A real time pipeline to link meteorological information and TGFs detected by AGILE

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Terrestrial Gamma-ray Flashes (TGFs) are brief (<ms) and intense gamma-ray (up to tens of MeV) emissions coming from the lowest part of Earth's stratosphere ($\sim$15 km a.s.l.), strictly correlated with thunderstorms and atmospheric electric activity. Unexpectedly discovered in the early 1990s by the CGRO, TGFs have been further investigated by several satellites devoted to high-energy astrophysics. The AGILE mission turns out to be particularly suitable to detect TGFs, because of its very wide energy range (up to 100 MeV and beyond), its optimized triggering system and its equatorial orbit.

We describe a new alert service that has been developed for the AGILE satellite, whose aim is to provide "real time" meteorological information about the detected TGFs. We take advantage of the Meteosat Second Generation (MSG) satellites data to promptly identify the possible individual thunderstorm or mesoscale convective system associated to the detected TGF event and to follow its evolution in space and time. Data from other meteorological satellites, for example the GPM mission, as well as ground measurements from lightning detection network, can be integrated in the pipeline. This allows us a prompt characterization of the ground meteorological conditions at TGF time which will provide instrument independent trigger validation, fill in a database for subsequent statistical analysis, and eventually, on a longer term perspective, serve as a real time alert system open to the community.