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Interannual Variability in the SE Levantine Basin 1995-2009

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Knowledge of the hydrographic character of the Levantine Basin increased dramatically with the few seasonal Physical Oceanography of the Eastern Mediterranean (POEM) cruises in the SE Levantine Basin during the 1980s. They first depicted the existence of a multi-pole gyre, the Shikmona gyre. This gyre consisted of three eddies, with the Cyprus warm core eddy being the most pronounced, and an offshore cross basin current, the Mid Mediterranean Jet (MMJ). From 1995 until 2009, a considerably larger amount of seasonal in-situ data was collected from various observing platforms in the SE Levantine Basin. These data were collected mostly within the framework of the Cyprus Basin Oceanography (CYBO) cruises and secondarily by some other collaborative cruises and projects (such as CYCLOPS, MFSPP, MFSTEP, HaiSec, etc). During the same timeframe (1995-2009), increases in sea surface temperatures (SSTs) have been recorded to occur globally, with the Mediterranean SSTs rising about twice as much as those of the global oceans. In-situ and satellite remote sensing SST data for the period 1995-2009 were analysed and compared in the Levantine Basin. Further, SST and sea surface salinity (SSS) in-situ profiles from the above oceanographic cruises in this region were extracted from the Bythos database, in order to study the interannual thermohaline variability at the surface layer (0-10m), along with the variability of the Cyprus warm core eddy and the MMJ. These long term seasonally collected in-situ datasets reveal that the dominant and permanent flow feature in the SE Levantine is the Cyprus warm core eddy, which undergoes significant seasonal and interannual fluctuations in terms of its shape, size, intensity and location. The Atlantic Water (AW) in the SE Levantine is very well pronounced during summer periods, mostly at the sub-surface depths, below the thermocline, with salinity as low as 38.65-38.9. The MMJ is documented to transfer the AW eastward within the Levantine Basin. Particularly, it was found that the MMJ transfers the AW along the periphery of the Cyprus warm core eddy, at the subsurface layers. Satellite SST data indicate that over the same examined period of the last 15 years, a general warming has occurred over the Levantine Basin, both at interannual and seasonal time scales. This increase in average SSTs is also seen in the seasonal averages, especially during the spring and summer. Moreover, the averages from the top 10m of in-situ temperature, using the relevant data from the above oceanographic databases, show a correlation with the satellite SST data particularly at seasonal time scales. Further analyses of near-surface in-situ data reveal that the pattern of temperature variability is shared by the patterns of salinity. Therefore, the Levantine Basin has also undergone salinity increases during the last 15 years. The initiation of glider studies of the area in 2009 will allow the extension of the study of variability to smaller spatial scales and faster time scales over the next several years.