



Seismic evidence of Messinian salt in opposite margins of West Mediterranean

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The post drift Messinian Salinity Crisis (MSC) affected the whole Mediterranean basin, with deposition of evaporitic sequences in the deep basins, in the lower continental slopes, and in several shallower marginal basins; usually, in the continental margins, the MSC originated noticeable erosional truncations that locally cause important hiatuses in the pre-Messinian sequences, covered by the Plio-Quaternary sediments.

In this work we focus on the MSC seismic signature of two new seismic datasets acquired in 2010 (West Sardinia offshore) and in 2012 (within the Eurofleet project SALTFLU in the South Balearic continental margin and the northern Alger abyssal plain).

The “Messinian trilogy” recognized in the West-Mediterranean abyssal plain, is characterized by different seismic facies: the Lower evaporite Unit (LU), the salt Mobile Unit (MU) and the Upper evaporite mainly gypsiferous Unit (UU).

Both seismic datasets show the presence of the Messinian trilogy also if the LU is not always clearly interpretable due to the strong seismic signal absorption by the halite layers; the salt thickness of the MU is similar in both the basins as also the thickness and stratigraphy of the UU.

The Upper Unit (UU) is made up of a well reflecting package of about 10 reflectors, partially deformed by salt tectonic and characterized by a thin transparent layer that we interpreted as salt sequence inner the shallower part of the UU.

Below the stratified UU, the MU exhibits a transparent layer in the deep basin and also on the foot of the slope, where a negative reflector, related to the high interval velocity of salt, marks its base. The halokinetic processes are not homogeneously distributed in the region, forming a great number of diapirs on the foot of the slope (due to the pression of the slided sediments) and giant domes toward the deep basin (due to the higher thickness of the Plio-quaternary sediments). This distribution seems to be related to the amount of salt and of the sedimentary cover.

During the MSC the margins of the West Mediterranean Sea seem to be involved in some tectonic events probably connected to reactivation of normal faults and to the fast variation of the water load related to sea level fluctuations. The absence of calibrating boreholes in the deep Mediterranean basins and the hard penetration of seismic energy below the evaporitic layers, represent a limit for the knowledge of the geological evolution of the basins; the interpretation of the presented datasets could be a contribution to the comprehension of the evaporitic deposition and early-stage salt deformation during the MSC in the Mediterranean sea.