Simulations of atmospheric TGFs and related physical processes: detection from space and side effects on MXGS/ASIM

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The Atmosphere-Space Interactions Monitor (ASIM) is an ESA mission which will be attached to the Columbus module of the International Space Station (ISS). The main goal of the ASIM mission is to characterize the optical and high-energy emission related to severe thunderstorms. We are setting up a set of simulations in order to analyse the expected detections from ASIM and in particular from the Modular X-ray and Gamma-ray Sensor (MXGS) imager. On the one hand we have developed a mass model of the instrument for its use in Geant4 applications. We plan to characterize the response of the instrument to the incident high-energy radiation, and the effects of background from backscattered photons from the Columbus module. On the other hand we are developing a set of atmospheric models to set up Geant4 simulations of electron avalanche and gamma-ray propagation, with emphasis on: a) the possible residual optical emission due to interaction with atmospheric components, and b) the expected spectral and timing properties of the resulting high-energy emission towards space. We plan to include comparisons with other software toolkits like CORSIKA or LEPTRACK (under developed at the University of Valencia).