

Modelling the water and heat balances of the Mediterranean Sea using a two-basin model and available meteorological, hydrological, and ocean data

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This research presents a one, two and multi ocean basin modeling approach (PROBE-MED) for calculating the water and heat balances of the Mediterranean Sea and uses available meteorological and hydrological data to force the ocean models. Through construction of nets of sub-basins the exchange of water, heat and salinity between the sub-basins were analyzed forming the base also for precipitation, sea surface temperature and sea level studies. The GCMs that describe the current Mediterranean Sea precipitation most realistically are GFDL-CM3-1, MIROC-ESM-CHEM, and HadGEM2-AO. Ensemble mean scenarios (based on 32 different simulations) show the best simulation for the current Mediterranean Sea surface temperature. However, GFDL-CM3 and GFDL-ESM2M are the most realistically simulations for the Mediterranean Sea level change. The large scale features of the Mediterranean Sea can be described using the two basin modeling approach (PROBE-MED), however Local Ocean features needs multi basin modeling approach. The water and heat balance analyses of gridded meteorological data and GCMs and using simplified ocean models provide a good support for the development of coupled atmosphere-ocean-land models.