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ZEUS and Meteosat observations during thunderstorms over Europe and Mediterranean Sea

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Lightning activity has been related to convection in several studies. It has been shown that lightning activity should allow us to determine new concepts and tools for operational applications. In addition long-range lightning sensors covering regions like Africa (ZEUS) or Australia-Asia (TOGA) where almost no ground observations are available, offer additional information to document the global water budget.

The National Observatory of Athens is operating the long-range VLF ZEUS lightning network composed of 5 stations located in Portugal, UK, Denmark, Romania and Cyprus. ZEUS monitors in real-time the lightning activity over Europe and the Mediterranean Sea.

Meteosat provides visible, infrared and water vapor images every 30 min of Europe and Africa. Meteosat images are the only continuous cloud observations for regions like the Mediterranean Sea and Africa where almost no radar observations are available.

Meteosat IR sensor (at 12 um) measures the brightness temperature (Tb) of the cloud top. Flash density (Fd) and flash rate (Fr) are the two variables used in the present study to quantify the lightning activity based on ZEUS measurements over Europe and the Mediterranean Sea. Comparisons of Tb with Fd and Fr will be shown based on statistical analysis. In addition we will present the results of the analysis of two situations, one continental and one maritime, that are currently investigated.