Ma (Dudek et al., 2000). The ages ~ 340 Ma were reported from durbachites in Austria as well (Kloetzli and Parrish, 1996). Rb-Sr study (Lorenc, 1998) didn't allow unequivocal geochronological interpretation, indicating an important role of magma mixing in the formation of these granitoids. The very complex U-Pb and Rb-Sr systematics (Scharbert and Veselá, 1990) are typical of durbachites from the eastern Moldanubicum too.

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Palaeomagnetism and its Applications to Tectonics – a Brief Outlook

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A primary objective of palaeomagnetic studies was to obtain a record of past configurations of the geomagnetic field. Extensive studies in early 50s on natural remanent magnetisation (NRM) recorded in the Icelandic lavas led to one of the most astonishing discovery in geophysics that geomagnetic field inverted its polarity in geologic time-scale. This facilitated an understanding of a nature of observed magnetic anomalies of the oceanic floor and triggered a sea-floor spreading concept, as well as a new discipline of magnetostrtigraphy. Parallel outcome of palaeomagnetic research was a concept of a palaeomagnetic pole, that, proving mobility of the continents in the geological past, made a basis for a plate tectonic theory.

These two most important contributions of palaeomagnetism to the Earth sciences do not exhaust variety of geologic applications. Tectonics can particularly benefits from palaeomagnetic outcomes. Using either palaeomagnetic direction-space or paleopole-space approaches, one can analyse vertical-axis and latitudinal motions of continents and/or tectonostratigraphic terranes. Deciphering relative movements of colliding blocks makes it possible to reconstruct a sense of shearing and a magnitude of associated rotations. Structural and palaeomagnetic data, if analysed collaboratively, enable determination of an Eulerian pole of rotation, contributing therefore to a quantification of relative block movements. Furthermore, palaeomagnetism can set up a time constraints on folding event(s), while anisotropy of magnetic susceptibility enables reconstruction of a palaeo-stress pattern.

Certainly, a fundamental for these applications is a quality of palaeomagnetic data, that depend on type of rock and its geological history. This does not mean, however, that only primary magnetisation is of the main concern in palaeomagnetic analysis. Secondary components of NRM, acquired due to metamorphic processes and often considered unwanted palaeomagnetic signature, may sometimes help in unravelling of a tectonic evolution. Equally important in a reliable interpretation of a palaeomagnetic record are tectonic data, particularly these related to a structural coherence of rocks in question and a paleohorizontal of plutonic rocks.

Strain Distribution and Fabric Development Modelled in Active and Ancient Transpressive Zones

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Transpressional models in general assume that a weak and deformable zone bounded by the rigid walls of adjacent lithosphere is progressively shortened in the course of convergence. In order to answer a question whether the measured internal (microscopic) parameters of ancient transpressional zones (e.g. orientation of lineation and foliation, K and D values) may be used to estimate the initial external (macroscopic) parameters (ratio of convergence velocity/initial width of zone = Rvd, rigid floor depth of transpressional zone = RFD and an angle of convergence = α) we developed the strain map, where isolines

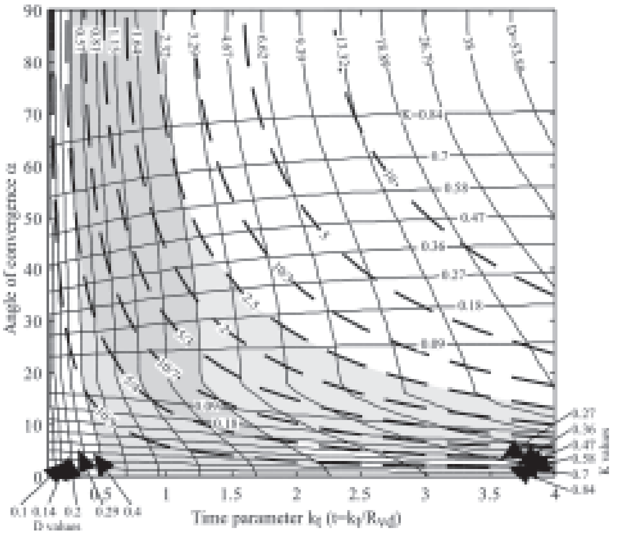

Fig. 1. Superposition of strain intensity (*D*), strain symmetry (*K*) and sample elevation, for various values of *RFD* and initial sample depth z_0, plotted in terms of angle of convergence (α) and time parameter (k_t.) The values of *D* show a strong dependence on R_{vd} and time (but not much on α for α=20° to 90°, for α<20° the dependence of *D* on R_{vd} increases. The *K* is strongly dependent on *a* but not much on R_{vd} and time.

of strain intensity D, isolines of strain symmetry K and vertical elevation of rock samples are superposed on a diagram of convergence angle against time. This map is used to depict the main features of homogeneous transpression and can be used to evaluate natural observations.

Our work shows that we are unable to correlate succinctly the external and internal parameters of homogeneous transpression. The inconsistency between modelled finite strains and parameters (internal vs. external parameters) of transpressive zones, apart from plate rotation, are well-explained by the three concepts of strain partitioning. Discrete partitioning results in general decrease of finite strain accumulations and in increase of pure shear component in deformed zone. Ductile partitioning splits the deformed domain into a pure shear zone (PSZ) and a wrench-dominated zone (WDZ) and is responsible for decrease the strain accumulation in the PSZ and increase in the WDZ. Viscosity partitioning is marked by different strain rates in domains of different viscosity leading to different strain accumulations. Therefore, the strain partitioning of any type may explain why generally small finite strains are measured in nature and also why many orogenic belts are considered to be the result of frontal convergence.

As an additional result of our modelling we have obtained information about the switch of lineation. The above analysis of the lineation produced by the classic transpression model shows that the switch of lineation during progressive shortening of the zone is theoretically possible. However, the corresponding strain intensities are very high and the degree of oblateness does not permit meaningful measurement of the change in the linear fabric. An interesting fact is that oblate fabrics are measured only exceptionally, more often we have to deal with lineation (vertical or horizontal and close to plain strain symmetries). In contrast to the model, the horizontal and vertical lineation in nature is often observed simultaneously in transpressional zones. This fact underlines the ideas of partitioning of the strain in transpressional zones or perhaps to later superposition of simple shear zones on already existing fabrics.

Li Isotopic Composition of Foraminiferal Tests and their Host Sediments

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Isotopic composition of Li is potentially a powerful tracer of geochemical processes such as high-temperature magmatic differentiation, alteration of oceanic crust or fluid-rock interactions. The Li mass balance in the ocean is only poorly understood: the two major sources of oceanic Li (expressed as d6Li values calculated relative to 6Li/7LiL-SVEC = 0.0832) are river input from the continents (-6 to -32.2‰) and high-temperature alteration of oceanic basalts (-9‰). Given the average sea water Li isotopic composition of -32‰, additional inputs or sinks that fractionate Li isotopes are required to maintain a steady state of Li isotopes in the oceans. An outstanding issue is whether the Li composition of biogenic carbonate, such as tests of planktonic foraminifera, can be used as a proxy for the composition of the present and past ocean water.

We have successfully analysed 5–10 mg samples of planktonic foraminiferal tests (Orbulina universa, Pulleniatina obliquiloculata, Globigerinoides sacculifer, Globoguadria venezuelena) collected from the sea water-sediment interface in the North Sea in Europe and from the ODP 926A hole in western equatorial Atlantic. The ODP samples were taken from 32.5 to 304.5 mbsf corresponding to an age of 1.8 to 15.8 Ma. To avoid contamination by the host sediment, the samples were crushed to break open the chambers and ultrasonically and chemically cleaned prior to dissolution and analysis by ICPMS.

Li isotopic composition of the studied tests and their host sediments from ODP 926A varies from ca −30 to −15 ‰ and from 0 to +5 ‰, respectively. The data suggest that over an period of ca 14 Ma there was no significant isotopic equilibration of Li isotopes between the foraminifera tests and their host sediments. Provided that the Li composition of planktonic foraminifera tests reflects the composition of Li in the sea water, the isotopic variation in the foraminifera that are preserved in the marine sediments can provide us with invaluable information about the Li isotopic composition of the past oceans. Comparison of the Li isotopic composition of recent foraminifera tests from the North Sea with previously published results from the equatorial Atlantic and Pacific oceans was used to evaluate a potential role of temperature on the Li isotopic fractionation between the sea water and the foraminifera carbonate.