dem Vorkommen von Bryozoen (im Inntaltertiär), Grünalgen (im Slovenien) und Großforaminiferen (unterschiedliche Formen); Korallen sind in beiden Gebieten vertreten. Großforaminiferen und Corallinaceen charakterisieren Oberoligozäne Karbonate wobei der direkte Vergleich durch sehr unterschiedliche Ablagerungsverhältnisse beschwert wird. Im Untermiozän sind Corallinaceen dominierte Kalke südlich der Alpen und Bryozoen dominierte Karbonate im nördlich der Alpen bekannt.

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The Aka'sai basin, an active peripheral foreland basin to the Altyn orogen, China?

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The ca. 50-60 km wide Aka'sai basin is located along the northern margin of eastern Altyn Mountains. The Altyn Mountains are considered to represent a major zone of transpression where India-Asia convergence is partitioned into northward growth of the Tibetan-Qaidam plateau and predominant sinistral strike-slip along the Altyn fault (e.g. MÉTIVIER et al. 1998, WITTLINGER et al. 1998). The northern boundary of the Aka'sai basin is formed by the Tarim basin and, in the east, by the Sanwei Shan which is separated from the Neogene to Quaternary Dunhuang basin adjacent to the N by a steep reverse fault. The filling of Aka'sai basin is represented by Neogene, gently S-dipping lake sediments (northern part of the basin) and recent pediments forming a frontal clastic wedge to the Altyn Mountains. Recent GPS measurements suggest present-day convergence of ca. 3 mm/year between the Tarim/Dunhuang basins and the central Altyn Mountains, and surface uplift of a similar order in the southern Aka'sai basin and at the northern slope of Altyn Mountains (BENDICK et al. 2000).
We interpret the gently S-dipping Neogene sediments of the Aka'sai basin as the result of flexure of the foreland lithosphere under the load of the Altyn Mountains, and the Sanwei Shan as a disrupted peripheral bulge to the Altyn orogen. The filling of the Aka'sai basin and its relations to the uplifting Altyn Mountains indicate rapid, ongoing surface uplift of Altyn Mountains supplying much material. These relations also suggest the presence of an active thrust fault along northern margins of the Altyn Mountains.
Consequently, the filling of the Aka'sai basin is governed by active tectonics, high relief, semiarid climate, high sediment supply and transport capacity. The filling represents a specific sort of an active, terrestrial, underfilled peripheral foreland basin. The clastic wedge along the Altyn Mountain front has an unusual regular slope along strike of the basin, with a regular inclination and comprises alluvial fans/braided rivers fed from the mountains and by cannibalization of the sediments eroded from southern sectors of the uplifting clastic wedge. The front of the clastic wedge forms the deepest depression, which also includes basin-parallel drainage and little remnant lakes. The northern area is characterized by non-deposition of sediments (except some local dunes). In comparison with other foreland basins (e.g., EINSELE 1992, SINCLAIR 1997) sedimentological features characterize the Aka'sai basin as a new sort of underfilled peripheral foreland basin within a semiarid climate where overall uplift exceeds subsidence in the foreland basin.

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Detrital mode of sandstones and $^{40}Ar/^{39}Ar$ ages of detrital mica from the Rhenodanubian Flysch Zone, Eastern Alps: Significance for Alpine paleogeography

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Detrital mode (using the Dickinson-Gazzi approach) of all sandstone formations and $^{40}Ar/^{39}Ar$ mica ages of Lower Cretaceous to Eocene sequences constrain the tectonic and paleogeographic evolution of the central Rhenodanubian Flysch Zone (RFZ; Salzburg section), Eastern Alps. Furthermore, the Walserberg Zone (early Late Cretaceous) displays no difference to the RFZ constraining a common paleogeographic origin of both zones. Abundant monocrystalline quartz, remnants of sillimanite-bearing gneisses, and chemically unzoned minerals like garnet indicate a high-grade metamorphic terrain as the principal source for the flysch zone. However, a major proportion of carbonate clasts and carbonate cement are common in all, Early Cretaceous to Eocene, formations. There is only a subordinate variation in composition through time suggesting a rather stable hinterland over the period of deposition. Together, the detrital mode is representative for collisional orogenic belts. Mafic/intermediate volcanic clasts are more abundant in the Lower Cretaceous Tristel Formation, whereas some acidic volcanic clasts occur within younger formations. Decimetre-thick altered tuff layers of primary mafic composition are common in early Cretaceous, late Campanian/Maastrichtian, and Paleogene formations. The alternation of sandstone-rich formations with sequences dominated by pelagic sediments, mainly marls, suggests that sandstone-rich formations may be interpreted as low-stand clastic wedges. The area of deposition was largely above the carbonate compensation depth.
$^{40}Ar/^{39}Ar$ ages (single grains) of detrital white mica from together four sandstones samples (together ca. 80 grains) of the Walserberg, Reiselsberg and Altlengbach Formations indicate predominant (> 70 percent) Variscan sources with ages between 330 and 299 Ma. Subordinate clusters include Cadomian (670 - 547 Ma), early Variscan (c. 360 Ma), late Permian to Triassic (240 - 224 Ma), Jurassic (192 - 154 Ma), early Cretaceous (c. 145 - 135 Ma) and late Cretaceous ages (c. 110 Ma).
The ca. 2500 meters thick section of flysch sediments was deposited within a period of ca. 80 million years. This indicates a rather long-term stability of the depositional realm which is not usual in accretionary wedges and convergent plate margins. A regular change between clastic wedges which are dominated by sandstone/graywacke and marl section appears to represent an important feature of the RFZ. The change may indicate changes in clastic input or eustatic sea level changes. Low-stand sea level may result in low-stand clastic wedges at the continental toe. At least for the Cretaceous portion of the section, the regular change appears to reflect third-order sea level changes.
The new data from the Rhenodanubian hinterland constrain the presence of a relatively stable, metamorphic/magmatic hinterland which persisted from Lower Cretaceous until Eocene. The main modulation is the variation in volcanic clasts which are more dominant in the Lower Cretaceous Tristel Formation. The composition of the hinterland can be reconstructed from $^{40}Ar/^{39}Ar$ mica

ages. These are interpreted to represent cooling in the source region within mainly a Variscan high-grade metamorphic, gneissic block. However, the few Jurassic to early Cretaceous ages suggest the presence of a possible Jurassic/early Cretaceous accretionary wedge, and the early late Cretaceous ages argue for an important tectonothermal event in the source region. These new data suggest that the Rhenodanubian Flysch Zone includes fans which represent the filling of synorogenic foredeep. The ages constrain, furthermore, that erosion of an orogenic continental wedge played a significant role.
Finally, the variable single grain $^{40}Ar/^{39}Ar$ ages within one samples indicate that multigrain concentrates may be meaningless because of possible mixtures of micas with different ages.

A plate tectonic model of the Alps constructed from Atlantic data

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The rotations of the plates involved in the evolution of the Alps can be determined to a large extent from the magnetic anomalies of the Atlantic Ocean. Most of the time the Mediterranean plates follow the Atlantic plates Africa, Iberia, and W.Europe. Only a few extra rotations are needed, and these are confined by available space and geological arguments. Complications arise during the eoalpine and neoalpine collisions when the collision zone was strongly deformed and extrusions occurred. For control of the model, we introduce palaeomagnetic declination arrows: All Permian, Mesozoic, and Cenozoic primary declinations of the Mediterranean plates must be orientated in N-S direction in the model. A series of palaeogeographical maps will demonstrate the correct orientations of the declinations and illustrate the evolution of the Alps from the Triassic Pangea situation to the final orogen.
The plates involved in the orogen are W.Europe, Briançonnais on the northern side, Adria and its marginal plates Austroalpine-W.Carpathia, Pelso, Ivrea in the south, and Tisza. Special features of the model are: (1) Adria is linked to Africa except for a small extra rotation of about 9°. (2) The Meliata units are parts of the Tethys obducted in the Upper Jurassic from the E onto the margins of Pelso and Austroalpine-W.Carpathian plate. The continuation of the obducted units are found in the Dinarides and Hellenides. (3) The eoalpine (pre-Gosau) collision take place between the marginal plates of Adria and Tisza far off the W.European margin. Palaeomagnetic data indicate that the Austroalpine-W.Carparthian plate was strongly rotated by this event. (4) The S.Penninic Ocean was maximally 400-500 km wide. (5) The neoalpine collision was a two stage orogeny: First, the continental margin on the European side was overriden in Eocene and Oligocene times. Then, in Miocene time, further convergence of Africa and W.Europe induced extrusion to the W and E.

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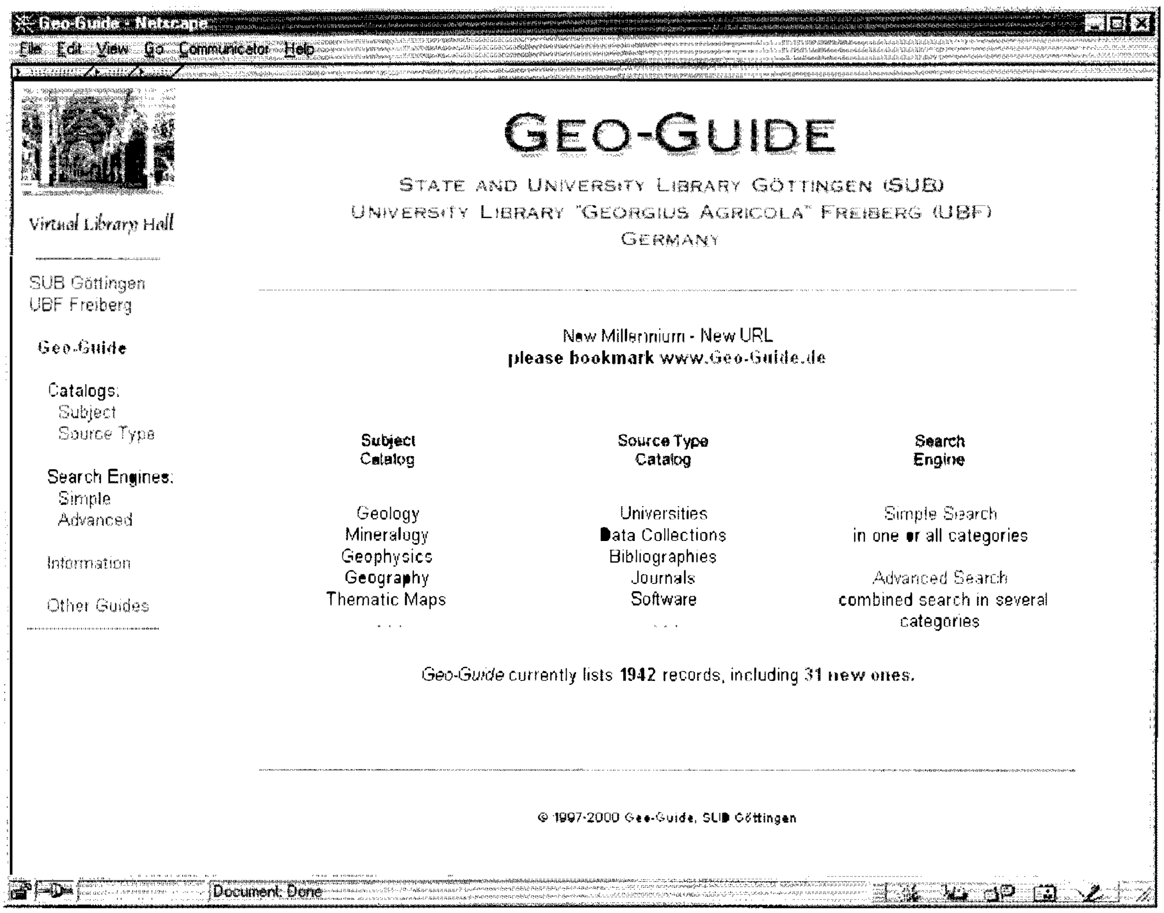

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