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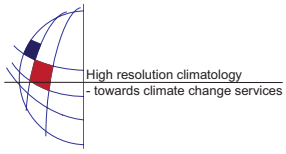

Impacts Of Atmospheric Modes Of Variability On Mediterranean Sea Surface Heat Exchange

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The impacts of variations in the state of the first four modes of atmospheric variability in the North Atlantic / Europe region on air-sea heat exchange in the Mediterranean Sea are considered. Observation based indices of these modes from the NOAA Climate Prediction Centre (CPC) are used together with two reanalysis (NCEP and ARPERA) surface flux datasets for the period 1958-2006 to determine their relative influence on the mean heat budget of the full Mediterranean basin and the eastern and western sub-basins. The modes considered are the North Atlantic Oscillation (NAO), the East Atlantic pattern (EA), the Scandinavian pattern (SCAN) and the East Atlantic / West Russian pattern (EA/WR). Similar results are obtained for each of the reanalysis datasets considered, in each case winter anomalies dominate the annual mean heat budget. The leading mode, the NAO, has a surprisingly small impact on the full basin winter mean heat budget, < 5 Wm-2. In contrast, the EAP 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 EAP, 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. A particularly strong impact in the Aegean Sea is observed for the EA/WR mode and this is discussed in the context of episodic deep water formation in this region.