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# Paleobathymetric evolution of the Venetian-Friuli foreland basin (NE Italy): consequences on flexural modelling and relative rate of tectonic vs. sedimentary processes

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The Veneto-Friuli foreland basin (Late Paleocene-Pleistocene) is the result of the superposition of three overlapping foreland systems, different both in age and direction of tectonic transport; the Dinarides to the East, the Southern Alps to the North and the Apennines to the South-West. These orogenic belts had their main orogenic phases in different times: the Dinarides experienced their main WSW vergent deformation phases since the Late Paleocene to the Middle Eocene; the eastern Southern Alps were mostly deformed during Middle-Late Miocene with south-directed tectonic transport; eventually, the NE-directed Northern Apennines deformation affected the evolution of the Veneto-Friuli area during the Plio-Pleistocene time interval.

Therefore, the Veneto-Friuli foreland system is an interesting geological topic where the sensitivity of current flexural models used for foreland basins with respect to the different used variables can be checked.

The presented research challenges the problem of the role played by micropaleontological paleobathymetric analyses on that models; furthermore, paleobathimetric data are used as a tool for highlighting the sedimentary evolution of the basin, i.e. the sedimentary response to belt uplift and eroded materials accumulation in the new accommodation space created by crustal flexure.

The study of these topics have become possible in the last years thanks to the release by the major Italian oil company (ENI) of data regarding the hydrocarbon wells drilled in the basin over several decades of hydrocarbon research.

In order to fulfil the aims of the research about 500 cuttings from thirteen wells, distributed along some regional seismic-based cross sections, covering over 20000 m of studied successions collectively, were used to perform an integrated study of both benthic and planktonic foraminiferal assemblages. These analyses provided the data base to unravel the initial water depth along the studied sections at the beginning of flexure and the following paleobathymetric evolution of the foreland basin up to Pleistocene time.

The results of this study, in term of paleo-waterdepth range (i.e minimum, average and maximum value) along two of the studied transects, have been incorporated into a 2D flexural model of the basin in response to topographic load exerted by the Dinaric chain (SW-NE transect) and the eastern Southern Alps belt (NNW-SSE transect). Regarding this point, the results highlight that initial water depth can play a very important role in the surface loads driving flexural subsidence in collisional settings and in the studied case it contributes up to 50-60% to the total flexure close to the thrust-front in both the studied sections. With this respect it must be noted that, if initial water depth is taken into account, no additional subsurface loads are necessary to fit data with model along both the studied sections.

Following flexure, baleobathimetric data clearly record the progressive infilling of the new created accommodation space, providing also evidence for the sedimentary response to tectonics through belt erosion and sediment accumulation in the foreland basin.