gests a forebulge-type elevation (Mindszenty et al. 1994 and Tari 1994) across the TCR. The forebulge area is characterised by non-deposition, then transgression of a Rudistid buildup complex of latest Aptian-Early Albian. Although the exposures are limited, the facies distribution suggets a N–S to NW–SE trending topography/structural background. This pattern of terrestrial deposits (bauxite formation), lagoonal and reef complex with a similar orientation shifts westwards during the Albian. A different sedimentary pattern and facies orientation, parallel to the main NE-SW structures is valid for the Senonian deposits (Haas 1979, Mindszenty et al in press).

The structural record shows NE–SW and NW–SE oriented fold axes. Dating of these folds is often very hard, since even Eocene, Early Miocene folds exist in the area. Analysis of pre-Albian unconformity structures suggests that the main fold axes trend NNW–SSE to NW–SE, with local deflections towards NE-SW. Both the NNW–SSE oriented folds and the deflected portions are covered by the Late Albian sedimentary complex. This is on its turn folded into NE-SW oriented folds. The Senonian deposits cover all preceding formations relatively flat and are only slightly, locally undulating.

Interpretation of the sedimentary and structural data can give a conscise story of progressing deformation. The original forebulge-like elevation in the eastern part of the mountain is possibly the result of a northeastern load excerted by an ophiolitic nappe (Bagoly-Árgyelán and Császár 1996) emplaced in the latest Jurassic–Early Cretaceous. This original shortening should have prevailed for quite a long time, to provide the NW–SE trending topography for the terrestrial-coastal-near shore deposits in the Aptian-Albian. During this longer shortening period broad NW–SE oriented anticlines with bauxite formation and synclines with shallow marine deposition were formed. Internal nappe stacking may be possible, but no direct proofs exist yet. The main deformation area possibly shifted westwards with the lateral shift of the facies pattern, too. Local NE–SW trending, pre-unconformity folds are interpreted as caught in local shear zones, or formed on lateral ramps. The structural and sedimentary pattern changed drastically during Cenomanian-Turonian, when the major NE–SW trending folds were formed. Rudistid buildups occupied the topographic highs above anticlines or thrust fronts (Tari 1994), parallel to this main structural trend.

3D geological map of Sheet 280 – Fossombrone: visualisation of orogenic structures and the evolving foreland basin system in the northern Marche sector of the Apennines (Italy)

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The visualisation techniques are used to create a 3D model of the area of Sheet 280 – Fossombrone. In this sector, the carbonate multilayer of Umbro-Marche succession and the mainly terrigenous deposits of a complex Neogene foredeep crop out. The structures are related to the pre-, syn- and post-orogenic settings. In this context, the 3D visualisation techniques are usefull and powerfull for understanding the complex geological frame.

The methodology consists of combining the available geological and geophysical data within 3D structural modelling and visualisation tools. The 3D model integrates the Digital Elevation Model for the surface and its geomorphological aspects. Results from analogue modelling experiments, together with satellite imagery, are also integrated in the 3D model, in order to find possible solutions for interpreting complex structural problems. Linkages between the 3D structural and visualisation tools and GIS are also investigated.

In this way it is possible to build and validate 3D geological models of the study area, addressing geological uncertainties at various scales. The models is also users friendly, directed not only to scientists, but also to technicians and people who want to learn about geology without any esoteric knowledge of it.