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On the relationship between TRMM 3B-42 datasets and cloud-to-ground lightning observations over Greek territory.

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The spatial and temporal relationships between TRMM 3B-42 (Tropical Rainfall Measuring Mission) datasets and lightning observations from Hellenic National Meteorological Service (HNMS) Precision Lightning Network (PLN) were analyzed over the wider area of Greece.

The analyses concern the period from January 14, 2008 to December 31, 2012. The TRMM 3B-42 product comprises 3-hourly gridded rainfall data with a resolution of $0.25^\circ \times 0.25^\circ$. The dataset is created using a combination of initial data from multiple satellites and ground gauges. The satellite data are mainly passive microwave (MW) data from low orbit satellites and infrared (IR) data from geosynchronous satellites. The data for retrieving the location and time-of-occurrence of lightning were acquired from HNMS. An operational Precision Lightning Network (PLN) has been established since 2007 by HNMS, consisting of eight time-of-arrival sensors (TOA), spatially distributed across Greek territory. Lightning data were first upscaled to TRMM's grid resolution schema and thereafter correlated with gridded daily rain rate and altitude for a quantitative and qualitative analysis.

The seasonal and annual spatial correlation between TRMM 3B-42 and lightning datasets was based on Pearson correlation coefficients. All the analyses were carried out with respect to cloud to ground (CG) lightning, within the examined time period. The findings revealed patterns of co variability of the examined parameters within specific geographical sub-regions, mainly depended on the altitude.