

# The Agricultural Productivity Indicator Analysis System (APIAS):

Tracking the agricultural impacts of climate variability and change

Alex Ruane (PI) and Cynthia Rosenzweig, NASA GISS, New York;

Michael Glotter and Joshua Elliott, University of Chicago; Jonathan Winter, Dartmouth College

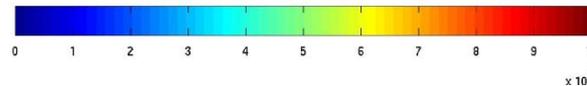
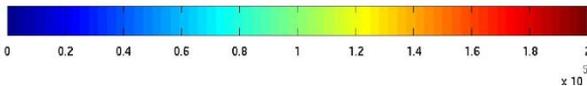
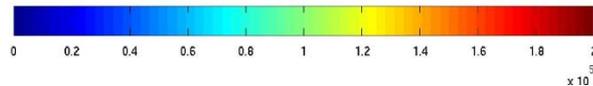
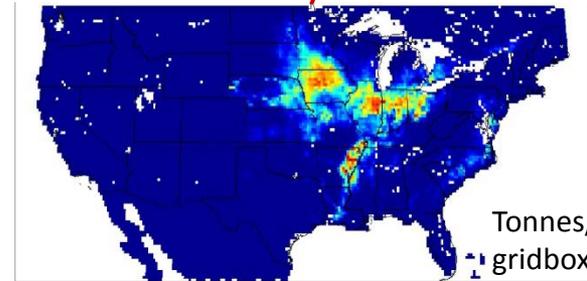
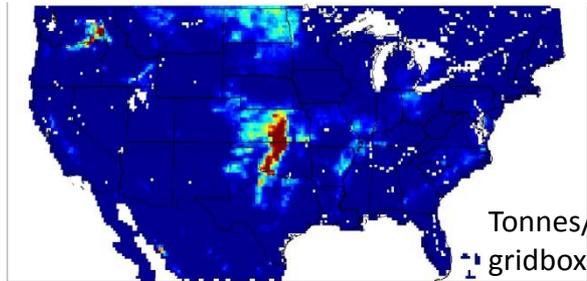
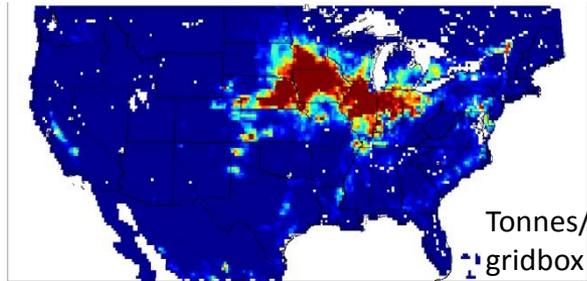
**Part 1: Construct & calibrate US-wide crop models on high-performance computational systems**

1980-2010 Corn Production

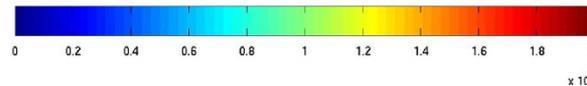
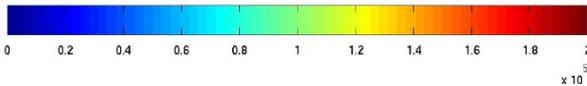
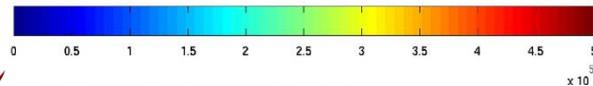
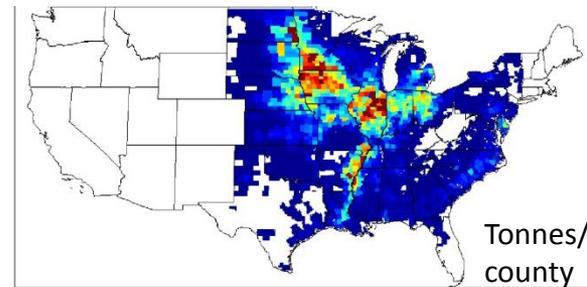
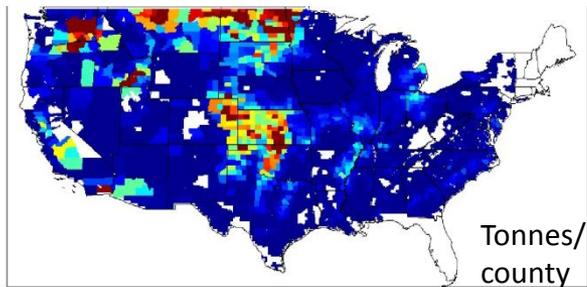
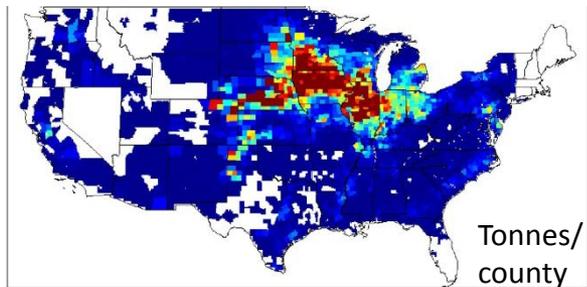
1980-2007 Wheat Production

1980-2010 Soy Production

APIAS



USDA  
NASS



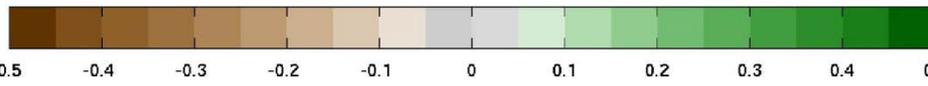
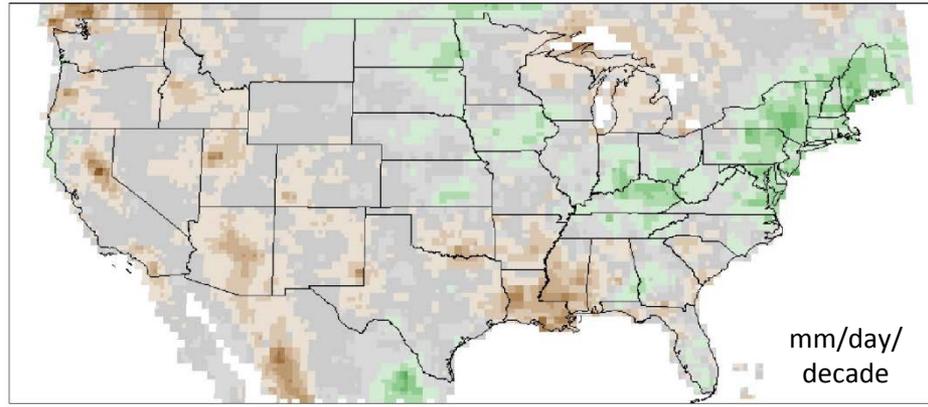
THE UNIVERSITY OF CHICAGO



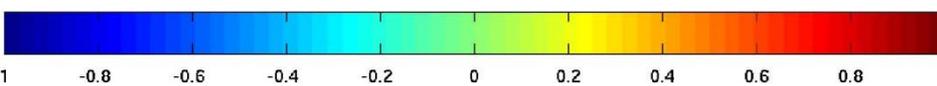
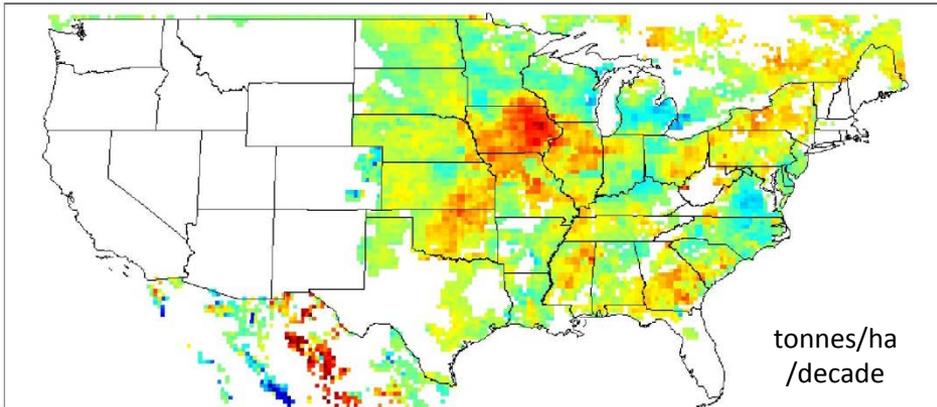
Dartmouth

# Part 2: Climate Trends

## 1980-2010 Precipitation Trends (AgMERRA)

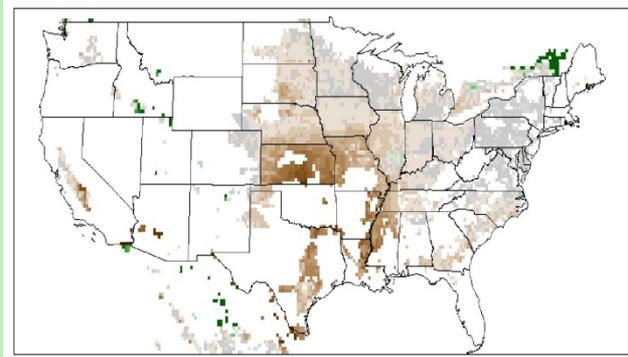


## 1980-2010 Soy Yield Trends (APIAS)

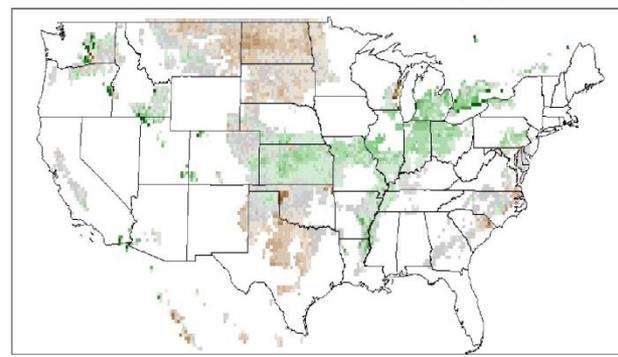


# Part 3: Mean and variability change scenarios for 2020s (median of 5 GCMs)

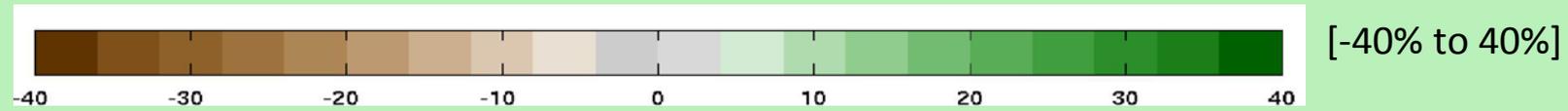
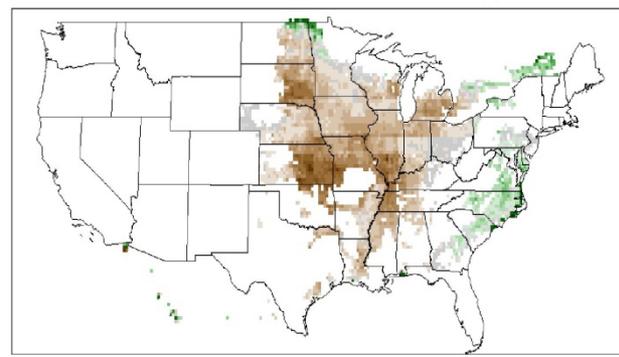
## %Change in Maize Yield



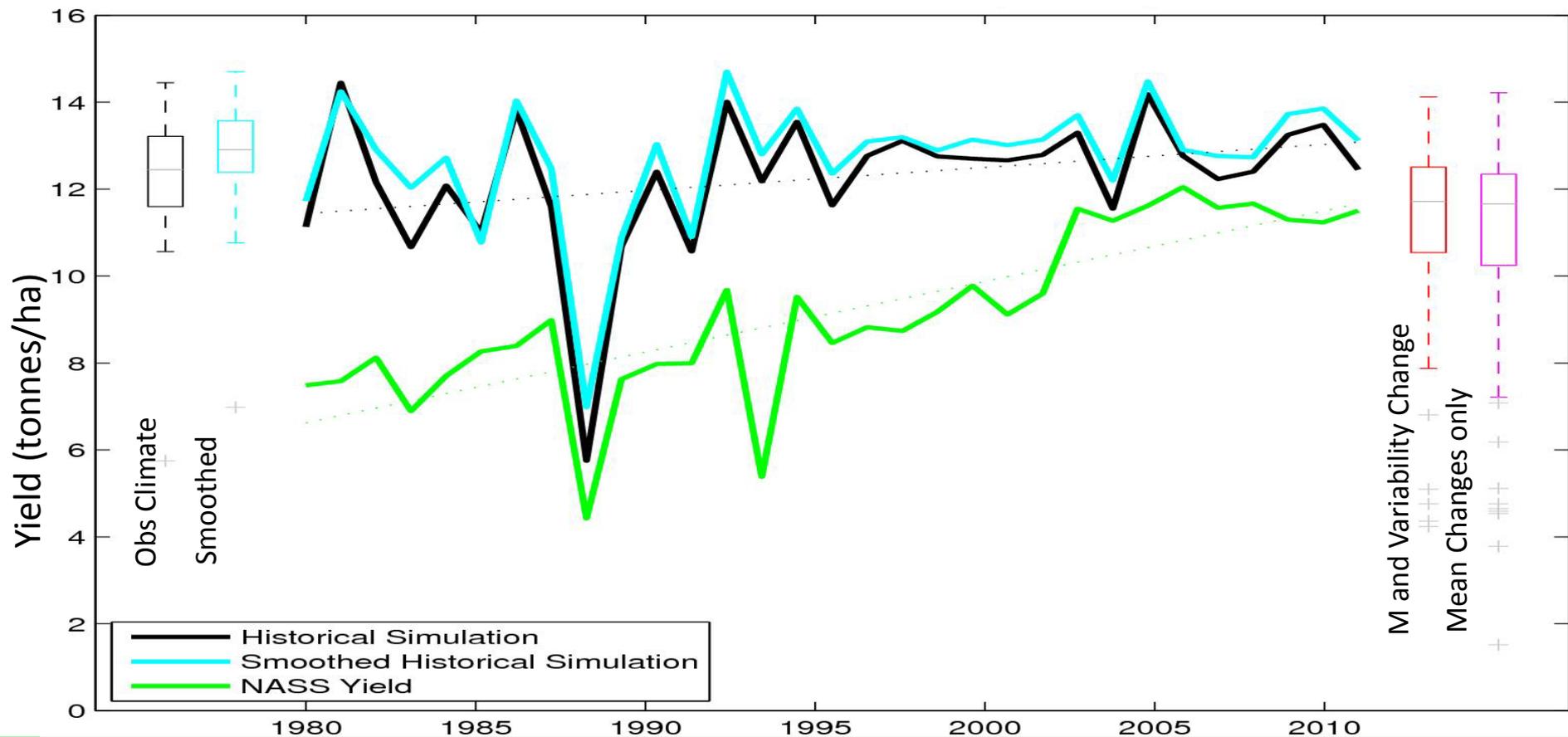
## %Change in Wheat Yield



## %Change in Soy Yield



## Part 4: APIAS for any given site (example = Central Iowa Maize):



### **Overview:** Allows rapid assessment of yield variability and trends at local and national level

#### **Initial findings:**

- Observed increase can't be attributed to climate change.
- Yields likely to turn downward from current slight rise/flat conditions in next 30 years.
- Interannual variation in conditions more important than within season extremes, although this may be a function of the model rather than real observations
- Climate changes projected to be most pessimistic for corn and soy, wheat production slightly increased in Southern Midwest while decreasing in Upper Midwest and Pacific NW