

# MODELING RESEARCH ON ATMOSPHERIC OPTICAL CHARACTERISTICS FOR GROUND-BASED OBSERVATIONS

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The atmospheric optical properties are crucial for evaluating observation conditions at astronomical observatories, which can affect the imaging quality and resolution of ground based telescopes. With the development of astronomical high-resolution methods and techniques, especially adaptive optics, that encourage higher requirements of studying atmospheric optics and the measurement techniques. For large telescope construction, the study of atmospheric optical properties is not only the major work of site survey, but also the essential correction parameters for improving the resolution in the operation of telescopes, including the integral of atmospheric turbulence parameters of the whole atmosphere, and that at different altitudes from ground to upper air. Based on meso-scale numerical model, we are committed to establish a forecasting system of atmospheric optical properties with high precision, to qualitatively describe the characteristics of optical parameters in detail, and provide forecasts of turbulence characteristics at an observatory. Take the Ali observatory above the Tibetan Plateau as an example, factors such as complex terrain, ground overlays, specific climate and so on need to be considered for the configuration of the numerical model, to ensure the reliability of the results. Based on the accurate parametric models of each atmospheric parameter built combined with measuring equipment at the observatory, the cloud cover, precipitable water vapor, atmospheric turbulence, optical aerosol and so on have been summarized. The forecasting model system has been demonstrated to be a useful tool for estimating atmospheric characteristics, that will be of great significance and can provide reliable guidance for scheduling astronomical observations, site survey, adaptive optics, communication engineering, laser transmission and others.