

THE OCEANOGRAPHIC ASSESSMENT OF THE MESSINIAN SALINITY CRISIS

Paul-Louis BLANC Institut de Protection et de Sûreté Nucléaire Fontenay-aux-Roses, FRANCE

The improved chronology of the Messinian stage and quantitative estimates of the evaporites allow the modelling of the water and salt budgets of the Mediterranean Sea during the Salinity Crisis, when the supply of Atlantic water was curtailed by the closure of the Betico-Rifian Portals. The tectonic chains extending along the Maghreb and Italy divide the Mediterranean into two major basins, and explain a shift in sedimentation from the East to the West. The Sicily Sill controls the distribution of the evaporates between the two basins. Initially, both reach salt saturation together. When double-layered circulation (present type: inwards flux of low salinity surface water, outwards flux of high salinity deep water) becomes ineffectual above the Sicily Sill, the Mediterranean Basins operate as endoreic successive-tier lakes, and the Western Basin is rinsed out of its excess salt to the benefit of the Eastern Basin. The discontinuous evaporitic sedimentation in the Western Basin was questionably interpreted as an Intra-Messinian re-inundation episode. The successive sedimentary phases result from the progressive closure of the Betico-Rifian Portals, without any jerk in the tectonic evolution. The basic principles of Oceanography account for the Messinian evaporates with little change in the climate and hydrology by comparison to the present. For the first time, a geological and palaeoceanographic event is assessed in term of flow rate and amount of water consumed: the Atlantic water which crossed the pre-Gibraltar strait during the Salinity Crisis amounts to seventy times the present volume of the Mediterranean.