Geophysical Research Abstracts
Vol. 12, EGU2010-13071, 2010
EGU General Assembly 2010

A new coupled Atmosphere-Ocean Regional Climate Model: study of the Eastern Mediterranean Transient

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The Mediterranean sea is an active semi-enclosed marginal sea which communicates with the Atlantic ocean through the Strait of Gibraltar. Its ideal configuration provides an opportunity to investigate hydrological mechanisms and heat and freshwater budgets over its basin. These surface fluxes and their variability at various temporal and spatial scale influence the formation of the Mediterranean water masses.

Modeling the mean behavior, the decadal variability and the trends of the Mediterranean sea water is a challenging task and important for future climate change scenarios. A new coupled Atmosphere-Ocean Regional Climate Model (AORCM) forced by ERA40 as boundary conditions simulates the recent climate from 1959 to 2001. A validation of the modeled heat or freshwater budget of the Mediterranean basin is done in comparison with a large panel of observation datasets. The Eastern Mediterranean Transient (EMT) which occurred in the early 1990's formed over those winter large amount of dense Cretan Deep water. This dense water then cascaded and spread into the Eastern basin. For the first time the EMT event is studied in a realistic frame using a high-resolution coupled model with no constraint on the spatio-temporal variability of the air-sea fluxes. Preconditioning step, air-sea fluxes over the Aegean Sea, water mass formation in the Cretan basin, cascading and spreading of the newly formed water in the Eastern Mediterranean is analysed