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**THE MESSINIAN SALINITY CRISIS:  
FROM GEOLOGY TO GEOBIOLOGY**



**ABSTRACT BOOK**

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(EDITORS)



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Front: Laminated gypsum cropping out in the Pollenzo section, Piedmont, NW Italy (*Photo M. Natalicchio*).

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## BASIN DYNAMICS MODULATES EVAPORITE DEPOSITION DURING THE MESSINIAN SALINITY CRISIS IN ZAKYNTHOS AREA (IONIAN SEA)

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Extensive mapping and sedimentological analyses of the Zakynthos Island Neogene deposits (Ionian Sea, W. Greece) indicates that the Messinian primary evaporite basins were delimited by the westernmost outcrop of the Triassic evaporitic diapirs. Planktonic foraminifera and calcareous nannofossil biostratigraphy suggests that primary evaporite accumulation took place during the first stage of the Messinian Salinity Crisis (MSC; 5.96-5.60 Ma), within shallower parts of this foreland basin. The Messinian depositional environments were formed before the Ionian emplacement, due to the particularities of the foreland basin (extending from the external Ionian to the internal Pre-Apulian zone). Field observations, borehole data and the available onshore seismic profile show that the Neogene sediments, over the Pre-Apulian basement, correspond to the forebulge-through-foredeep domain of the foreland basin, as documented from their spatial thickness distribution (800m in the west and 1350m in the east). In contrast, the Neogene sediments, over the Ionian basement, correspond to the wedge-top of the foreland basin, which subsided less (thickness 200-300m). The lower subsidence rate is due to the diapiric movements of the Ionian Triassic evaporites. In Agios Sostis area (over Pre-Apulian basement), the Neogene sequence is intercalated by decametre-thick re-sedimented blocks consisting of shallow water selenite. The progressive filling of the foreland's basin Pre-Apulian part, during the Messinian, led the basin's area near to its forebulge to shallower depths. These depths together with the Upper Messinian general dry climate conditions and the overall negative hydrological balance led to the deposition of the Primary Lower Gypsum (PLG) unit. Mass-wasting of the PLG unit and its subsequent erosion produced clastic gypsum that was deposited through gravity flows, mainly as gypsum turbidite, in the basin depocenter (to the southeast). These deposits deriving from the dismantlement and re-sedimentation of the PLG unit can be ascribed to the 2nd stage of MSC (5.60-5.55 Ma). In Kalamaki-Argasi area, located over Ionian basement and corresponded to the wedge top of the foreland basin, the shallow water environment led also to the deposition of the observed PLG. Thus, the foreland basin's depocenter was supplied with gypsum turbidites from the erosion of the primary gypsum of both forebulge and wedge-top areas.

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