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# Large-scale Mass Transport Deposits in the Valencia Basin (Western Mediterranean): slope instability induced by rapid sea-level drawdown?

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The Messinian Salinity Crisis (MSC) strongly affected the physiography of the Mediterranean margins at the end of the Miocene. The sharp sea-level fall gave a new configuration to the Mediterranean basin and created dramatic morphological and sedimentological changes: margins have been largely eroded whereas the deep basins accumulated thick evaporitic and detrital units. Amongst these detrital units, there are evidences on seismic reflection data for major large-scale slope failure of the Mediterranean continental margins. About 2700 km of seismic reflection profiles in the southwestern part of the Valencia Basin (Western Mediterranean) have enabled us the detailed mapping of distinctive Messinian erosional surfaces, evaporites and deep detrital deposits. The detrital deposits occur in a distinct unit that is made of chaotic, roughly-bedded or transparent seismic bodies, which have been mainly mapped in the basin domain. Locally, the seismic unit shows discontinuous high-amplitude reflections and/or an imbricate internal structure. This unit is interpreted to be formed by a series of Mass Transport Deposits (MTDs). Rapid drawdown has long been recognized as one of the most severe loadings conditions that a slope can be subjected to. Several large historical slope failures have been documented to occur due to rapid drawdown in dams, riverbanks and slopes. During drawdown, the stabilizing effect of the water on the upstream face is lost, but the pore-water pressures within the slope may remain high. The dissipation of these pore pressures in the slope is controlled by the permeability and the storage characteristics of the slope sediments. We hypothesize that the MTDs observed in our data formed under similar conditions and represent a large-scale equivalent of this phenomenon. Therefore, these MTDs can be used to put some constraints on the duration of the drawdown phase of the MSC. We have performed a series of slope stability analysis under rapid Messinian sea-level drawdown using slope geotechnical properties and pre-conditioning factors related to the geological setting of the Valencia Basin. Using several sea-level fall ratios, the variation of the safety factor with respect to successive positions of the sea-level during drawdown has been evaluated.