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

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

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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.

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