Long-term evapotranspiration rates for rainfed corn vs. perennial bioenergy crops in a mesic landscape

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Abstract

Hydrologic implications of the conversion of agricultural or conservation lands for annual vs. perennial bioenergy crop production are scarce. We converted three 22 year-old Conservation Reserve Program (CRP) grasslands and three 50+ year-old conventionally tilled corn-soybean rotation agricultural (AGR) lands to no-till corn, switchgrass (*Panicum virgatum* L.) or restored prairie. A seventh site was maintained in the preexisting CRP grassland dominated by smooth brome grass (*Bromus inermis* L.). We measured evapotranspiration (ET) using the eddy covariance method on all fields for over more than nine years (2009-2018). The ET data are presented for annual, growing season, and non-growing seasons. The difference in ET between corn and perennial crops is also presented for all seasons. In addition, aboveground net primary productivity (ANPP) during peak growing season is presented.

Methods

Water vapor concentrations (LI-7500 IRGA, LI-COR Biosciences, Lincoln, NE, USA) and wind velocity (CSAT3 three-dimensional sonic anemometer, Campbell Scientific Inc. Logan, UT, USA) were sampled at 10 Hz frequency using open-path eddy covariance (EC) method in southwest Michigan at seven

agricultural fields over 10 years (2009–2018). The data were analyzed using EdiRe software (University of Edinburgh, v 1.5.0.32, 2012) to compute half-hourly evapotranspiration (ET) from all fields. Missing or poor quality data were replaced using a standardized gap-filling algorithm. The study was conducted at the Kellogg Biological Station (KBS) Great Lakes Bioenergy Research Center (GLBRC) Scale-up fields.

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References

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Files

2 files for this dataset

Abraha_2019_HP_ETrates.xlsx	32.49 kB	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
Readme_Abraha_201..._HR_ETrates.docx	23.73 kB	application/vnd.openxmlformats-officedocument.wordprocessingml.document

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