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## **New insights on bottom water flows crossing a marine sill under periodic or impulsive perturbations: an application to the Sicily Channel sill (Central Mediterranean Sea)**

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We here discuss the remarkable uplift of the Eastern Mediterranean bottom waters that flow westward, over the Malta Escarpment, and cross the sill of the Channel of Sicily (Astarldi et al., 2001; Iudicone et al., 2003; Falcini & Salusti 2015); a dynamics that is rather similar to the one occurring at the Strait of Gibraltar (Mediterranean Sea) and Bab el Mandab (Red Sea) (Siddall et al., 2002). This classical uplift, which usually occurs under a three layer system dynamics, is mostly explained by the Bernoulli suction effect (Lane-Serff et al., 2000). However, the real field analyses suggest that this dynamics are significantly perturbed by tidal effects and or large scale storms (Smeed et al., 2004). Here consider a novel, theoretical approach to obtain a rather realistic view of natural perturbations that affect these deep flow dynamics. Our insights on uplift processes, in addition, give a contribution to the general understanding of the Mediterranean Sea deep water circulation and, on climatological grounds, heat storage dynamics. We finally remark that similar phenomena happens in several marine straits and/or in semi-enclosed, peripheral basins of particular importance for local and large-scale processes.

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