



Comparison of the CO₂ budget under two different climatic conditions in Hungary

K. Pintér (1,2), Z. Nagy (1), J. Balogh (1), Z. Barcza (2), Sz. Czóbel (1), Sz. Fóti (1), Z. Tuba (1) and T. Weidinger (2)

(1) Department of Botany and Plant Physiology, Szent István University, (2) Department of Meteorology, Eötvös Loránd University, (kriszta@nimbus.elte.hu/Fax +36 1 372 2904)

The carbon dioxide (CO₂) budget of semi-arid grasslands is in the centre of interest nowadays. There are two sites in Hungary where continuous eddy-covariance and supporting micrometeorological measurements are carried out to quantify the carbon balance of a grassland. One of them is at Bugacpuszta (46°41'31'' N, 19°36'06''E, 140 m a. s. l.), in the Hungarian Great Plain. The climate of the region is temperate continental (yearly precipitation is less than 500 mm, the average temperature during the growing season is above 17.5°C). The vegetation is semi-arid sandy grassland. The other site is situated in the northeastern part of Hungary, in the Mátra Mountains next to Szurdokpüspöki (47°50'31''N; 19°43'34''E, 350 m a. s. l.), on a heavy clay soil. The climate is temperate dry with strongly continental characteristics (warm, dry summers) with 600 mm precipitation in a year and 11 °C average annual temperature. Present study covers the period between June 2003 - December 2004, including the extremely dry summer of 2003, and the whole next year when the amount of precipitation was considerably higher in the whole region. Daily average temperatures were similar at the two sites with larger amplitude of daily temperature changes on the plain than in the mountains. The daily sum of the incident PAR at Bugacpuszta slightly exceeded the value measured at Szurdokpüspöki. In June 2003 the amount of water available to plants was more at Bugacpuszta than in Szurdokpüspöki, which resulted in a net carbon uptake by the vegetation on the plain while at the mountain site the vegetation acted as a net carbon source. In August the situation changed because of a precipitation event in the mountains. During the spring and summer of 2004 the vegetation was more active at Bugacpuszta than at Szurdokpüspöki. In September 2004 a second growing period occurred at Bugacpuszta due to precipitation events,

but in the mountains the amount of precipitation was not enough for the vegetation. Both sites turned to be a net carbon sink in 2004 and the annual sum of the C exchange at Bugacpuszta was larger than at Szurdokpüspöki. This difference was mainly due to the spatial variability of the precipitation and to the markedly different water economy of the soils of the two grasslands.