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Influence of Atmospheric Modes of Variability on Mediterranean Sea Surface Heat Exchange from a 12km Dynamically Downscaled Reanalysis

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Earlier research on the impacts of the first four modes of atmospheric variability in the North Atlantic / Europe region on air-sea heat exchange in the Mediterranean Sea will be extended to higher spatial resolution using the ALADIN 12 km dynamical downscaling of the ERA-Interim reanalysis. Observation based indices of the modes from the NOAA Climate Prediction Centre (CPC) are used together with the 12 km ALADIN surface flux fields for the period 1979-2012 to determine the sensitivity of the mean heat budget of the full Mediterranean basin and the eastern and western sub-basins to surface forcing at higher resolutions than previously considered. The four modes are the North Atlantic Oscillation (NAO), East Atlantic pattern (EA), Scandinavian pattern (SCAN) and East Atlantic / West Russian pattern (EA/WR). Results at coarser resolution using the NCEP/NCAR and 50 km resolution ARPERA reanalysis will also be reviewed. These indicate that winter anomalies dominate the annual mean heat budget and the leading mode, the NAO, has a surprisingly small impact on the full basin winter mean heat budget, < 5 Wm-2. In contrast, the EA mode has a major effect, of order 25 Wm-2, with similar impacts on both the eastern and western Mediterranean. The SCAN mode has the weakest influence of those considered. The EA/WR mode plays a significant role but, in contrast to the EA mode, it generates a dipole in the heat exchange with an approximately equal and opposite signal of about 15 Wm-2 on the eastern and western sub-basins. New results will be presented which reveal the extent to which these earlier conclusions still hold at the higher 12km resolution now possible using ALADIN.