

Sensitivity study of two Mediterranean tropical-like storms

Ll. Fita and R. Romero and C. Ramis(1)

Grup de Meteorologia, Departament de Física, Universitat de les Illes Balears, Palma de Mallorca, Spain

Tropical-like storms have been detected over the Mediterranean Sea. These systems have been described as cloudy rounded structures showing a free cloud area in the centre. Moreover they were associated to strong cyclonic winds and a warm core. Despite these systems did not reached the hurricane strength, they presented some dynamical and structural similarities with the tropical storms. Theoretical studies of the tropical storms depicted a significant sensitivity to sea surface temperature, and the heat exchanges between sea and the boundary layer of the tropical system. In addition, recent studies show some differences on the evolution of these systems in the Mediterranean basin in comparison to the tropical ones. They show that a cold, upper low centre over the area was present in some cases. The instability induced by the upper level low in addition to the low level stability seem to be the necessary conditions to develop these tropical systems over the Mediterranean basin. A set of numerical simulations with the MM5 numerical model is presented to validate these hypothesis. Factor Separation technique is applied to four factors of the storms: Sea surface temperature, Latent Heat Flux from the Sea, Sensible Surface Heat Flux and Upper level Potential Vorticity anomaly. Their effects and related synergies are studied over the central pressure of the storm and related cyclonic winds of two cases: the January 1995 South Jonic Sea storm and May 2003 Balearic Islands storm. Preliminary results shown the importance of these aspects. However the dynamical features of these systems are shown more complex than the dynamics of pure tropical systems.