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Convection characterization by means of infrared observations from geosynchronous satellites and lightning data from VLF ground-based networks

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The purpose of this study is to show that lightning information is valuable for improving the estimation of cloud convection from visible-infrared (VIS-IR) imagers on geosynchronous (GEO) satellites. To this end, we use lightning data from the ZEUS VLF ground network in conjunction with IR data from the Spinning Enhanced Visible and Infrared Imager (SEVIRI) on board the European METEOSAT Second Generation (MSG) satellite, for a series of thunderstorms over the Mediterranean area that have been selected for the database of the new European Union FP6 FLASH project, that aims at improving the monitoring, nowcasting and forecasting of the hazardous, flood-producing storms that intermittently strike the Mediterranean coastal regions.

Specifically, we first enhance the Global Convective Diagnostic (GCD) algorithm (Mosher, 2001) by adding lightning information, and then compare our results on cloud convention – obtained by means of both the GCD and enhanced-GCD algorithms – with concomitant lightning and radar measurements taken by the Lightning Imaging Sensor (LIS) and the Precipitation Radar (PR) on board the Tropical Rainfall Measuring Mission (TRMM) space observatory.