

Study of atmospheric turbulence characteristics in Northwest Bohemia

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This study presents atmospheric turbulence characteristics observed in the year 2017 at the Kopisty meteorological station in the northwest part of Bohemia, Czech Republic. The utilised datasets came from a 3D ultrasonic anemometers mounted on an 80 m high meteorological mast at heights of 20, 40, 60 and 80 m. High frequency three wind components and sonic temperature were measured, as well as 10-minute data of temperature, humidity, barometric pressure and other meteorological physical quantities. Time intervals in order of hours were selected from the primary datasets and integral turbulence characteristics and spectral characteristics were analysed. Selected time intervals were organised into two groups, where the first group comprised of days with high mean wind speed and the second group comprised of days with unstable atmospheric stratification. Friction velocities are calculated in order to evaluate the integral turbulence characteristics (ITCs). The ITCs are then compared with other authors and evaluated spectral characteristics are compared with the theoretical spectral models. Eddy covariance software TK3 and MATLAB were utilised in data processing.

This paper aims to extend the database of studies of atmospheric turbulence characteristics, especially for the Central European region, which are not so frequent in the available literature. Also, a better understanding of flow and turbulence in this region severely influenced with brown coal mining and heavy industry is desirable.

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