

## **MONITORING TECHNIQUES AND METHODS OF ATMOSPHERIC CHARACTERISTICS AT HIGH ALTITUDE OBSERVATORIES ABOVE THE TIBETAN PLATEAU**

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**Abstract.** Since the atmospheric conditions at an observatory are of great importance for ground-based astronomical observations, and based on the key atmospheric elements influencing astronomical observations in different wavelengths, such as cloud cover, precipitable water vapor, wind, optical turbulence, atmospheric transparency, radiation, and so on, a lot of research on measurement techniques and methods for obtaining atmospheric characteristics have been carried out. In addition to the atmospheric characteristics of the whole layer, that in the near-surface layer especially the boundary layer are particularly essential for ground-based photoelectric equipment, as well as the characteristics in the upper air, in particular, in the near space, affecting the monitoring equipment, experimental platform, laser transmission, etc. in the upper atmosphere. In this study, based on the site survey of multiband observatories over China, as well as the site testing at the Ali observatory located on the most western Tibetan Plateau, at an altitude above 5050 m above sea level, a series of monitoring techniques and methods for obtaining the characteristics of atmosphere from ground to upper air will be introduced.

**Key words:** atmospheric characteristics, cloud cover, precipitable water vapor, optical turbulence, atmospheric transparency, radiation, numerical model, atmospheric radiation transmission model, machine learning, Ali observatory.