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Carbon balance of steppe reserve in Central Russia

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In 2014 eddy covariance tower was installed at the weather station "Streletskaya steppe" - site of the Central Chernozem state natural biosphere reserve named after Professor V. V. Alekhin in the Kursk region, Russia. This area is the reference model of forest-steppe of the European part of Russia. According to available historical data, last 300-400 years vegetation on the present territory of the reserve was formed under the influence of mowing and grazing. On relatively small territory there are 860 different species of herbs, shrubs and trees. With biodiversity up to 87 species of plants on one square meter of steppe. Such biodiversity is rare in the Central regions of Russia. Territory of reserve are managed under several regimes: cut (mowing is simulating herbs eating by wild ungulates, which are now gone), pasture, uncut, pyrogenic (when the parts of the steppe are burned). The tower was installed on the border of uncut and cut steppe, where maximum biodiversity detected. Soil cover is represented by the typical chernozems with up to one-meter deep layer of humus layer.

Half hour carbon dioxide fluxes from the investigated area was calculated for whole year of 2014 utilizing the eddy covariance method. For all wind directions fluxes footprints was shorter than 250m during the time of monitoring. Because of the peculiarities of the wind flow was analysed mainly from cut part of the site. Part of footprints included areas of uncut and cut steppe, as result, for more accurate interpretation algorithm 2d footprints calculation by Kljun 2014 was applied

Diurnal difference between day and night fluxes were increasing from winter to summer period reaching it’s highest point in July. Rare precipitation periods significantly influenced the difference in the summer months. Resulting Net ecosystem exchange for the period 2014 was -123 g C/(m2 year)