

A study on UV emission from clouds with Mini-EUSO

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Mini-EUSO is the first mission of the JEM-EUSO program located on the International Space Station. One of the main goals of the mission is to provide valuable scientific data in view of future large missions devoted to studying Ultra-High Energy Cosmic Rays (UHECRs) from space by exploiting the fluorescence emission generated by Extensive Air Showers (EAS) developing in the atmosphere. A space mission like Mini-EUSO experiences continuous changes in atmospheric conditions, including the cloud presence. Therefore, the influence of clouds on space-based observation is an important topic to investigate from the EAS point of view as it might alter the instantaneous exposure for EAS detection or deteriorate the quality of the EAS images with consequences on the reconstructed EAS parameters. For this purpose, JEM-EUSO planned to have an IR camera and a lidar as part of its Atmospherizing Monitoring System. At the same time, it would be extremely beneficial if the UV camera itself would detect the presence of clouds, at least in some specific conditions. For this reason, we are performing a few case studies with Mini-EUSO by comparing the variation of pixel count rates during orbits with re-analyses of the atmospheric state, namely the cloud cover in different height bands and its optical depth, performed employing the global model Global Forecast System (GFS). GFS is already used to supply the real-time forecasts of the atmosphere during the Mini-EUSO sessions; here, it is paired with different satellite products such as MODIS Terra-Aqua or VIIRS. The results of this analysis will be reported.

Keywords

Mini-EUSO; UV detector; cloud cover; atmospheric observations; atmospheric models

Collaboration

other Collaboration

Subcategory

Experimental Methods & Instrumentation

Authors: GOLZIO, Alessio (INFN Torino, Università degli Studi di Torino); Dr BATTISTI, Matteo (INFN Torino); Prof. BERTAINA, Mario (INFN Torino); Dr CASOLINO, Marco (INFN Roma); Prof. CASSARDO, Claudio (Università degli Studi di Torino); Dr CREMONINI, Roberto (ARPA Piemonte); Dr FERRARESE, Silvia (Università degli Studi di Torino); Dr MANFRIN, Massimiliano (Università degli Studi di Torino); Dr MARCELLI, Laura (INFN Roma); Dr SHINOZAKI, Kenji (National Centre for Nuclear Research, Lodz, Poland)

Co-author: FOR THE JEM-EUSO COLLABORATION

Presenter: GOLZIO, Alessio (INFN Torino, Università degli Studi di Torino)

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