



Growing degree days variability in Central Europe in response to contemporary climate changes

Agnieszka Wypych (1), Zbigniew Ustrnul (1), Agnieszka Sulikowska (1), Malgorzata Sliwinska (1), and Frank-M. Chmielewski (2)

(1) Jagiellonian University, Cracow, Poland, (2) Humboldt-University of Berlin, Germany

The temperature rise in the Northern hemisphere, especially in Europe, may lead to a change in plant phenology and agricultural production in consequence.

The aim of the study is to estimate the long-term variability of thermal conditions in Central Europe described by growing degree days index (GDDs), which quantifies the amount of heat accumulated each day. GDDs were calculated for the period 1951-2010 using gridded data of daily maximum and minimum air temperatures from the E-OBS dataset at 0.25° spatial resolution. To assess the impact of temperature variability on plant vegetation temperature thresholds of 0°, 5° and 10°C were used as base GDD temperature values, as meaning: warm period, heat supply for vegetation period and the period of active plant growth respectively.

Detailed analyses of GDDs spatial distribution in Central Europe were carried out and followed by long-term variability and trend estimation. The latter were performed by using linear regression method.

As a result the significant increase in growing season length bringing the increase in the amount of heat accumulated each year was proved. Though it differs regionally reflecting oceanic and continental climatic conditions of respectively western and eastern part of the area.

The demonstrated rise of heat resources supports predictions about possible vegetation cover or plant cultivation changes as a response to progressive warming.