



# Illinois Farmer Views and Use of CMS Data

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## Illinois Farm Bureau

- Since 1916, Illinois Farm Bureau has provided education and information to help farmers, while supporting legislation and lobbying about agricultural issues.
- Today, IFB has 78,000 voting members. Three out of four Illinois farmers.
- Farmers join through their county Farm Bureau and engage in grassroots policy development process, programs and initiatives.
- IFB is a member of the American Farm Bureau Federation.

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## American Farm Bureau Federation

- The American Farm Bureau Federation (AFBF) is the nation's largest general farm organization in the United States, representing over 5.9 million members in all 50 states and Puerto Rico.
- As a whole-farm advocacy organization, our members represent the entirety of American agriculture, from specialty crops, traditional row crops, livestock producers, aquaculture and more.
- We are farm and ranch families working together to build a sustainable future of safe and abundant food, fiber and renewable fuel for our nation and the world.

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## Illinois Farm Bureau – My Role

- Organizational policy
- Board of Director priorities: "Promote Illinois agriculture's contribution to improve the environment"
- Three types of people: farmers, regulators and scientists
- Equal parts proactive, farmer education, and policy
- Have made a concerted effort over past several years to build relationships with researchers in our state universities with the goal of getting the best science in front of our farmers
  - Advisory boards
  - Conference presentations
  - Communications coverage
  - Farmer focus groups
  - Field days



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## Illinois Farm Bureau – A Glimpse Into Policy

### Currently global climate change policy:

#### WE SUPPORT (in part):

- Science-based research and economic analysis, not cultural consensus, to conclusively determine the causes and impacts of global climate change.
- Scientific research to document the continuous improvement and beneficial impact of agricultural efforts to date with regard to increasing climate resiliency, improving water quality and soil health, sequestering carbon in the soil, and preventing erosion.
- Expanding and improving state and federal voluntary conservation programs
- Market-based solutions to allow farmers to voluntarily adopt practices
- **Increased funding for research of farming practices that mitigate climate change while maintaining farm profitability**, as well as technical assistance and educational efforts that ensure the research outcomes are transferred effectively to farmers.

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## NASA CMS Data Products Used



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## Project

### Title: Improving the monitoring capability of carbon budget for the US Corn Belt - integrating multi-source satellite data with improved land surface modeling and atmospheric inversions

A proposal submitted to NASA ROSES 2016 Solicitation NNH16ZDA001N-CMS

A7: Carbon Monitoring System

## PI

#### Team members:

##### Principal Investigator:

Dr. Kaiyu Guan  
Department of Natural Resources and Environmental Sciences  
University of Illinois at Urbana-Champaign  
[kaiyug@illinois.edu](mailto:kaiyug@illinois.edu)

##### Co-PIs:

Caroline Alden (University of Colorado)  
Evan Delucia (University of Illinois at Urbana-Champaign)  
Christian Frankenberg (California Institute of Technology/NASA Jet Propulsion Laboratory)  
Joseph Berry (Carnegie Institution for Science/Stanford)

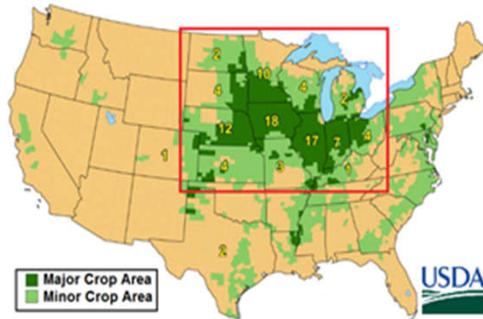
##### Postdoctoral Scholar:

Bin Peng (University of Illinois at Urbana-Champaign)

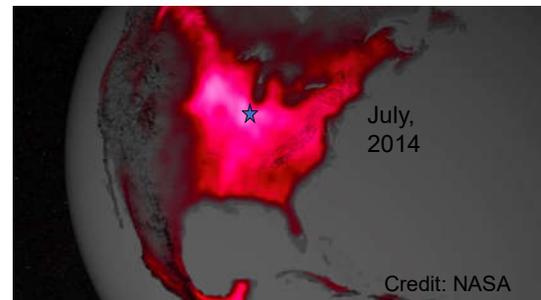
##### Collaborators:

John Miller (NOAA Earth System Research Laboratory)  
Arlyn Andrews (NOAA Earth System Research Laboratory)  
Xi Yang (University of Virginia)

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Study domain in red box. The background shows the averaged corn production from 2007-2012, and the numbers indicate the percentage (%) of the state production to the national total corn production.

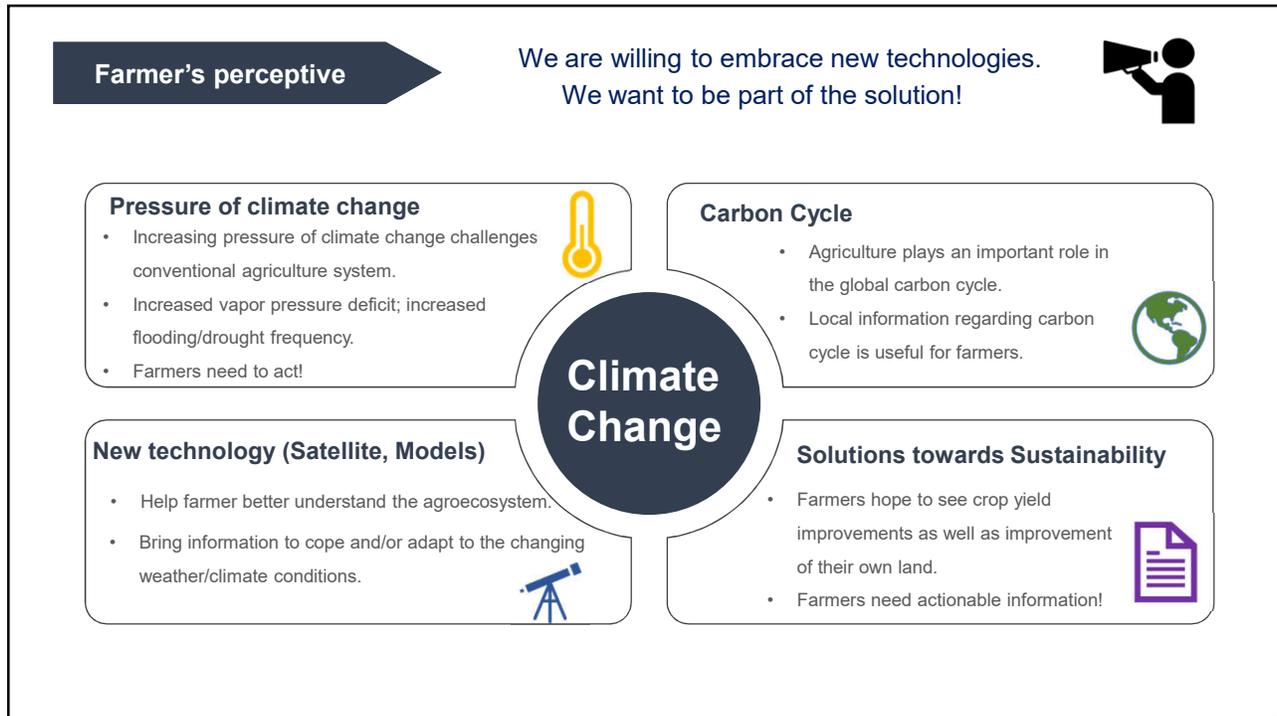


Sun-induced chlorophyll fluorescence (SIF) as a proxy of photosynthesis.

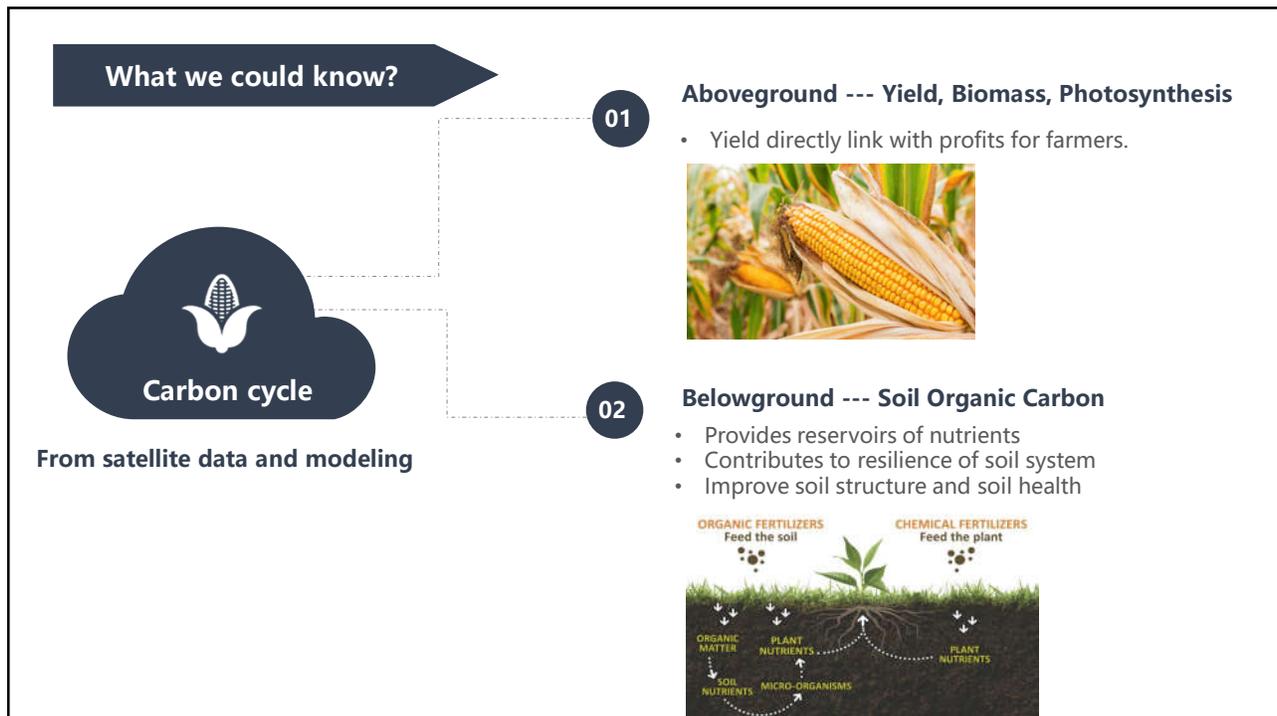
**US Corn Belt produces ~35% of global corn production and ~30% of global soybean production.**

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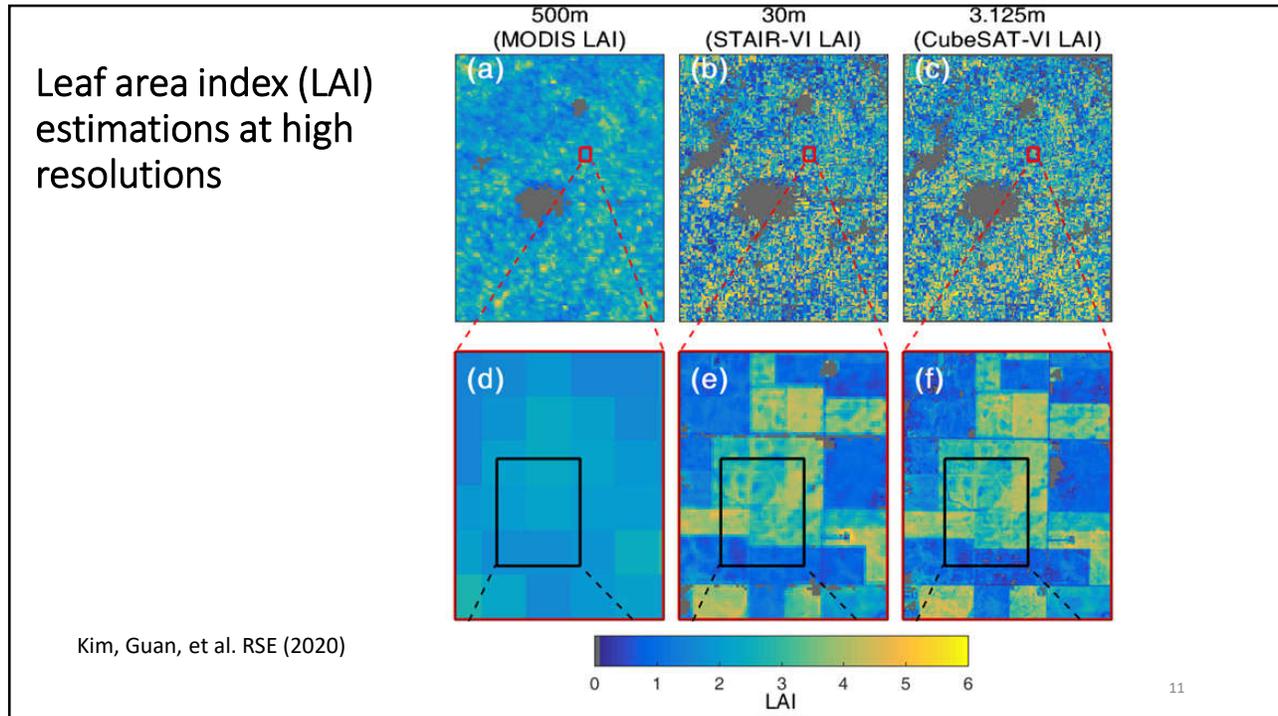
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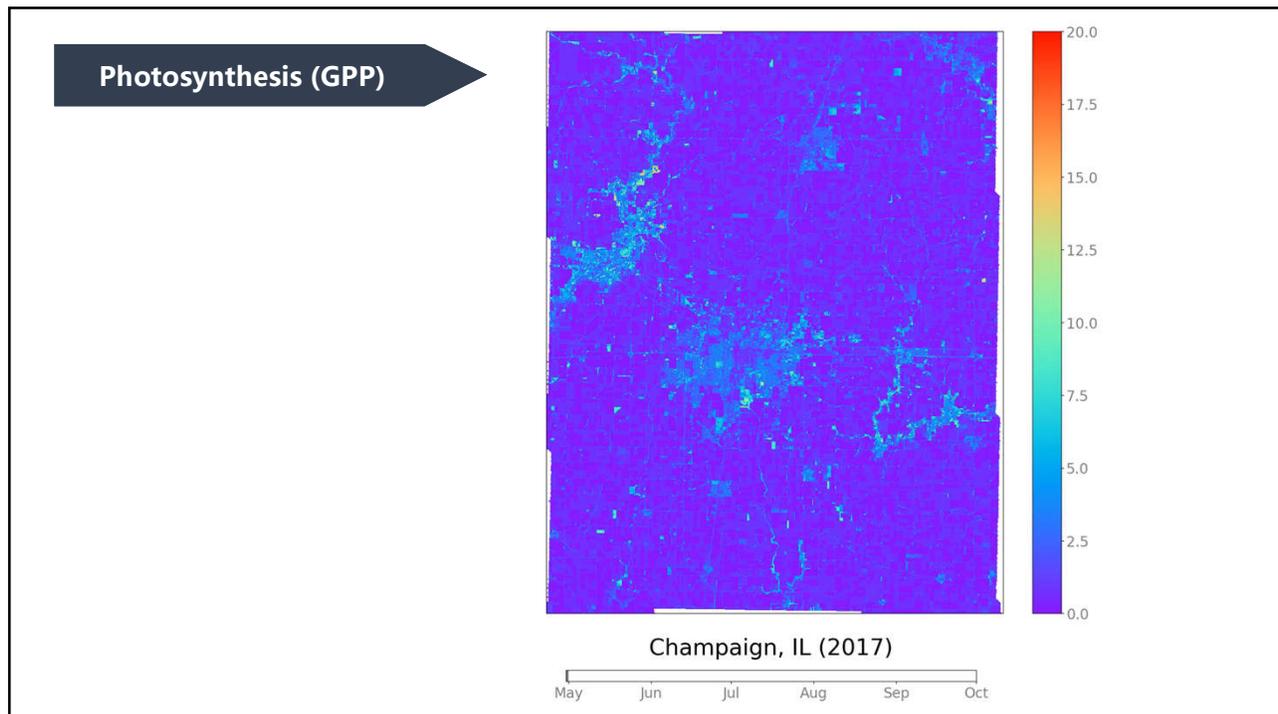
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## Belowground --- Soil organic carbon



**Conservation practices** - Increase whole ecosystem carbon sequestration

### Non-till

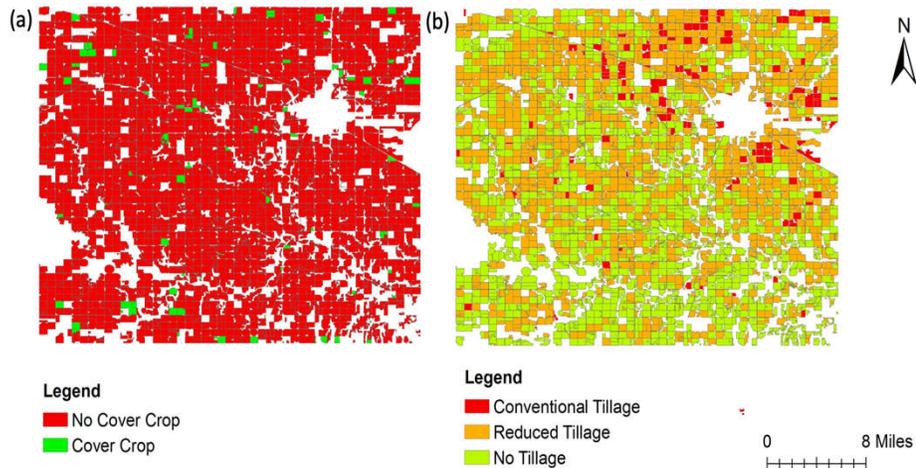
- No-till will reduce the transfer of plant C to surface and subsurface residues, and hence reduce the amount of stable decomposition products of these residues relative to those in continuous cropping.

### Cover crops

- Cover crops are crops planted during the conventional fallow time.
- Cover crops provide many benefits to agricultural systems including weed suppression and soil aggregation and are also known to promote soil C formation.

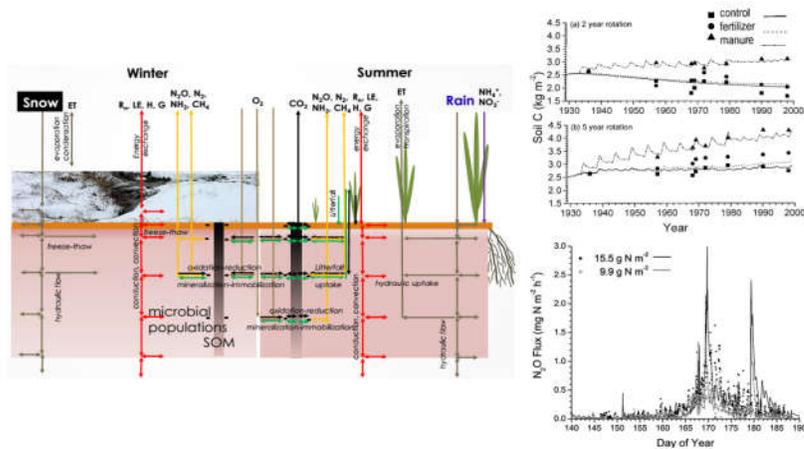
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## Tillage/Cover Crop mapping from satellite data



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## A crystal ball for predicting carbon cycle belowground? - Models to simulate belowground carbon cycle



Satellite data is used to help constrain the process-based models for better prediction of belowground carbon dynamics.

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### In the future

#### ➤ Studies of soil organic matter need to be verified

- There are seldom ground truth data on soil organic matter, the result derived from the model need further validation.

#### ➤ Some practices only show benefits in the long period

- Some practices such as implementing cover crops in the agroecosystem may show benefits after a long period, which makes it impossible to do field trials and we have to use calibrated model to do further studies.

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## Positive Aspects of CMS Data for My Work

- The best science being put to use by and for farmers
- Field scale for their own decision-making
- Can meet them where they are – different tolerance for risk, different business models, different views of conservation, family businesses
- The more informed the individual farmers are, the more they will do to improve the environment.

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## Next Priority For My Work

- Since 2013, Nutrient Loss Reduction Strategy has been a priority.
- Soil health focus on cover crops has been related.
- More climate discussions in policy lately at state and federal level and involve “working lands” concepts.
- This science is helpful to know what IL farmers contribute, how they can improve, and what is a realistic goal.

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## What Scientific Advancement Could Contribute To My Work?

- Continuing this research in the Midwest in a corn and soybean rotation.
- Continuing to build tools that help them make decisions in absence of neutral third-parties or minimized technical expertise.
- Need the data interpreted into “plain language”.

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## Questions?

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