



Late Miocene sedimentary architecture of the Ebro Continental Margin (Western Mediterranean): Implications to the Messinian Salinity Crisis

Alejandra L. Cameselle (1), Roger Urgeles (1), Ben De Mol (2,3), and Angelo Camerlenghi (4)

(1) Dept. Geociències Marines, Institut de Ciències del Mar (CSIC), Barcelona, Spain (acameselle@icm.csic.es), (2) Barcelona-CSI, Institut de Ciències del Mar (CSIC), Barcelona, Spain, (3) Senergy AS, Oslo, Norway, (4) Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Trieste, Italy

The Messinian Salinity Crisis (MSC) resulted from a significant multi-phase drop and subsequent reflooding of the Mediterranean Sea during the Late Miocene. In a relatively short time span (5.96 to 5.33 Ma), partial desiccation of the basin and consequent subaerial exposure of the continental margins resulted in widespread erosion of continental shelves and slopes and regressive erosion along major fluvial valleys. Using 3D seismic reflection data from the Ebro Margin (Western Mediterranean), we provide new insights into the origin of the Messinian Erosional Surface (MES) and timing of the capture of the subaerial Ebro Basin. The observed sedimentary architecture of the Ebro Continental Margin indicates a sedimentary-active continental slope and delta progradation during Middle-Late Miocene, in a normal regressive context associated to a pre-Messinian proto-Ebro River. Configuration of the clinofolds below the MES suggests that deltaic sediments of the Messinian Paleo-Ebro River deposited during the Tortonian and initial Messinian sea-level drawdown. The MES formed at the top of the Tortonian Highstand, where a fluvial network was deeply carved, and in the topset region of the Messinian Falling Stage Systems Tract, where minor erosion occurred. The patterns of Messinian erosion and sedimentation produced a MES with a step-like profile. Significant Miocene progradation and the mature development attained by the Messinian Ebro River network during the MSC indicate that capture of the Ebro Basin occurred prior to the MSC. Fluvial deposits are outstandingly preserved on the main valleys of the MES indicating that re-flooding of the margin was extremely rapid. Therefore, the step-like profile of the MES was created during the latest stages of the main Messinian sea-level drawdown and lowstand.