EMS Annual Meeting Abstracts
Vol. 7, EMS2010-424, 2010
10th EMS / 8th ECAC


High resolution climatology
- towards climate change services

# Correlation between air-sea heat fluxes over the Aegean Sea and the total precipitable water over Europe and North Africa.

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The relationship between the air-sea heat fluxes at two sites in the Aegean Sea and the total precipitable water (TPW) over Europe and North Africa is investigated. The four components of heat flux (shortwave and longwave radiation, latent and sensible heat) originate from two independent and widely used data sets. At first a comparison is carried out between in situ observations, and various available dataset in order to select the most suitable for the Aegean Sea area. Thus, the Mediterranean HIPOCAS dataset (1958-2001) is used for the radiative components of air-sea heat fluxes while the OAFlux dataset is used for the turbulent ones. The TPW data were retrieved from the European Centre for Medium-Range Weather Forecasts data archive (ERA-40 dataset, 1958-2002) covering the area from 15W to 35E and 20N to 70N with a 2.5oX2.5o grid resolution. Then, correlation coefficients were estimated between the monthly mean heat flux anomalies at each one of the two sites in the Aegean Sea (one in the north and one in the south) and the monthly TPW anomalies at each grid point of the aforementioned area for winter (November-March) and summer (May-September). Finally, the eight correlation patterns were constructed, revealing the following: For the shortwave radiation, in winter, a dipole of opposite correlation (see-saw teleconnection), is observed between northeast Europe and East Mediterranean Sea. This pattern is inverted for the longwave radiation during winter and is limited to a strong positive south pole during the summer. Both correlation patterns indicate that an increase of TPW over northern Europe and the simultaneous decrease over eastern Mediterranean imply a decrease of total cloud coverage over the Aegean Sea and vice-versa. Regarding the turbulent air-sea heat flux components –latent and sensible heat-a different correlation pattern is appeared. The winter pattern exhibits a strong positive correlation (r>0.75) over the Balkan Peninsula indicating a simultaneous TPW decrease/increase and turbulent fluxes increase/decrease (flux anomaly arithmetically decrease when heat losses increase as latent and sensible heat are both negative during winter). The latter is in accordance with the effect of the strong northeastern cold and dry winds dominating the area throughout winter. These winds strengthen the turbulent heat loss over the Aegean Sea transferring cold and dry air masses from the Balkans. The identified correlation patterns weaken during summer although they still remain prominent. Regarding to the sensible heat the summer correlation pattern forms a weak dipole between the Northern Balkans and the Eastern Mediterranean.