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- Recent Papers
- Volumes**
- Library Search
- Title and Author Search

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Submission

Review

Production

Subscription



[Volumes](#) [Contents of Volume 7](#)

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A mesoscale convective system trapped along the Spanish Mediterranean Coast

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Abstract. This paper describes the evolution of a mesoscale convective system (MCS) developed over the Alboran Sea on 7 February 2005, using surface, upper-air stations, radar and satellite observations, and also data from an operational numerical model.

The system developed during the night as a small convective storm line in an environment with slight convective instability, low precipitable water and strong low-level vertical wind shear near coast. The linear MCS moved northwards reaching the Spanish coast. Then it remained trapped along the coast for more than twelve hours, following the coast more than five hundred kilometres.

The MCS here described had a fundamental orographic character due to: (1) the generation of a low-level storm inflow parallel to the coast, formed by blocking of the onshore flow by coastal mountains and (2) the orientation of both the mesoscale ascent from the sea towards the coastal mountains and the midlevel rear inflow from the coastal mountains to the sea.

The main motivation of this work was to obtain a better understanding of the mechanisms relevant to the formation of heavy rainfall episodes occurring at Spanish Mediterranean coast associated with this kind of stationary or slowly moving MCSs.

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