

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Papers in Natural Resources

Natural Resources, School of

1-13-2020

The Impacts of Irrigated and Rainfed Agriculture on Near-Surface Atmosphere: Preliminary Results from GRAINEX

Emilee Lachenmeier

Rezaul Mahmood


Trenton E. Franz

Eric Rappin

Udaysankar S. Nair

See next page for additional authors

Follow this and additional works at: <https://digitalcommons.unl.edu/natrespapers>

 Part of the [Natural Resources and Conservation Commons](#), [Natural Resources Management and Policy Commons](#), and the [Other Environmental Sciences Commons](#)

This Article is brought to you for free and open access by the Natural Resources, School of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Papers in Natural Resources by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Authors

Emilee Lachenmeier, Rezaul Mahmood, Trenton E. Franz, Eric Rappin, Udaysankar S. Nair, Roger A. Pielke Sr., Aaron Kaulfus, Chris Phillips, William O. Brown, and Steven P. Oncley



- 76: The Impacts of Irrigated and Rainfed Agriculture on Near-Surface Atmosphere: Preliminary Results from GRAINEX

Monday, January 13, 2020, 04:00 PM - 06:00 PM

- Boston Convention and Exhibition Center- Hall B

Land use/land cover change (LULCC) has long been viewed as a contributing source of climate change. Modification of natural prairie grasslands to irrigated and rainfed agriculture has proven to have significant impacts on regional weather and climate variables including temperature, precipitation and energy fluxes. These impacts can be visible in various parts of the Great Plains. In this presentation, we have analyzed energy flux and soil moisture data collected during the Great Plains Irrigation Experiment (GRAINEX) in the 2018 growing season.

The GRAINEX field campaign includes 12 in-situ integrated surface flux systems; three mobile radar units that also conducted radiosonde balloon launches; 74 temporary weather stations; and two integrated sounding systems that launched radiosonde balloons. Balloon launches were conducted every two hours from sunrise to sunset accumulating to 40 radiosonde balloon launches every day. The data were collected during two intensive observation periods (IOPs) in early June (May 30-June 13, 2018) and late July (July 16-July 30, 2018). Flux and surface meteorological observations were continuous from May through July. Impacts of four different land covers, including, irrigated soybean, irrigated corn, non-irrigated soybean, and non-irrigated corn were quantified by analyses of observed data. The data assessed for this study included sensible and latent heat energy, and equivalent temperature (moist enthalpy). In addition, soil moisture and temperature data were also collected and used to determine how root zone soil moisture affected atmospheric boundary layer variables.

Authors

- [Emilee Lachenmeier](#)
 - High Plains Regional Climate Center
Lincoln, NE, USA
- Rezaul Mahmood
 - Univ. of Nebraska
Lincoln, NE, USA
- Trenton Franz

- Univ. of Nebraska - Lincoln
Lincoln, NE, USA
- Eric Rappin
 - Western Kentucky Univ.
Bowling Green, KY, USA
- Udaysankar S. Nair
 - Univ. of Alabama in Huntsville
Huntsville, AL, USA
- Roger Pielke
 - Univ. of Colorado
Boulder, CO, USA
- Aaron Kaulfus
 - Univ. of Alabama in Huntsville
Huntsville, AL, USA
- Chris Phillips
 - Univ. of Alabama in Huntsville
Huntsville, AL, USA
- William O. J. Brown
 - NCAR
Boulder, CO, USA
- Steven P. Oncley
 - NCAR
Boulder, CO, USA

<https://ams.confex.com/ams/2020Annual/meetingapp.cgi/Paper/364826>