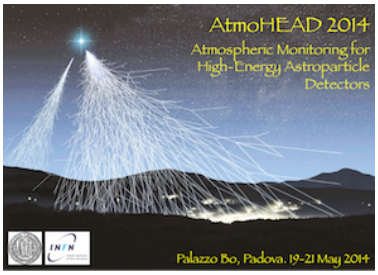

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Retrieval of optically thin cloud emissivity from brightness temperatures provided by IR Camera of JEM-EUSO Mission

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Clouds interact with the radiation propagating through the atmosphere absorbing, reflecting and transmitting part of the energy. This interaction may lead to misinterpretation of data retrieved from the radiation observed by JEM-EUSO UV telescope. At the same time the interaction cloud-ratiation can be used to retrieve cloud properties. JEM-EUSO Mission includes an Atmospheric Monitoring System (AMS), consisting of a LIDAR and an IR Camera, devoted to provide the cloud coverage and the cloud height in the FOV of the main UV Telescope.
Different methods can be applied to retrieve the cloud top height from IR images: stereoscopic and radiative techniques. Radiative algorithms are based on the Radiative Transfer Equation which changes significantly depending on the cloud optical depth (thick or thin clouds). The cloud temperature retrieval becomes much more difficult for thin clouds (emissivity lower than 1).
In this work we present a methodology based on brightness temperatures in 10.8 and 12 micrometers bands measured by the JEM-EUSO IR camera. The method uses Look Up Tables (LUTs) which involve values of emissivity and brightness temperature differences in both bands. This LUT method has been validated with data obtained by simulation but also in real scenarios (MODIS images). The results are very promising for emissivities higher than 0.5. For lower emissivities, the retrievals become much more difficult since the IR radiation impinging the IR Camera also comes from other emitters such as Earth surface and atmosphere beneath the cloud.

Primary author: Dr FERNÁNDEZ-GÓMEZ, Isabel (Universidad Carlos III de Madrid)

Co-authors: Dr DE CASTRO, Antonio J. (Universidad Carlos III de Madrid); Dr LÓPEZ, Fernando (Universidad Carlos III de Madrid); Ms RODRÍGUEZ, Irene (Universidad Carlos III de Madrid); Dr BRIZ, Pacheco (Universidad Carlos III de Madrid)

Presenter: Dr BRIZ, Pacheco (Universidad Carlos III de Madrid)

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