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Intrinsic low-frequency variability of the Mediterranean Sea circulation studied using a multilayer ocean model

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Intrinsic chaotic variability in the oceans is an active field of research in modern oceanography, with important implications concerning the understanding and predictability of the ocean system. The focus is mainly on open ocean basins while very little attention is devoted to enclosed or semi-enclosed seas. The intrinsic variability of the Mediterranean Sea, in particular, has not yet been investigated. Here, results obtained with an eddy-resolving nonlinear multilayer ocean model are presented shedding light on relevant aspects of the intrinsic low-frequency variability of the Mediterranean Sea circulation.

An ensemble of multi-centennial ocean runs is performed to allow for a significant statistical analysis. The statistically stationary state obtained after long simulations shows a robust meridional structure consistent with the observed Mediterranean mean state. Among the various features emerging in the decadal and multidecadal temporal ranges are abrupt shifts in the water mass stratification structure. Differences and similarities with observed patterns are finally discussed.