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Instability indices and unstable atmospheric conditions over Greece

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Significant research has been carried out investigating the use of diagnostic variable sets or instability indices, as forecasting tools or parameters to identify favorable atmospheric conditions of severe convective weather. Indeed, the value of such variables is strongly associated with their capacity to summarize in a single number some characteristics of the severe storm environment, thus, operational forecasters use them to address the overall threat of severe weather associated with convective storms.

In this paper a spatial and temporal analysis of specific instability indices over Greece during 2008-2014 period is presented. The energy helicity index (EHI), the bulk Richardson number (BRN) shear, the storm-relative environmental helicity (SRH), and the convective available potential energy (CAPE) were considered as principal diagnostic instability variables and employed in spatial and temporal analysis.

The EHI, BRN, SRH and CAPE indices were calculated from ERA-Interim reanalysis dataset of European Centre for Medium-Range Weather Forecasts. The lighting activity, recorded by the Hellenic National Meteorological Service (HNMS) Precision Lighting Network (PLN), is employed to highlight favorable atmospheric conditions of severe convective weather.