Project Title:

Development and test of software to be used for JEM-EUSO simulation and event reconstruction.

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The JEM-EUSO space observatory will be launched and attached to the Japanese module of the International Space Station (ISS) by 2016. It aims is to observe UV photon tracks produced by Ultra High Energy Cosmic Rays (UHECR) developing in the atmosphere and producing Extensive Air Showers (EAS). JEM-EUSO will use our atmosphere as a huge calorimeter, to detect the electromagnetic and hadronic components of the EAS. The Atmospheric Monitoring System plays a fundamental role in our understanding of the atmospheric conditions in the Field Of View (FOV) of the telescope and it will include an IR-Camera for cloud coverage and cloud top height detection.

For UHECR experiments, the atmosphere acts not only as the showering medium for the primary cosmic ray, but it is also an essential part of the readout system. Thus, the atmosphere must be calibrated, and consider as input to the analysis of the fluorescence data. Major uncertainties in the fluorescence energy measurements come from the precision of various atmospheric transmission effects, air Cherenkov subtraction, multiple scattering of light and cloud corrections.

The use of the RICC is focused in the simulations developed for the IR-Camera. This work give us the capabilities to study the impact of several scenarios of the atmosphere, in terms of retrieval temperature accuracy, detection capabilities, calibration procedures, and correction factor to be taken into account for the final data products of the AMS

system of the JEM-EUSO Space Mission. At this design stage of the IR camera prototype, this E2E simulation is giving us some answers in key points of the design, like the compression algorithms evaluation, and estimation of expected accuracy of calibration options. This simulation is composed by 2 parts, the SDSU (H. Masunaga, Bulletin of the American Meteorological Society (BAMS), 91,1625-1632 (2010)) and the instrument simulator still being developed.

In this year the work will be based in the data reconstruction code for the IR-Camera, where several data analysis methods will be analyzed and we hope to arrive to publications and conclusions.

Fiscal Year 2013 List of Publications Resulting from the Use of RICC

[Publication]

[Proceedings, etc.]

 J.A. MORALES DE LOS　RIOS et al, An End to End Simulation code for the IR-Camera of the JEM-EUSO

Space Observatory, 33ND INTERNATIONAL COSMIC RAY CONFERENCE, RIO DE JANEIRO (2013).

[Oral presentation at an international symposium]

[Others]