Development of an algorithm for convection detection by means of IR observations from geosynchronous satellites and lightning data from VLF ground-based networks: Application to the FLASH Project case studies over Italy.

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In this study, we present an algorithm for monitoring cloud convection, which is obtained by enhancing the GCD (Global Convective Diagnostic) technique (Mosher 2001) by means of lightning data information provided the ZEUS VLF ground network. We first investigate how the dual band GCD algorithm (WV – IR) can be improved using other SEVIRI (Spinning Enhanced Visible and Infrared Imager) bands to obtain additional cloud information from the MSG geosynchronous satellite. Then we discuss its enhancement using lightning data. To this end, we use five recent case studies over Italy, that have been selected within the FP6 FLASH project, and validate the results with available ground radar data. Finally, the one-dimensional cloud electrification model EMTM (Explicit Microphysics Thunderstorm Model) is used to simulate the non-inductive cloud electrification, so as to help us understanding the microphysical/electrification processes of the selected precipitating systems.