Spectral composition of photosynthetically active radiation over one year and its relation to cloud cover

Marie Opáliková, Thomas Matthew Robson, Martin Navratil and Vladimir Spunda
University of Ostrava, Czech Republic

The city of Ostrava is situated in the north-eastern part of the Czech Republic in central Europe and air pollution is a large problem in this area. Pollution causes health problems for people, but aerosols influence solar radiation too. The resultant changes in the spectral composition of photosynthetically active radiation (PAR) may be large enough to influence crop yields, and this is the reason why a study of solar radiation is important in an area where the air is polluted. Solar radiation and its composition are measured by a system of radiation sensors, which is located in polluted part of Ostrava, in the area of Botanical Garden (University of Ostrava). In this work, the spectral composition of PAR around midday is shown for sunny and cloudy days over four months (March, June, September and December). Large deviations during cloudy days (because of the heterogeneity of clouds) and relatively small deviations during sunny days (because of the values for radiation on clear days are similar over one month) were recorded. Blue part of PAR usually represents higher proportion than other parts on clear days. For our next work, we would like to compare solar radiation reaching the Earth's surface at two locations (one with higher pollution and the other with lower pollution) and make experiments with plants (in the localities of the sensors, and in growing chambers too).

Biography

Marie Opálková finished her Master’s Degree in 2013 at the University of Ostrava, in the Czech Republic. After her Master’s thesis, she focused on influence of water stress on plants, and she started her PhD studies with a focus on solar radiation changes in polluted areas of Ostrava. She has taken part in one international and five national conferences. She has published one paper in a peer-reviewed journal (on the topic of her Bachelor’s thesis).

opalkovamarie@seznam.cz