

geographical isolation. Whereas the general development of this amazing ecosystem is well established, several fundamental questions concerning palaeogeography, depositional environments and stratigraphical correlation remain a matter of impetuous debate. Marine intercontinental pathways between the western Caribbean and the Parana Basin through Amazonia are proposed and discussed. Likewise, the frequency, timing and effects or even the existence of marine incursions are still disputed. In the course of an Austrian-Brazilian project dealing with the evolutionary pattern of a widely occurring and biostratigraphically important ostracod lineage (Cyprideis), several outcrops around Eirunepe (Jurua region, Amazonas state, Brazil) were sedimentologically investigated to obtain basic data of the sedimentary environment. The outcrops are located along the cut banks of the Jurua (Pau D'Alho, Morada Nova, Aquidaba, Remanso) and the Tarauaca River (Torre da Lua, Barro Branco), a few kilometres east respectively south of Eirunepe. The total thickness of the Solimoes Formation, which consists of deposits of „Lake Pebas“, is estimated to range in the order of several hundreds of metres in that area. However, due to restricted outcrop conditions in Amazonia surface investigations are limited to the uppermost few decametres of Neogene sediments and lateral facies architecture studies are restricted as well. Detailed facies analyses are still missing in this region, which is supposed to be located at the south-eastern margin of „Lake Pebas“.

The sedimentary record of observed outcrops comprises channel-fills of different orders and origin and sediments of flood basin settings. Fine-grained abandoned channel-fills are documented as well as sandy-silty crevasse-channel and point bar deposits. Within the overbank environment successions of greenish to pale red coloured, intensively mottled paleosols with root casts occur frequently, occasionally also calcrete horizons can be found. Sandy or pelitic layers, rich in carbonaceous matter (including tree trunks) and vertebrate remains refer to swampy environments within the floodplain. Massive to poorly laminated pelites with plentiful mollusc faunas indicate the formation of shallow floodplain lakes or are associated with abandoned channel-fills. Alternations of rhythmically stratified laminated clays/silts and ripple-bedded sands partly represent fine-grained point bar sediments and crevasse-splay deposits.

In conclusion, the investigated sections document various subenvironments of a suspension-load dominated fluvial system. Based on these results, the development of an extensive, deep and stable lake can be excluded as well as any marine influx.

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### **Directional correlation of petrophysical anisotropy patterns with rock deformation during alpine tectonic evolution (Eastern Alps, Austria)**

GRUBER, K. & SCHOLGER, R.

Department of Applied Geological Sciences and Geophysics, Chair of Geophysics, Univ. of Leoben, Austria

Recent geodynamic investigations in the Eastern Alps and surrounding areas gave rise for large neotectonic movements, which are dated younger than 5 Ma. The main objective of the study involves petrophysical analyses of textures in Alpine rocks in order to observe changes of the regional deformation pattern. Measurements of anisotropy of magnetic susceptibility (AMS) were carried out on samples from 32 sites collected in the Eastern Alps. Samples spanning an age range from U. Permian to Mesozoic were taken along a North-South transect from Scheibbs in the North to Kapfenberg in the South, comprising Helvetic and Penninic Flysh units, most of the Northern Calcareous Alps (NCA) nappes, as well as the Greywacke zone. Standard paleomagnetic drill cores were taken. All measurements were performed in the Petrophysics and Paleomagnetic laboratories of the University of Leoben using AGICO MFK1-Kappabridge susceptibility system and a 2-G cryogenic magnetometer. Statistical evaluation of the AMS data was performed using the software package AGICO ANISOFT 4.2.

AMS analysis was carried out on two to six sites per thrust sheet or nappe for a structural investigation of the relationship between magnetic fabrics and tectonic strain in the investigated area. The study focuses on the directional correlation of the AMS axes patterns. The paleostress results of PERESSON & DECKER (1997) give evidence of six tectonic events during alpine evolution which we use as reference frame for our strain correlation.

Particularly within the NCA, AMS is inapplicable on most rocks for strain analysis as they are diamagnetic and/or isotropic. Even so, some sites are anisotropic and yield oblate or prolate magnetic fabrics. The AMS data of the research area show three main characteristics of magnetic fabrics related to strain. In the northernmost and southernmost part, the AMS principal axes document a weak tectonic deformation. Within the Flysh units the dominantly oblate fabrics with a quite low bulk susceptibility yield in-situ orientations of the maximum principal axes ( $k_1$ ) well aligned in a subhorizontal NE-SW direction with a separate cluster in the South. Moreover, the minimum principal axes ( $k_2$ ) after bedding correction are slightly scattered around a NW-SE direction, which differs from primary sedimentary fabrics. In a previous paleomagnetic study of the same samples (PUEYO et al. 2002) both, primary and secondary remanent magnetization vectors were observed. No significant rotations were detected in the Flysh units.

In the Greywacke zone oblate magnetic fabrics are dominant. The in-situ orientation of  $k_1$  yields two trends: (1)  $k_1$  scattered around a N-S trending girdle normal to the bedding and  $k_3$  clustered SW and (2)  $k_1$  is subhorizontal and aligned in a E-W direction with  $k_3$  clustered normal

to the bedding of the two sampled limbs. The bulk susceptibility reaches its highest values in the samples observed. A general increase of the degree of rotation (PUEYO et al. 2002) towards the south can be observed.

Within the Northern Calcareous Alps (NCA), some sites reveal weakly deformed magnetic fabrics with very low susceptibility values and the directions of  $k_1$  vary locally. Oblate as well as prolate magnetic fabrics are present. Three main trends in the in-situ orientation of  $k_1$  can be distinguished: (1) North or South direction, (2) NE or SW direction and (3) NW or SE direction. In most cases,  $k_3$  scatter around the poles of the bedding planes, but in few sites  $k_3$  is aligned near the bedding plane which indicates a stronger tectonic overprint on the fabrics. Tirolic and Juvavic units display clockwise rotation ranging between 30 and more than 100° (PUEYO et al. 2002), which was assigned to block rotation.

The new AMS data will be presented and correlated to the young tectonic history of the Eastern Alps. A quantitative correlation of AMS and strain data is beyond the scope of this study.

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### **Facies and stratigraphy of the early and middle Burdigalian North Alpine Foreland Basin (Hall Fm., Eggenburgian)**

GRUNERT, P.<sup>1</sup>, CORIC, S.<sup>2</sup>, SOLIMAN, A.<sup>1</sup>, HARZHAUSER, M.<sup>3</sup>, PILLER, W.E.<sup>1</sup>, HINSCH, R.<sup>4</sup> & SPERL, H.<sup>4</sup>

<sup>1</sup> Institute for Earth Sciences, University of Graz, Heinrichstraße 26, 8010 Graz, Austria;

<sup>2</sup> Geological Survey of Austria, Neulinggasse 38, 1030 Vienna, Austria;

<sup>3</sup> Natural History Museum Vienna, Geological-Paleontological Department, Burgring 7, 1014 Vienna, Austria;

<sup>4</sup> Rohöl-Aufsuchungs AG, Schwarzenbergplatz 16, 1015 Vienna, Austria

The North Alpine Foreland Basin (NAFB) comprises one of the main Oligocene-Early Miocene sedimentation areas of the vanished Central Paratethys Sea and contains important source and reservoir rocks. Currently, the Rohöl-Aufsuchungs AG (RAG) is facing new ventures of oil and gas exploration in the heavily tectonised southern NAFB comprising the Foreland, the Imbricated and the Overthrust Molasse. To assure efficient exploration, a project co-funded by RAG and the Commission for the Paleontological and Stratigraphical Research of Austria (Austrian Academy of Science) intends to provide new insights in the paleoceanographic setting of the NAFB. New data for an integrated analysis (micropaleontology:

foraminifers, calcareous nannoplankton, dinoflagellates; geochemistry: TOC, S, carbonate content, stable isotopes; geophysical logs; seismic images) come from three wells along a N-S-transect spanning late Oligocene - Early Miocene.

In a first step a depositional model for the Hall Fm. (Eggenburgian, early-middle Burdigalian) has been developed. For the northernmost drill-site results show a depositional environment mainly controlled by channel deposition during early Burdigalian. Later the setting changes towards an upper bathyal environment temporary influenced by a prograding delta from the southern coastline. In the South, a calm deep-water setting with elevated bio-productivity persisted throughout most of the Eggenburgian. Only for the uppermost part of the succession a slight shallowing is documented.

In a next step, the successful integrative approach will be applied to the Upper Puchkirchen Formation (Egerian, Aquitanian).

### **Oceanographic trigger mechanisms for the formation of an Early Miocene (Aquitanian) Konservat-Lagerstätte in the Central Paratethys Sea**

GRUNERT, P.<sup>1</sup>, HARZHAUSER, M.<sup>2</sup>, RÖGL, F.<sup>2</sup>, SACHSENHOFER, R.F.<sup>3</sup>, GRATZER, R.<sup>3</sup>, SOLIMAN, A.<sup>1</sup> & PILLER, W.E.<sup>1</sup>

<sup>1</sup> Institute for Earth Sciences, University of Graz, Heinrichstraße 26, 8010 Graz, Austria;

<sup>2</sup> Natural History Museum Vienna, Geological-Paleontological Department, Burgring 7, 1014 Vienna, Austria;

<sup>3</sup> Department of Applied Geosciences and Geophysics, Montanuniversität Leoben, Peter-Tunner Straße 5, 8700 Leoben, Austria

The section Pucking in the North Alpine Foreland Basin of Upper Austria represents an exceptional Early Aquitanian *Konservat-Lagerstätte* with well-preserved vertebrate and invertebrate fossil assemblages. The finely laminated sediments of the Ebelsberg Formation were deposited along the northern shelf of the Central Paratethys Sea. Micropaleontological (foraminifers, dinoflagellates) and geochemical (organic carbon, sulfur, carbonate content, biomarker, stable isotopes) proxies indicate intense upwelling activity. In addition, episodically increased coastal runoff provided large amounts of nutrients stimulating primary productivity. All evidence suggests deposition within dysoxic-anoxic bottom waters of an oxygen minimum zone along the outer shelf and upper slope. Fossil assemblages show specific planktic and nektic associations in distinct intervals of the section. Various mechanisms are considered to explain their origin: (1) Blooms of pteropods and calcareous nannoplankton reflect short-term peaks in primary productivity. Increased coastal runoff and/or intensified upwelling activity are considered as trigger mechanisms for providing the nutrients. (2) Allochthonous associations of the cephalopod *Aturia* with brown algae suggest a two-fold transport mechanism: shells of the offshore-living cephalopods were transported post