Tectonosedimentary reactions induced by collisions of the African Plate with Iberian Plate and Corsican-Sardinian Microplate in the Magrebides forelands situated to the North of the South Atlasic Fault Throw in Tunisia and Morocco

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During Paleocene and Eocene some platforms of the northern border of the African Plate in Morocco and Tunisia have been favourable to the accumulation of phosphates bearing sedimentary series. Development, extension in space and stopping of the genesis of phosphates have been controlled by the interactions between structural evolution of the basins due to collision of Iberian Plate against African Plate, eustatic fluctuation of sea level and climatic variations. In present paper we compare the results of these interactions between Tunisia and Morocco. This comparison shows that synchronous processes due to global phenomena appear before Lutetian in the two countries. Particularly synchronous genesis of phosphates is favoured by: 1) warm climate inducing high biologic productivity, 2) high mean sea level which has favoured circulation of marine waters and the rising of upwellings under large continental platforms, 3) structural evolution of the two platforms part of wrench faults corridories activated by rejuvenation of crustal discontinuities during collision of continents. Such structural framework permits the development of subsident areas (en echelon synclines, rhomb graben) separated by rises. Such a tectonic context found around Kasserine Achipelago in central Tunisia and in the Essaouira basin of Morocco favours appearance of area where superficial currents are inducing concentration of pellets. During Lutetian general cooling of sea surface temperature and eustatic fall of the mean sea level has induced reduction of the genesis of phosphates while collision between Iberian and African Plates has induced separation between Atlantic and eastern Thetys. So the synchronous evolution of phosphated bearing sedimentary series disappeared progressively.

Transmission of stress through the foreland of the Appalachian–Ouachita Orogen during the Alleghanian Orogeny

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The collision between Pangaea and Laurasia is responsible for the Appalachian–Ouachita Belt, a mountain belt having a variety of styles for the transmission of stress (i.e., strain) into the foreland. The Appalachian–Ouachita Orogen is characterized by a dual coupled-uncoupled model for stress transmission. This conclusion is based on evidence that the foreland transmission of stress is a two tier process. Cover detachment was responsible for stress transmission through the more dramatic foreland structures whereas basement possibly carried stress into the interior of continents by as much as 2000 km (i.e., van der Pluijm et al, 1997). Calcite strain advances beyond the reach of obvious detachment and well into the interior of continental North America. The preferred explanation is that calcite strain reflects stress coupled to basement deformation during the Alleghanian orogeny. The style of stress transmission in the uncoupled cover is greatly dependent on the pre-collision tectonosedimentary evolution of the foreland that can be divided into three major provinces including the Central Appalachian Mountains, the Southern Appalachian Mountains, and the Ouachita Mountains. Transmission of stress to the uncoupled foreland depends on the strength of the sedimentary cover which includes three major parametres: friction of detachment surfaces, lithology, and section thickness. It is friction that is most important in dictating the distance of stress (i.e., strain) transmission. The Central Appalachian Mountains are characterized by a low friction detachment and a thicker sedimentary cover. Here stress (i.e., strain) is transmitted into the foreland by layer parallel shortening across a belt up over 400 km wide. The Southern Appalachian Mountains are characterized by higher friction detachments and a thinner sedimentary cover. Such a section suppresses stress (i.e., strain) transmission to the foreland and consequently the foreland fold-thrust belt is much narrower here. Foreland deformation in the Ouachita belt is further restricted as a consequence of formation of a very thick foreland clastic wedge during active collision.

Neotectonics of the Eastern Carpathian bend area and its foreland, Romania

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The Eastern Carpathians consist of a nappe pile made up of basement nappes in the western part and Early Cretaceous pelitic marine deposits, late Cretaceous to Paleogene flysch deposits, and Miocene to Quaternary molasse deposits in the central and eastern parts. Imbrication and internal deformation of the nappes took place in several periods of deformation from Late Cretaceous to Quaternary time with general rejuvenation of the structures from the west to the east affecting also distinct intra- to synorogenic deposits in piggy-back basins. Calc-alkaline to alkalibasaltic recent volcanism as well as late-stage intramount extensional basins in the back of the main orogen are additional features of this area. Several lines of evidence point to still ongoing active crustal deformation in the Eastern Carpathian bend area: Folding and tilting of Late Pliocene to Early Pleistocene sedimentary deposits.

Several levels of highly uplifted fluvial terrasses with indication of tilting of some terrasses along the Carpathian orogenic front.

A hydrographic network, whose geometry suggests strong influence of recent tectonic movements. This is particularly evident along the Carpathian orogenic front and its foreland where some deep crustal structures, like the Intramoesian and the Trotus Faults play also an important role. A clear temporal relationship can be observed between an older network of streams in the valleys crossing the Carpathian thrust and fold belt (Buzau, Teleajen, Prahova etc.) and a more recent hydrographic network in the intramount basins (Olt river basin).

A good correlation of the geometry of the actual hydrographic network, the area of recent crustal uplift, and recent shallow earthquakes point to the beginning of an ongoing inversion of the Focsani foreland basin.

The geometry between the intramount basins inside the Carpathians bend area and their relation to the Neogene to recent andesitic and basaltic volcanic centers can be related to still active extensional and transtensional crustal movements.

Post-Middle Pliocene uplift of the Ligurian and Provençal coasts (NW Italy and SE France): New kinematic constraints

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Along the coasts of NW Italy and SW France, Pliocene marine sediments, currently exposed at elevations up to 600 m indicate significant uplift in the Ligurian–Provençal area. After the cessation of the opening of the Ligurian-Provençal basin, the area was in tectonic quiescence. It is only since the late Pliocene that significant amount of uplift has taken place in the region.

Located on the intersection between the Alpine chain and a rifted basin, understanding the kine-