Geophysical Research Abstracts, Vol. 7, 09505, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09505

Air-Sea interaction processes during extreme weather events in the Mediterranean region

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Specific synoptic patterns of the Mediterranean region in association with sea surface conditions (SSTs) may lead to intense and/or rapidly-intensifying cyclones. The rapid evolution of such systems imposes spatiotemporal changes into the SST patterns and a feedback mechanism is established. Typical events include decaying cyclogenetic activity over Central Mediterranean and rejuvenation as the systems progress eastward. For most of the cases such processes may lead to the formation of the well-known “Cyprus lows” and less frequently in intense activity over the Aegean Sea where mesoscale components are also important. In this presentation the characteristics of such a rapid cyclogenesis over Eastern Mediterranean is discussed. Emphasis is given in an extreme case that was characterized by strong pressure gradients (case of 22 January 2004). The role of the SSTs and the surface fluxes in the rapid intensification of the system was explored. A number of sensitivity tests have been performed in order to investigate the response and in general the predictability of the system. As it was found SST perturbations even by 1oC may lead to significant modification of convective activity and in general in the mesoscale structure. The model used for this analysis is the nonhydrostatic version of the SKIRON/Eta modeling system. This work has been performed at the framework of the EU-funded projects MFSTEP and ENVIWAVE with main objective the establishment of a sea-state forecasting system.