

Large Eddy Simulation of the Optical Turbulence under Various Stability Conditions

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In this present study, the optical turbulence in the horizontally homogeneous atmospheric boundary layer is modelled by making use of the results of the large eddy simulations. Before investigating the atmospheric optical turbulence and refractivity, large eddy simulation results are compared with the full-scale measurements. Different cases are investigated corresponding to different stability classes, ranging from very stable ($L=27$ m) to very convective stability ($L=-74$ m). The variations of the dissipation are of the turbulence kinetic energy and the molecular destruction rate of temperature variance, which are related with the parameterization of the optical turbulence, are investigated for different stability classes. Finally, an algebraic relationship, as a function of the boundary layer properties, is proposed to be used by the mesoscale models for the parameterization of the optical turbulence.