Oberflächenpotential getestet. Die Gesamtkonzentration an TiO_2 in Suspension wurde mittels Ele-