



Stationary nocturnal offshore precipitation near the coastline in the Mediterranean basin

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Nocturnal offshore precipitation near the coastline caused by the convergence between drainage winds and a synoptic flow has been well studied in the tropical areas by several authors (e.g. Yu et al., 2004; Frye, 2001; Oshawa et al., 2001; Mapes et al., 2003). However, the existence of this mechanism of precipitation in the Mediterranean basin has been scarcely studied (Callado et al. (2002) in the Northeast of the Iberian Peninsula; Mazón and Pino (in press) in the Mediterranean coast of the Iberian Peninsula; Greich et al. (2004) and Newman (1951) in Israel). Drainage winds lead offshore the cold inland air, which might form a coastal front. The relative warm and wet Mediterranean air lifts over this cold drained air mass, and convective clouds may appear if the air reaches the Level of Free Convection (LFC).

The focus of our presentation is the stationary nocturnal offshore precipitation in the Mediterranean basin. By using TRMM database and radar reflectivity images that cover some areas of the coastline, many nocturnal events have been detected. In order to analyze and characterize this type of precipitation, the version 3 of the WRF mesoscale model has been used to simulate and analyze this type of events. The main precipitation detected and simulated in these events uses to be weak, last few hours, and moves offshore, as a difference than those produced in tropical areas, where the nocturnal convective lines are longer, produce more intense precipitation, and move faster offshore. However, in some detected cases in the Mediterranean basin a convergence line is formed near the coastline, producing moderate precipitation, and due to a counterbalance between the drainage wind and the synoptic wind this line of convection remains stationary or quasi-stationary during the whole night and the early morning, disappearing at morning.

Two WRF simulated events of a nocturnal offshore stationary precipitation near the coastline will be shown. By using the parameters proposed by Miglietta et al. (2010) and Wang et al. (2000) we have quantified the stationarity of the convergence line according the values of the LFC, the relative horizontal wind against the drained cold air, and the Brunt-Väisälä frequency. In the first selected event, several cells were formed in a convective line with more than 100 km length from 22 UTC on 5th January to 09 UTC on 6th January several kms offshore the coastline of Israel and Lebanon, with an accumulated precipitation around 10 mm every hour many convective cell. Some of these cells moved onshore and the precipitation affected the coastline. The second selected and simulated event occurred in the Gulf of Geneva on 30th and 31st January 2008.