



Factors for the development of explosive cyclones in the Mediterranean region

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An explosive cyclone ("bomb") is characterised by an unusually large deepening rate of its core pressure at mid-latitudes. There are numerous studies investigating the factors leading to such extreme developments, which have their focus on regions outside of the Mediterranean area. Among the factors that have been found to contribute to the initiation of explosive developments are local baroclinicity and latent heat release.

The occurrence of explosive cyclones in the Mediterranean is comparatively rare. A recent climatology of "bombs" in the Mediterranean has identified such systems and located preferred regions for the explosive development. This study analyses explosive cyclones over the Ionian Sea using the ERA-Interim dataset. The choice of the region was motivated by two factors: a) a reasonable number of explosive cyclones (26) have been detected over the area during the ERA-Interim period (1989-2010); and b) the influence of orography is assumed to be moderate.

Baroclinicity and latent heat release in the area are investigated by analysing eady growth rates and equivalent potential temperatures. Composites show that the role of both factors depends on the path of the cyclone. Strong positive anomalies are found for systems generated nearby, systems entering the region from the south and systems which remain in the vicinity for some time. For systems entering the region from the North West via the Alps, local baroclinicity and latent heat release are of minor importance. The results of individual selected systems are compared to examples found for North Atlantic explosive cyclones.