The impact of the Messinian Salinity Crisis on the Messinian carbonate continental shelf in the Chelif Basin (Northwest Algeria)

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At the end of the Messinian (Upper Miocene), the Mediterranean basin was the site of an exceptional event called "the Messinian Salinity Crisis" (Hsü et al., 1972). This was the most dramatic crisis that the Mediterranean Sea has ever known: a sea level drop of about -1500 m (Ryan, 1976). In the central and outlying basins of the Mediterranean, large deposits of evaporites (salt, gypsum) bear witness to this event.

Around the Mediterranean Sea, rivers strongly incised forming deep canyons to fit the base level fall (Clauzon, 1982; Julian and Nicod, 1984; Bini, 1994; Bourillot et al., 2010; Krijgsman et al., 2018). The Algerian coast is just near the steepest slopes of the Alboran Sea during MSC, so that it was strongly impacted by the sea level drop. According to Rubino et al. (2010), two river canyons formed, one related to Chelif River and the other one to the Algiers system. The Chelif Basin which was occupied by a marginal sea during the Messinian was disconnected from the Mediterranean Sea and filled with gypsum-rich sediments (Roveri et al., 2014, Naimi et al., 2020; Moulana et al., 2021).

The large deep underground voids along the Messinian shelf of the southern margin of the Chelif Basin are a paleokarst formed during this low base level, as in other areas around the Mediterranean Sea (Bini, 1994 ; 1998); Audra et al., 2004; Mocochain et al., 2006 a, b; 2009).