MAPPING OF THE GESSOSO-SOLFIFERA LAYER AND THE MESSINIAN EROSIONAL SURFACE IN THE NORTHERN AND CENTRAL ADRIATIC SEA

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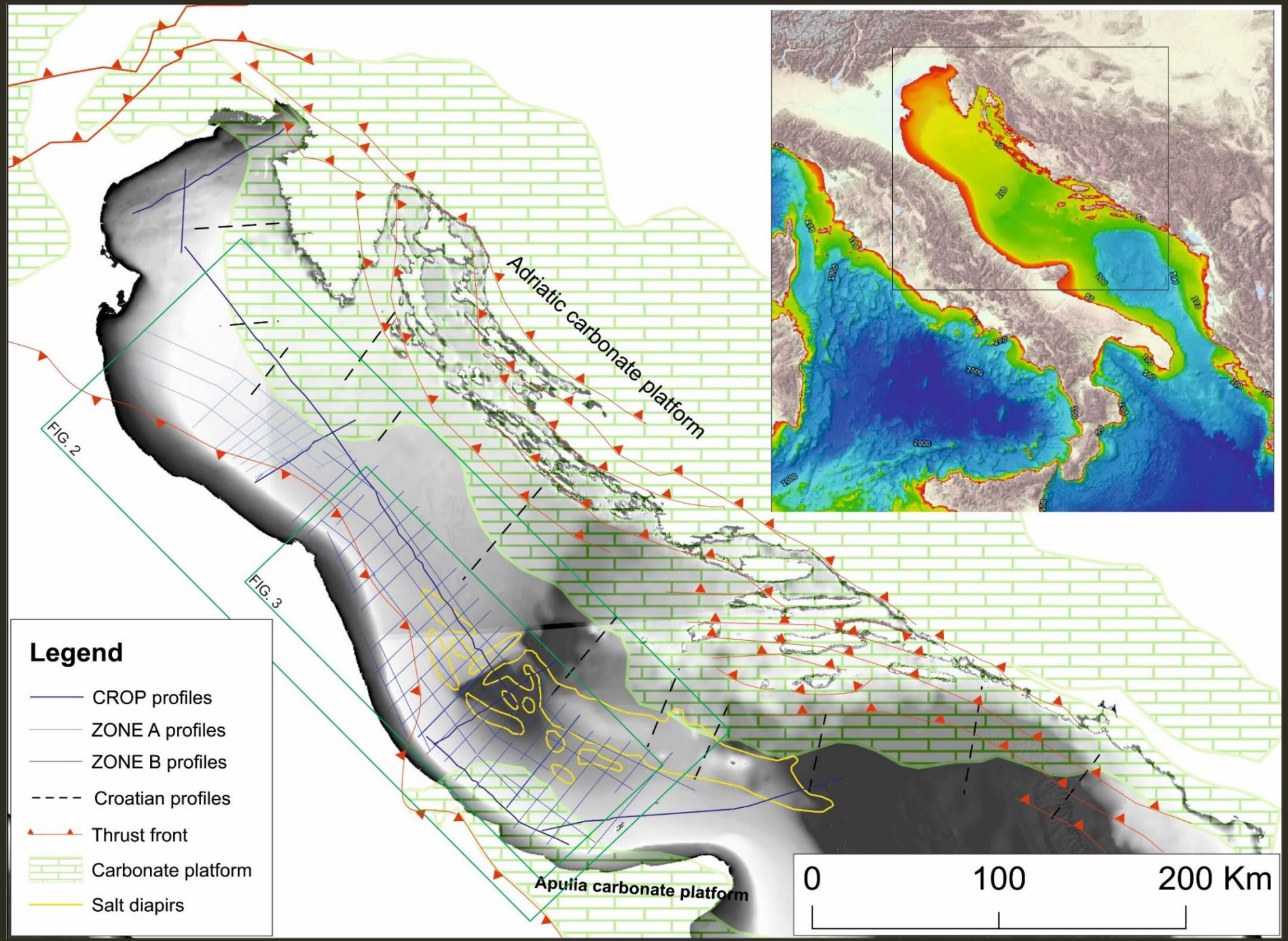
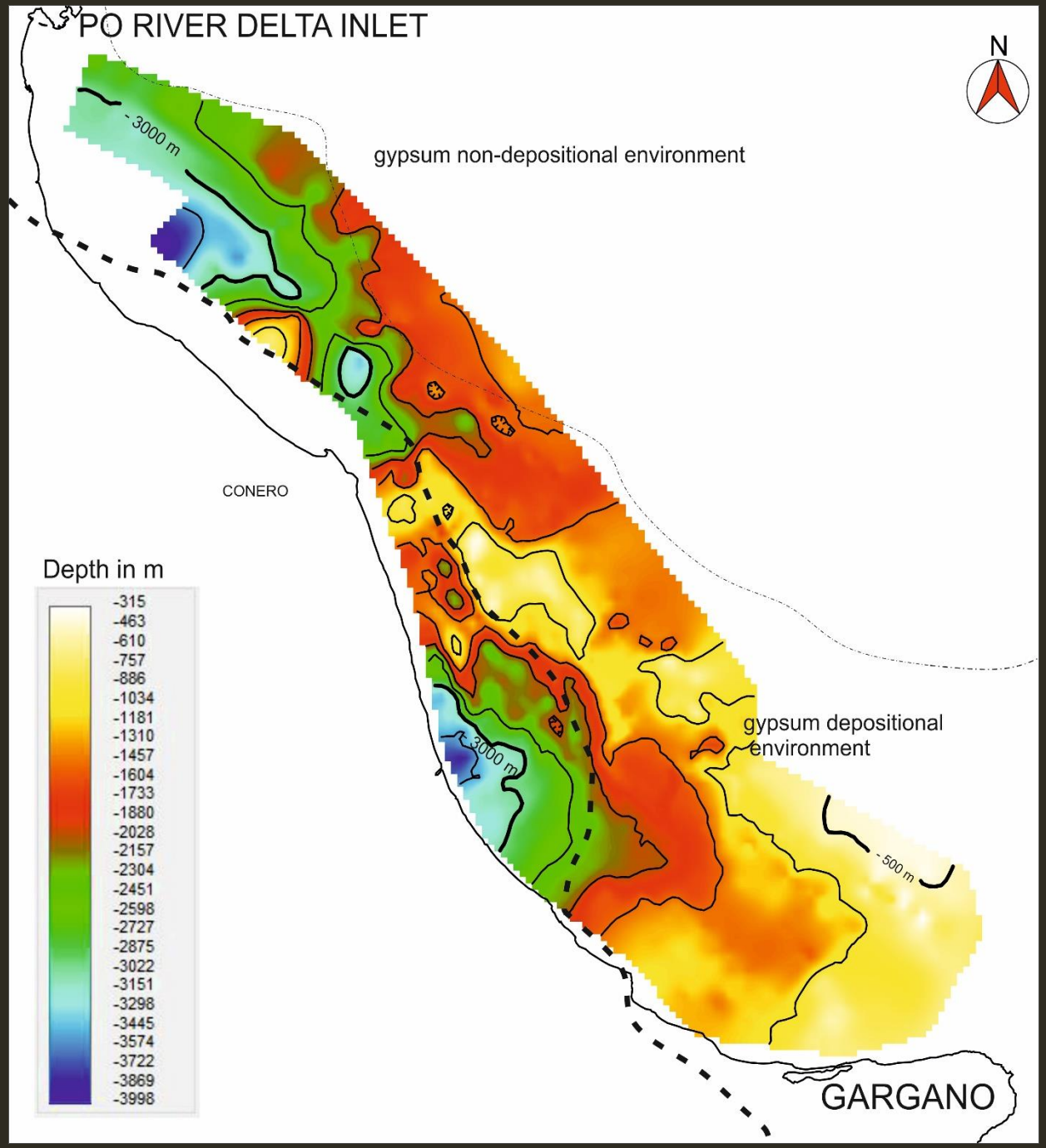


Figure 1: Study area with the position of the interpreted lines used in this work. They have been collected from the ViDEPI dataset SNAP system of OGS. External thrust of Dinaric, Apennines and Southern Alps converged, during different ages, toward the current Adriatic Sea. The salt diapirs (Geletti et al., 2008), originated by the Triassic evaporates, produced the regional structure of the Mid Adriatic Ridge, buried below the Plio-Quaternary sequence.

Figure 2: Depth map of the Top Messinian (TM)

TM in the northernmost portion almost 4000 m below the seafloor, due to the combined loads of the Apennine Chain (front depicted by the dark dashed line) and of the Po river sediments which tilted the Adria foreland. Southward, the Conero structure represents the most north-western part of the Mid-Adriatic Ridge. All this structural high lineament shows a post Messinian tectonic uplift mainly related to the deep diapirs that brought the TM to a depth of 500-1000 m below the sea level. Moving toward South, the TM deepens below the Apennine chain in the Pescara basin and rises in the Gargano promontory.

Messinian surface is at a shallower depth, in correspondence of the MAR, related to a post-Messinian uplift of the deep diapiric structures tectonic configuration, which brought the TM of depth between 500 - 1000 m below sea level.



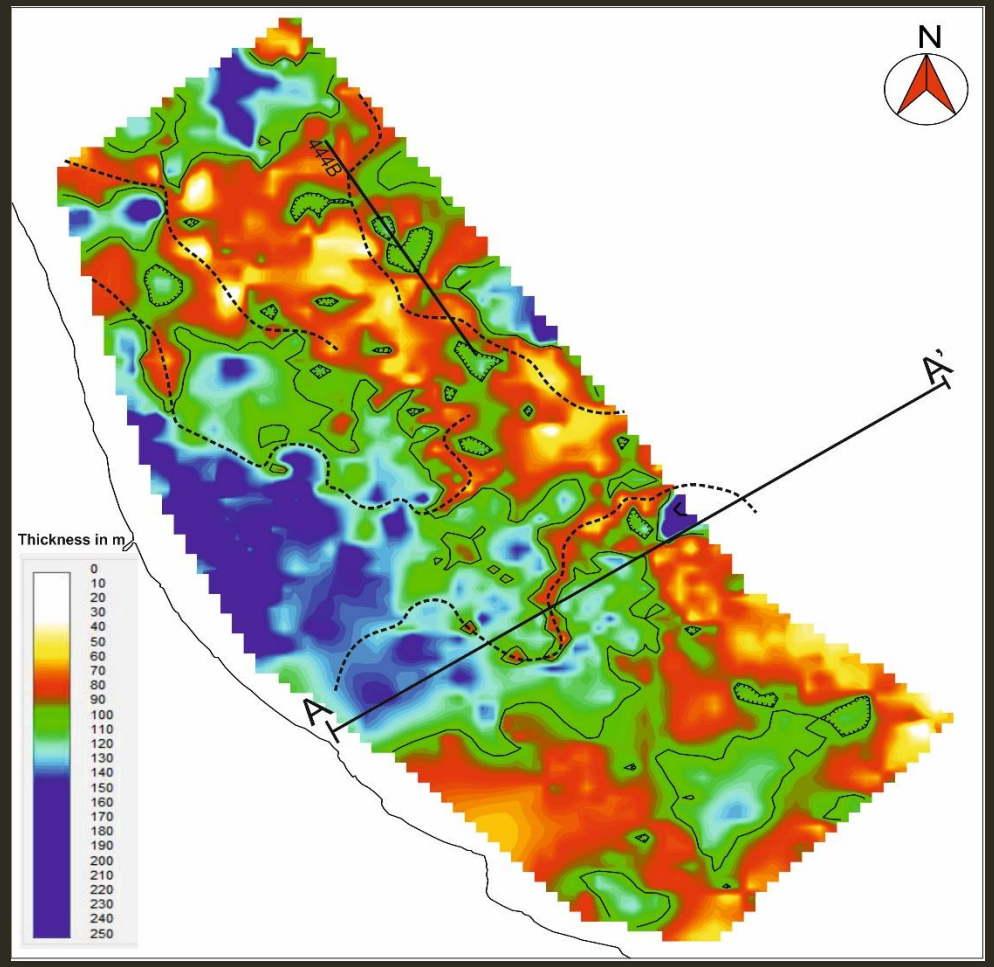
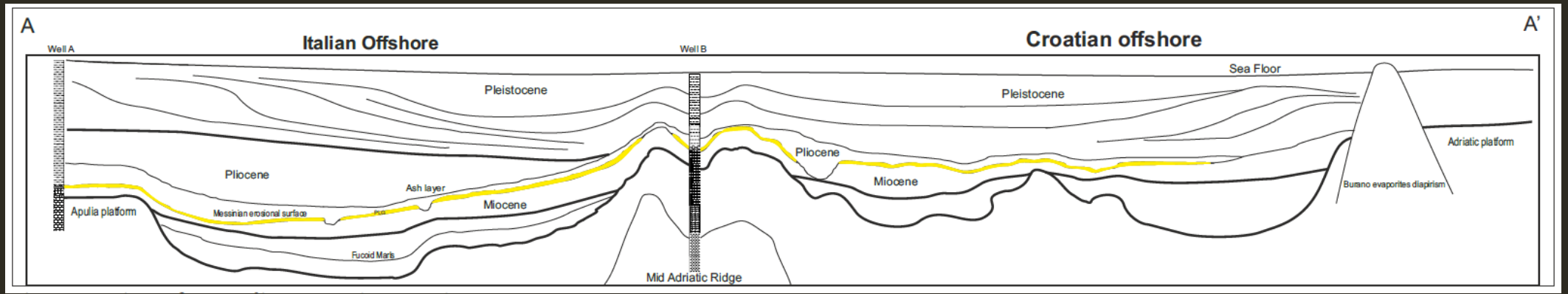


Figure 3: Isopach map of the Gessoso-Solfifera formation (GS)

The map shows the thickness (in m) of the GS in the Pescara basin. At this moment is not clear if the thickening of the GS in the foredeep is due to an original tilting of the Adria foreland during the Messinian, that implies an advanced position of the Apennine front, or to the erosional effect in the central part of the current Adriatic Sea, possibly also related to the structural highs of the MAR, already active during Messinian.

The Messinian erosion in the central Adriatic produced channels where almost the entire GS and the shallowest part of the underlying Miocene sequence were incised (section AA'). Channels present a meandrification that could suggest a fluvial erosion related to stage 2 of the MSC when portion of the Adria emerged.

Section AA': line drawing of a composite profile (B421 + J22-82) from the Italian to the Croatian coasts: the line cuts in 3 different points the same channel, that borders some structures of the MAR. The GS is widespread also in the Croatian offshore.



CONCLUSION

The thickness of the gypsum layer has been mapped considering both well calibrations and 2D seismic lines. It is widespread in the central Adriatic Sea, reaching about 200 in some structural lows.

The reconstruction of the thickness Map of the Gessoso Solfifera Formation allows us to obtain some main observation:

1) The thinning of the Gessoso-Solfifera coincides with the Mid Adriatic Ridge: this last, produced by deep salt diapirs from the Burano Formation, started to uplift in the pre-Messianian time. This uplift continued also during the Messinian Salinity Crisis. During the Late Messinian the regional erosion affected particularly the MAR area.

2) In the basin present between the outermost Apennine front and the MAR, the gypsum thickness remained preserved.

3) Some channels were produced during the Messinian after the deposition of the gypsum, generally interpreted as canyons. Their meandering distribution allows to hypothesize a subaereal exposure.

4) It is still unclear if the tilting toward the Apennine chain had a role during the Messinian in the current central Adriatic Sea. This is the next topic we intent to focus.

If you have any question or suggestion or you want to talk with me about the project please contact me!

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