

EGU23-14768, updated on 18 Jan 2024
<https://doi.org/10.5194/egusphere-egu23-14768>
EGU General Assembly 2023
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Dominant features and variability of the mesoscale circulation and thermohaline structure of the eastern Levantine during the post POEM period 1995-2015

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An analysis of in-situ data gathered over the two decade post POEM period in the South-Eastern Levantine Basin from extensive hydrographic (CTD) campaigns and VOS XBT transects, along with data provided by the latest SeaDataCloud Mediterranean Sea Temperature and Salinity climatology (<http://dx.doi.org/10.12770/3f8eaace-9f9b-4b1b-a7a4-9c55270e205a>) and the Mediterranean Sea Physics Reanalysis from the Copernicus Marine Service (CMS; https://data.marine.copernicus.eu/product/MEDSEA_MULTIYEAR_PHY_006_004), have all provided insight on the dominant, coherent, meso-scale, circulation features as well as the evolution and variability of the thermohaline properties of the main water masses in this sub-basin. The most pronounced feature, the warm core Cyprus Eddy, migrates over the broad region of the Eratosthenes seamount and exhibits significant seasonal and inter-annual spatio-temporal variability. Another prominent structure is the anticyclonic Shikmona Eddy generated periodically due to instabilities of the strong northward flowing jet along the south-easternmost shelf and slope of the Levantine basin. Its evolution and co-existence with the Cyprus Eddy for periods of a few months, affects the temporal re-establishment of the Shikmona Gyre, which was first observed during the POEM cruises in the mid 1980s. The eastward flowing Mid Mediterranean Jet (MMJ) defines the northern flanks of these sub-basin scale eddies and transports the lower salinity Modified Atlantic Water (MAW) through the warmest and most saline region of the Mediterranean. Periodically the MMJ bifurcates and/or is diverted northward, along the western coast of Cyprus due to spatial fluctuations of the Cyprus Eddy. Four active periods were identified with either a dominant Cyprus Eddy only or coexisting Cyprus and Shikmona Eddies. This long term in-situ monitoring also provides an overview of the extent of the main water masses and characterizes their variability throughout the period considered. The temperature and salinity of the Levantine Surface Water (LSW) and of the subsurface MAW have increased. The Eastern Mediterranean Transient Water (EMTW) is shown to occupy the deep cavities, below the Eastern Mediterranean Deep Water (EMDW), in the vicinity of the Eratosthenes seamount while its upper boundary was lifted to shallower depths over the same period.

