



Characterization of air flow patterns at the Atmospheric Station Křešín u Pacova

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In 2013 the 250 m tall atmospheric tower was finished construction as the major part of the Atmospheric Station (AS) Křešín u Pacova, central Czech Republic. The AS is part of international monitoring networks, most importantly ICOS (www.icos-infrastructure.eu). Concentrations of greenhouse gases, selected air quality and meteorological parameters are measured at 5 altitudes. It is therefore important to characterize the tower and the AS from the viewpoint of air flow patterns in order to interpret the measured data correctly. As it is known, climate, meteorology and atmospheric pollution is a linked system and it is necessary to study them together.

For characterization of the air flow patterns at the AS, wind speed and direction data at 10 m height measured at the adjacent Observatory Košetice since 1988 was used. The dataset was related to the data obtained from the NCEP/NCAR reanalysis project, namely the wind direction and speed at the pressure levels of 925 hPa, which approximately corresponds to the tower height of 250 m, and 850 hPa, where the air flow is considered not to be influenced by the Earth's surface. Then several analyses such as calculation of prevailing wind direction, possible long-term changes in advection (i.e. shifts in prevailing wind directions) and identification of the occurrence and variability of extreme situations were done. Selection of the years with typical flow patterns is necessary for the future characterization of the tall tower by a footprint analysis. Wind direction data was also compared with calculated air parcel back-trajectories to confirm that they present advection typical for the present-day climate.

All obtained results are important for understanding which sources could contribute to the measured values due to the long-range transport and what is possible development of the air flow characteristics at the station in the future.