ments from the top of the Palaeozoic, Jurassic, Paleogene, and partly also the Neogene of the Foredeep.

Different diagenetic pattern is observed in the overthrust. The Magura and Silesian units are significantly more thermally mature than the external Zdanice and Subsilesian units. The marginal foredeep is the least mature. The extent of erosion decreases from the main fold and thrust belt towards the foredeep. Occurrence of the thermal maturity discontinuously increasing upward suggests a deeper burial of the rear units prior to their emplacement on the frontal units and the foreland.

The results of the modeling show a close relationship of the hydrocarbon generation and migration in the region with the final phases of the Alpine orogeny. The platform sediments and the external overthrust units include intervals of the most important source rocks while the thick Carpathian orogenic wedge acts as a seal and load burying the source rocks to thermal conditions favourable to organic maturation and hydrocarbon generation.

A metamorphic core complex in a foreland: news from the Montagne Noire (S-France)

W. FRANKE, M. DOUBLIER, P. KÖNIGSHOF & U. WIEDERER

Institute for Geosciences, University of Giessen, Germany, wolfgang.franke@geolo.uni-giessen.de

The mantled gneiss dome of the Montagne Noire is situated in the southern foreland of the Variscan orogen. It is cored by HT/LP gneisses and anatectic granites ("Zone Axiale"), encased by ENE-trending dextral shear zones, and flanked by low- to very low-grade Palaeozoic sediments. These sediments record tectonic stacking of recumbent fold nappes with grossly S-directed tectonic transport (Arthaud 1970). It is generally agreed that the uplift of the Zone Axiale postdates nappe thrusting, and has reduced the metamorphic and tectonic profile on the flanks of the dome. The internal structure of the dome is characterized by ENE-trending folds which deform a pre-existing foliation and metamorphic zonation, and by extensional fabrics with tectonic transport towards the western and eastern terminations of the structure. Isotopic data reveal a polyphase exhumation history spanning c. 327–297 Ma (Matte et al. 1998, Maluski et al. 1991). The geodynamic setting of the gneiss dome is still controversial: uplift of the gneisses has been alternatively explained by diapirism (Faure and Cottereau 1988), extensional collapse of previously thickened crust (Brun and van den Driesche 1994; Echtler and Malavieille 1990), or compressive folding (Arthaud 1970; Matte et al. 1998). We present new tectonic and metamorphic data, which constrain the exhumation mechanism.

In the axial zone, our own observations combined with published data (Matte et al. 1998) suggest that the ENE-trending folds and stretching lineation are cogenetic. NNW/SSE-shortening and ENE-ward extension combine to form a regime of prolate strain, superimposed upon an earlier stage of deformation with planar fabrics (formed during nappe thrusting). Augengneisses with purely prolate strain probably represent portions of rock, which were left undeformed by the first phase, and therefore only record the strain of the second phase.

As revealed by a regional survey of illite crystallinity and conodont alteration index (CAI), metamorphism occurred during the post-nappe thermal regime imposed by the rise of the anatectic gneisses. Close to the Zone Axiale, where peak temperatures were higher, devonian limestones have been deformed into tight, ENE-trending folds. Detailed mapping of key areas has revealed that these folds do not represent the hinges of fold nappes, but, instead, the flanks of metric to kilometric sheath folds. Like in the Zone Axiale, ductile shearing was directed top to the ENE. It appears, that the lower part of the Palaeozoic mantle, at an earlier stage, was part of the uplifted dome (see also Byung-Joo Lee et al. 1988).

As a working hypothesis, we propose that the Zone Axiale was formed in a pull-apart confined by dextral shear zones, which was extended in ENE, and, at the same time, shortened in NNW/SSE. Uplift of the Zone Axiale was probably aided by buoyancy of the felsic core. During progressive uplift and cooling, the rising core contracted into its present contours.

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Origin of intraplate deformation in the Atlas system of Algeria: from Jurassic rifting to Cenozoic-Quaternary inversions

D. FRIZON DE LAMOTTE & R. BRACENE

Université de Cergy-Pontoise, CNRS ESA 7072, Av du Parc, 95 031 Cergy Cedex, France

Based on the analysis of data from petroleum exploration and a compilation of available paleostress data, this paper aims to discuss the origin of deformation observed in the western and central Saharan Atlas, which is an intraplate foreland fold-thrust belt fringing the Sahara platform. From a general point of view, this intraplate area has recorded the break up of Pangea (upper Triassic), the opening of the Maghrebian Tethys (since the Dogger) and then its closure (Tertiary to present).

However, we show that the Atlas build up occurred during two phases of Late Eocene and Pleistocene-Lower Quaternary ages respectively. These phases are distinct and do not represent end points of a progressive deformation. The development of the Tell accretionary prism, bounding the Mediterranean sea, occurred during Oligocene and Miocene times (i.e., between the two steps of the Atlas building) and is related to subduction rollback of the Maghrebian Tethys. The accretion of this prism to Africa at 18–15 Ma did not generate far stress field in Africa.

So the two periods of strong coupling between Europe and Africa, which correspond to rapid uplifts of the Atlas system, are not collision-related. They can be correlated to the beginning and the end of the development of the western Mediterranean sea (i.e., to the initiation and the cessation of the subduction processes active in the western Mediterranean region).

The use of features of foreland basins to constrain the development of the adjacent orogenic edifices

Z. GARFUNKEL[1] & R.O. GREILING[2]

[1]*Institute of Earth Sciences, Hebrew University, Jerusalem, Israel*
[2]*Geological-Paleontological Institute, Ruprect-Karls University, Heidelberg, Germany*

The history of foreland basins can provide important insights into the development of the adjacent orogens, e.g., the progress of emplacement of orogenic wedges over the foreland and changes in the taper angle of the wedge. This can supplement the often fragmentary record provided by the complex and incompletely preserved internal parts of orogens. This also applies to depressions (e.g., flysch basins) that form in front of major nappes during stacking of orogenic edifices. Such information should, whenever possible, be incorporated in the interpretation of mountain belts.

The simplest situation is that of flexural basins in front of wedge-shaped loads that advance over an otherwise undeformed foreland. Many studies have shown that in this case at any given moment the deepest part of the basin is located next to the edge of the load, while the basin depth depends on the shape of the load and on the flexural strength of the foreland. This allows, using the migration of the deepest part of the basin and the history of basin subsidence, to gain a better understanding of the relative roles of displacement of orogenic loads and changes in their cross sections.

The situation becomes complicated when the foreland and/or the basin fill are deformed and thrust/fold complexes develop in front of the main orogenic wedge, which thickens the rock pile overlying the foreland. This is equivalent to an extra load, in addition to the main tectonic wedge, but the tectonic thickening actually fills at least a part of the frontal flexural depression. Modelling