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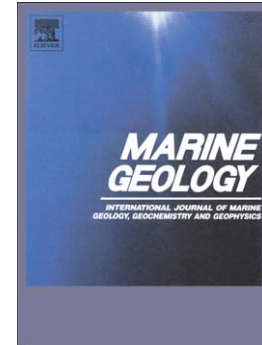
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Dimensions of the Atlantic-Mediterranean connection that caused the Messinian Salinity Crisis

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Abstract

What kind of gateway is needed to cause a salinity crisis? Although several reconstructions of possible Atlantic-Mediterranean gateways are proposed for the late Miocene, so far the gateway that must have existed before the desiccation of the Mediterranean during the Messinian is unknown. This study uses the theory of hydraulic control combined with the effect of bottom friction in order to find out, to first order, the geometrical dimensions of the connection that existed during the Primary Lower Gypsum stage (5.97 – 5.61Ma) of the Messinian Salinity Crisis (5.97 – 5.33Ma).

The connecting strait is assumed to behave in a similar way as existing straits, such as the Strait of Gibraltar or the Bosphorus. A salinity crisis in an enclosed basin results, when its connection to the open ocean is highly restricted. A strait needs to be relatively shallow, narrow and/or long in order to result in exchange fluxes that are of around 25% or less of the exchange at the Strait of Gibraltar today. Considering the evaporite deposits together with global sea-level variations we estimate the cross section of a

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