

The SIMBAD project : Messinian markers and recent deformation in the Balearic Region



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The SIMBAD Project aims to study the sedimentary deposits linked to the Messinian Salinity Crisis (MSC) on the Balearic Promontory in order to :

- > follow their continuity from land and shallow areas to deep basins (spatial variability of the evaporites)
- > use the MSC markers to evaluate their paleo-connections and quantify the post-MSC tectonic reactivation.

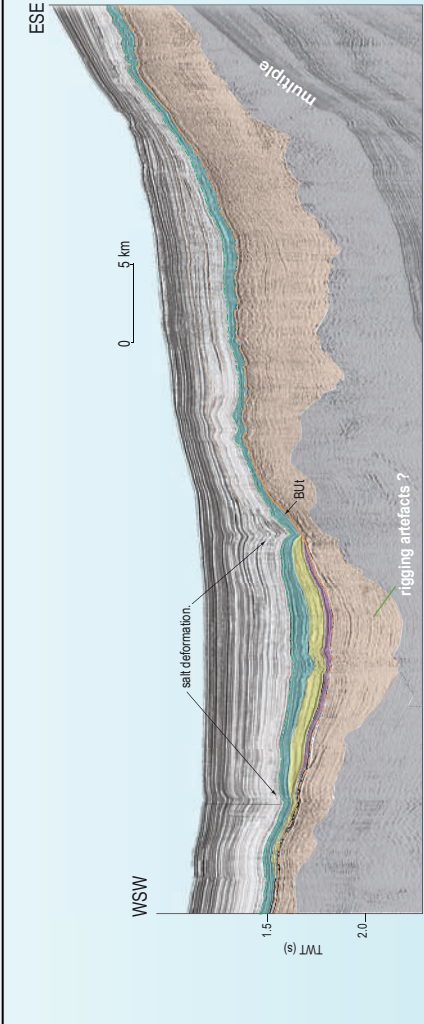


Figure 3. SIMBAD 13 from the Mallorca slope to the Mallorca Central Depression, showing the variability of the MSC unit. Plastic deformation occurs on the borders of the Depression and a transparent seismic facies below BU show evidences for a salt layer (MU), ranging 2000m shallower than the deep basin MU

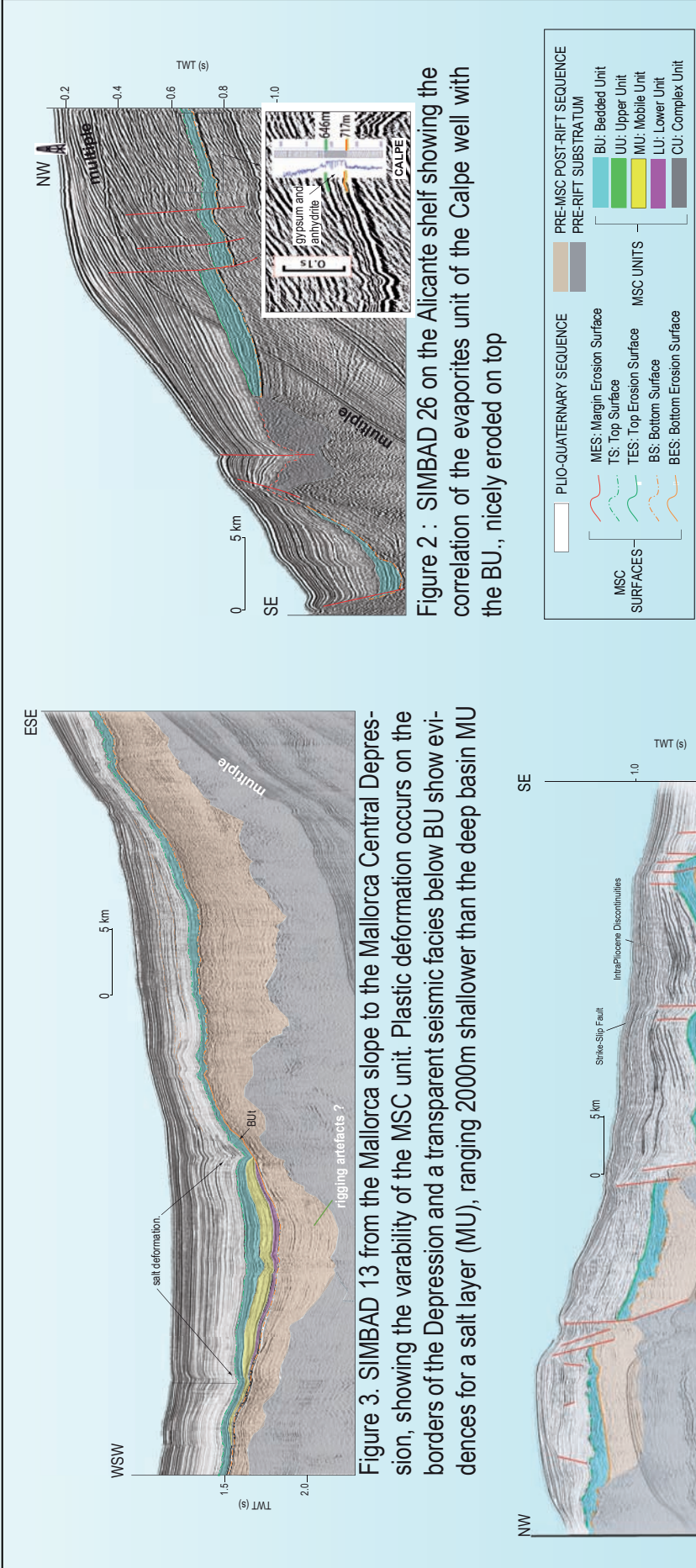


Figure 2 : SIMBAD 26 on the Alicante shelf showing the correlation of the evaporites unit of the Calpe well with the BU., nicely eroded on top

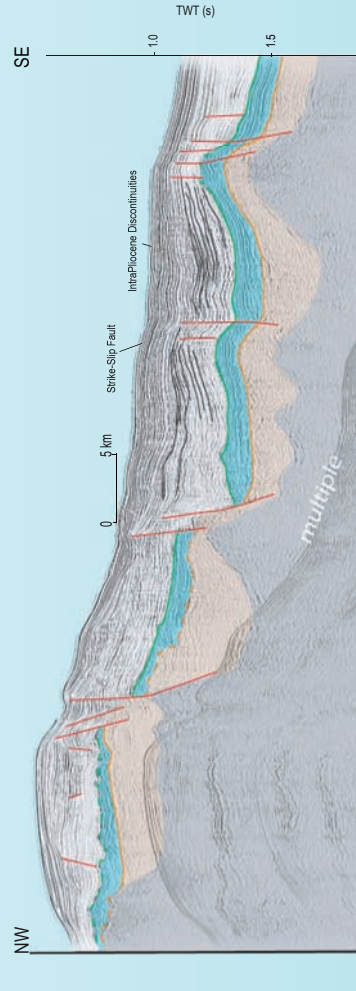


Figure 4. SIMBAD 16 from the centre of the Mallorca Central Depression, showing recent extensional tectonics that offset the MSC unit. Most of the faults seems to be Pliocene in age but also Pre-MSC fault are clearly reactivated during Pliocene or actually.

The SIMBAD cruise (January 2013) that acquired high resolution seismic profiles provides evidence of the thin MSC deposits widespread on the Balearic Promontory, at Present day ranging from 500 to 2500m. It questions the occurrence of only “deep” versus “marginal” evaporites types.

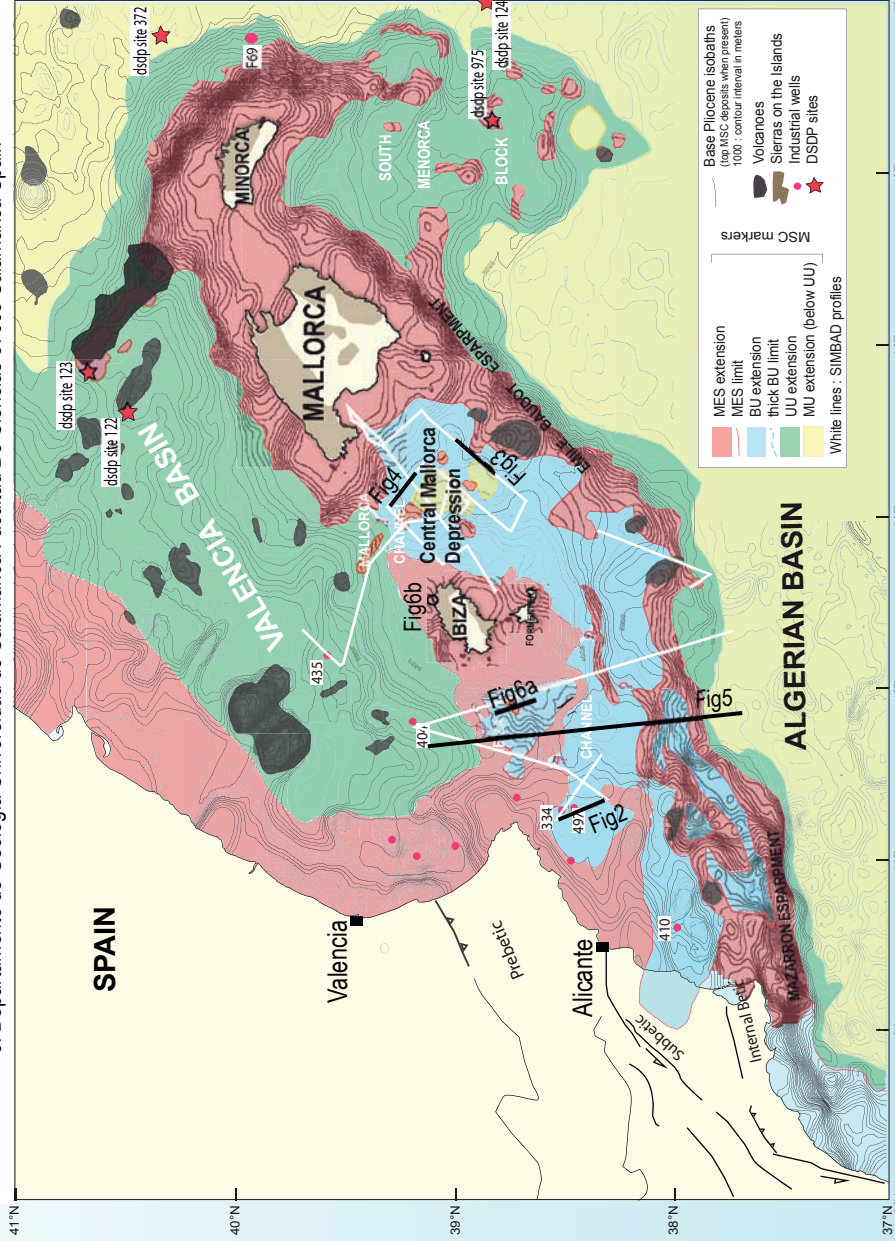


Figure 1. Present day extension map of the MSC units of the Balearic area. The thin MSC units on the Promontory between Alicante shelf and Mallorca are called BU (blue) though they resemble UU, because they cannot be surely connected to the surrounding UU. Either a horst prevents the connection either data is lacking in the localised area (channels). On the Minorca block, the MSC unit present is clearly the continuity of the UU of the deep basin (trilogy present in the Algero-Provencal basin).

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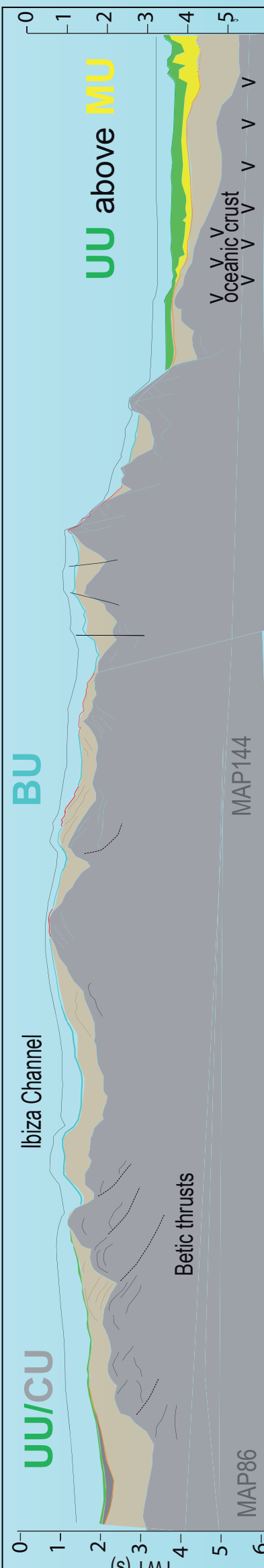


Figure 5. Cross-section along the Ibiza channel showing the variability of the MSC unit. As observed, the MSC unit is present in the Ibiza channel within small basins between eroded areas (Xabia Seamount). The relation with the deep basins is complicated as recent tectonics offset both the Balearic BU and the Valencia and Algerian UU. A paleo-connection between the different MSC units before the recent reactivation is conceivable.

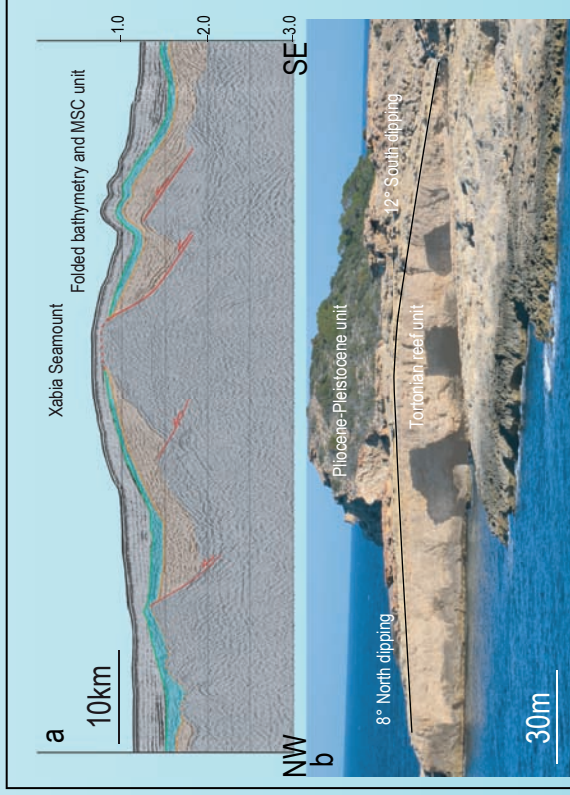


Figure 6. Kilometric scale flexure showing recent reactivation where Betic thrusts occurred in the Ibiza channel (a). Same kind of flexure affects the Tortono-Messinian reef surface (b, Portinatx bay, NE Ibiza Island).