



## **Synoptic and thermodynamic study of severe hail events over the area of Cyprus**

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Hail is a hazardous weather element often accompanying a thunderstorm, which results either from thermal instability or from frontal depressions. Nevertheless, instability and thunderstorm activity do not always cause the formation of adequate size of hail to reach ground. The knowledge concerning hail is useful for the better understanding of the underlying thermodynamic and dynamic mechanisms and physical processes associated with its formation.

The severe hail events over Cyprus during a ten-year period, from 1996 until 2005, were examined and grouped into two clusters, the “instability cluster” and the “frontal depression cluster”. For the “instability cluster” several thermodynamic indices were calculated, using the data for 1200UTC, from Athalassa radiosonde station in Cyprus.

For the “frontal depression cluster” the characteristics of the associated synoptic situation were examined and the fields of a lower tropospheric stability index, relative vorticity and divergence of the horizontal wind vector were calculated. The NCEP/NCAR global analyses for 0000UTC, with a grid of 2.5x2.5 degrees were used in order to perform the necessary mathematical calculations. The calculations covered the area bounded by the meridians 20W and 50E and the parallel circles 20N and 65N. Some thermodynamic-instability indices were also calculated for this cluster.

The synoptic and dynamic characteristics and the thermodynamic instability indices of the day before, the day of occurrence of a hail event and of the day after were listed, in order to create a useful forecasting tool for local weather forecasters. The most representative indices were chosen for further study, while their critical thresholds and seasonal variations were classified.