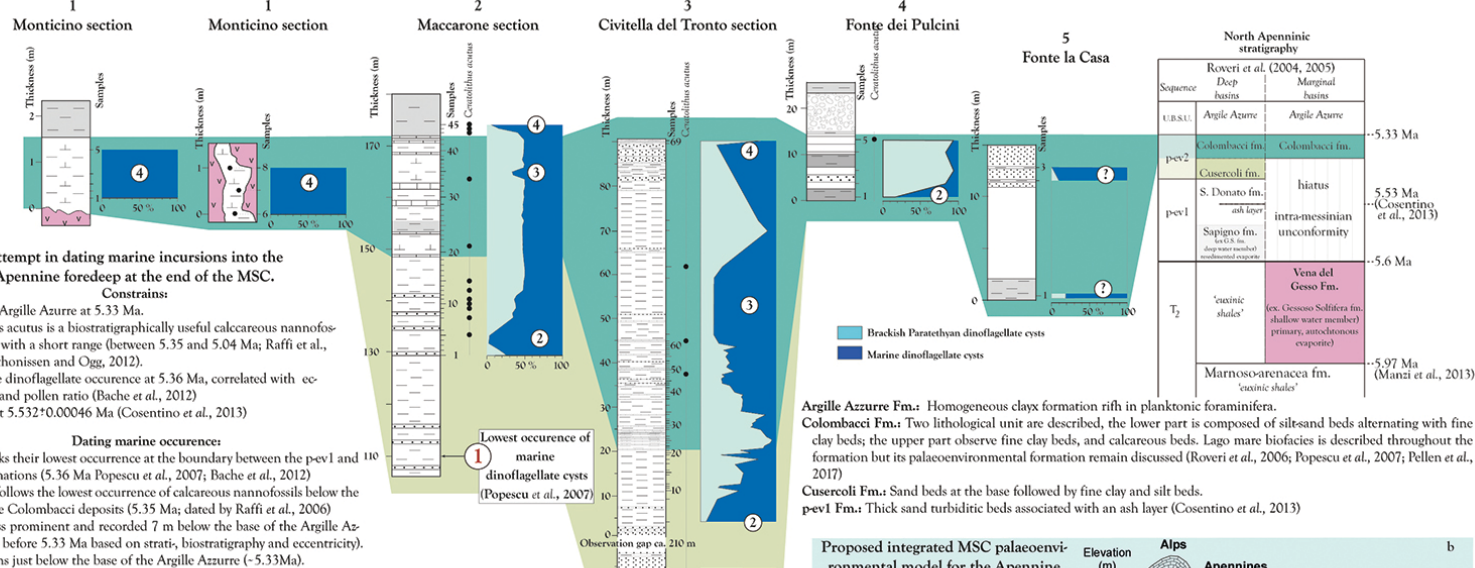


The Adriatic Basin (Central Mediterranean Sea) is the place of intense controversy concerning the sedimentary dynamics and palaeogeographic evolution during the Neogene, especially during the Messinian Salinity Crisis (MSC: 5.97 to 5.32 Ma).

Following the various interpretations, this basin was totally disconnected or connected to the deep basins during the MSC sea level fall (~5.60–5.46 (?) Ma). Five stratigraphic sections (Fig. 1, 2) have been sampled. Accordingly, much attention has been devoted to the chronostratigraphic and palaeoenvironmental interpretation of the sediments deposited in the Apennine foredeep after the peak of the MSC before the early Pliocene and marine formation (Fig. 1).

Figure 2 (A) simplified geological map with location of the studied sections shown in B; (B) schematic geological section from Romagna to Apulia focusing on Messinian and Zanclean deposits (modified from Roveri et al., 2008) with correlations between the studied successions. Sediment thickness not to scale.

Litho- and biostratigraphic correlation between post-evaporitic sections of the Apennine foredeep (figure 3). Associated with the stratigraphic section, illustration of the Brakisch/marine Dinoflagellate cyst ratio (without reworked species) and *Ceratolithus acutus* occurrence.



Argille Azzurre Fm.: Homogeneous clay formation rich in planktonic foraminifera.

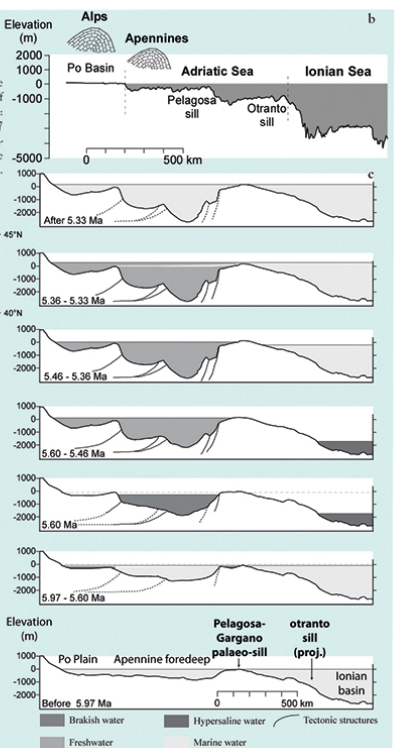
Colombacci Fm.: Two lithological unit are described, the lower part is composed of silt-sand beds alternating with fine clay beds; the upper part observe fine clay beds, and calcareous beds. Lago mare biofacies is described throughout the formation but its palaeoenvironmental formation remain discussed (Roveri *et al.*, 2006; Popescu *et al.*, 2007; Pellen *et al.*, 2017).

Cusceroli Fm.: Sand beds at the base followed by fine clay and silt beds.

pev1 Fm.: Thick sand turbiditic beds associated with an ash layer (Cosentino *et al.*, 2013)

Proposed integrated MSC palaeoenvironmental model for the Apennine foredeep

Figure 5: Mediterranean-Adriatic (vs. Apennine foredeep) connections since 6 Ma: a: location of the cross-sections; b: present-day cross-section; c: successive reconstructed cross-sections from 5.97 to 5.33 Ma, highlighting the role of the Gargano-Pelagosa palaeo-sill and Messinian Apennine deformation phase.



Conclusion

The Lago Mare cannot be considered as a uniform brackish palaeoenvironment but must be envisioned as a complex mosaic of sedimentary facies resulting from competing marine and brackish waters controlled by physiographic factors.

The Mesozoic heritage with the Apennine front propagation plays a major role in the palaeo-environmental evolution of the Apennine foredeep. Deposits overlying the unconformity separating the regional *pev1* and *pev2* formations must henceforth be regarded as representing the first marine incursion into the isolated central Adriatic Basin after the peak of the MSC.

These results allow us to refine the palaeogeographic reconstruction of the Apennine foredeep during the peak of the MSC. Although this basin was deep, its history during the peak of the MSC did not parallel that of the central Mediterranean basins.

Reference

[illegible]

Existence of a palaeo-sill during the MSC between the Apennine foredeep and the deep Ionian basin

- Strong dissymmetry is observed between the Central and South Adriatic domains (Figure 4).
- Thick Aquitanian-Tortonian and detrital Messinian megasequences fill the South Adriatic domain. Pliocene-Quaternary megasequence is controlled by the Dinarid deformation front.
- Thick Pliocene-Quaternary megasequence compose the Central Adriatic domain. The Laga basin form the main syn-MSC depocentre as illustrated Figure 1.
- Few evaporitic Messinian deposits are observed along the south Apennine front.

Existence of a palaeo-sill formed by carbonate platform, and Apennine deformation front.

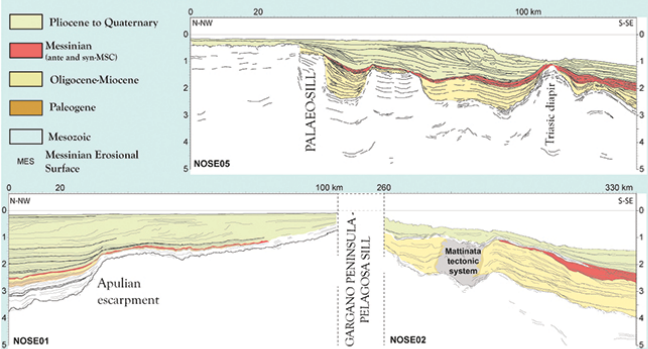


Figure 4: Line drawings of interpreted seismic profiles in the Adriatic Sea showing the Messinian Gargano-Pelagosa palaeo-sill.