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# A novel image correction method for cloud-affected observations with Imaging Atmospheric Cherenkov Telescopes

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The imaging atmospheric Cherenkov observational technique employs the atmosphere as part of the detector, thus it is sensitive to all the changes taking place in it. Particularly, in the presence of clouds, the detector registers incomplete and degraded information caused by additional light absorption. Such data are often rejected from further analyses due to increased systematic errors. In order to exploit data that are affected by the presence of clouds, we developed an innovative correction method on the image parameters based on a simple geometrical model. In this approach, the pixel position on the camera is related to the expected height of the emitted Cherenkov light registered by that pixel.

We present the results of an investigation of a correction method applied to Monte Carlo simulations, imitating the very-high-energy events affected by clouds registered by an array of four Large-Sized Telescopes, at the core of the future Cherenkov Telescope Array Observatory Northern site. We studied the one- and two-layer clouds located at different heights, assuming various transmission parameters. We show the effect of the correction method, which efficiently corrects for the extinction of light in clouds and improves the reconstruction of gamma-ray events, as well as overall system performance. In particular, this correction method does not need additional time-consuming and computationally intensive Monte Carlo simulations in order to be applied to real data.

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