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Carbon and greenhouse gas evaluation for NRCS conservation practice planning

Soil Nitrous Oxide Metamodel Update and Uncertainty Method

C-AGG Workshop, Fort Collins
13 February 2017

Mark Easter, Chris Dorich and Keith Paustian

Natural Resource Ecology Laboratory & Dept Soil and Crop Sciences, Colorado State University, Fort Collins

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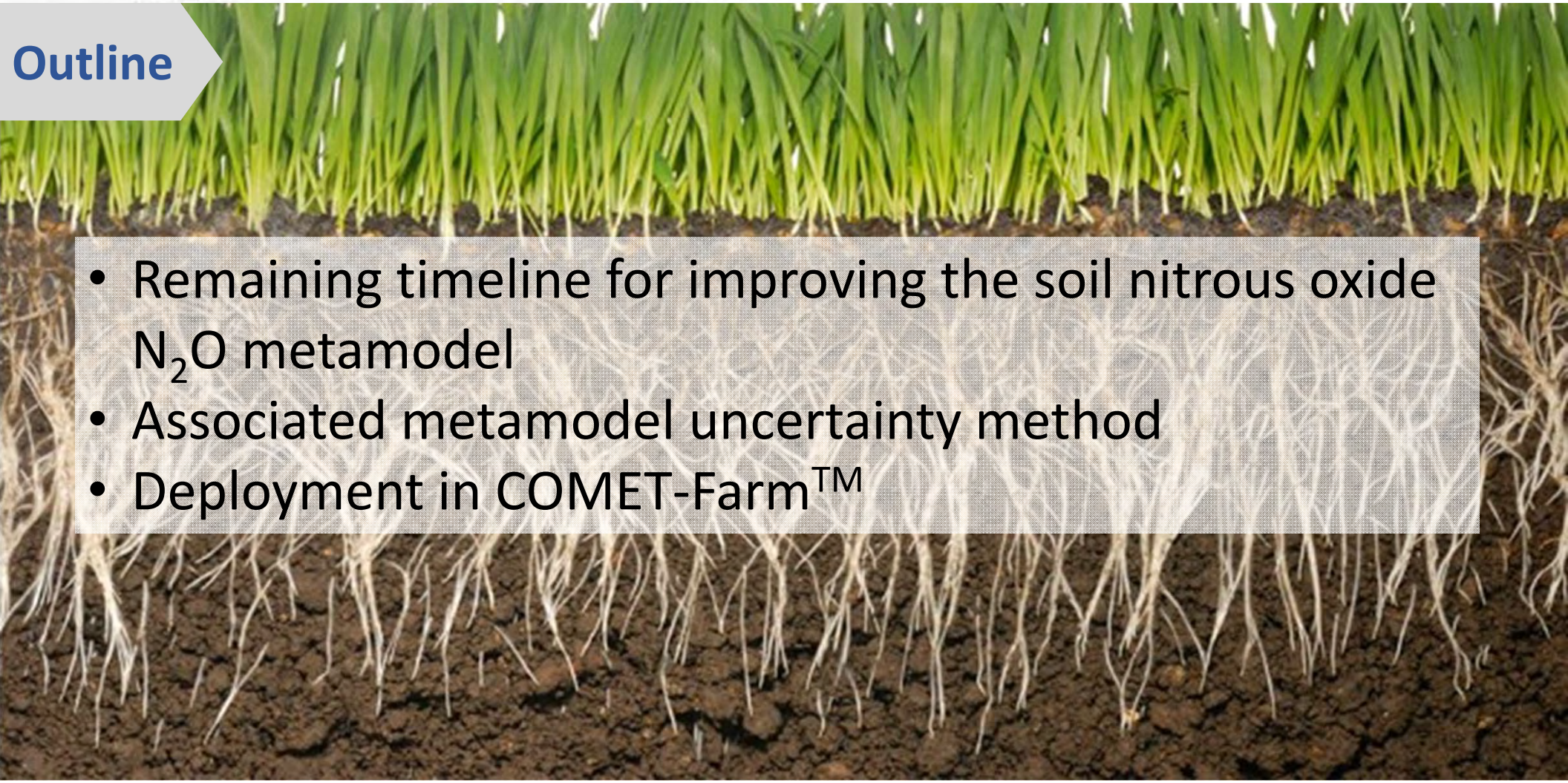
Outline



- Remaining timeline for improving the soil nitrous oxide N_2O metamodel
- Associated metamodel uncertainty method
- Deployment in COMET-Farm™

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Greenhouse Gases in Agriculture

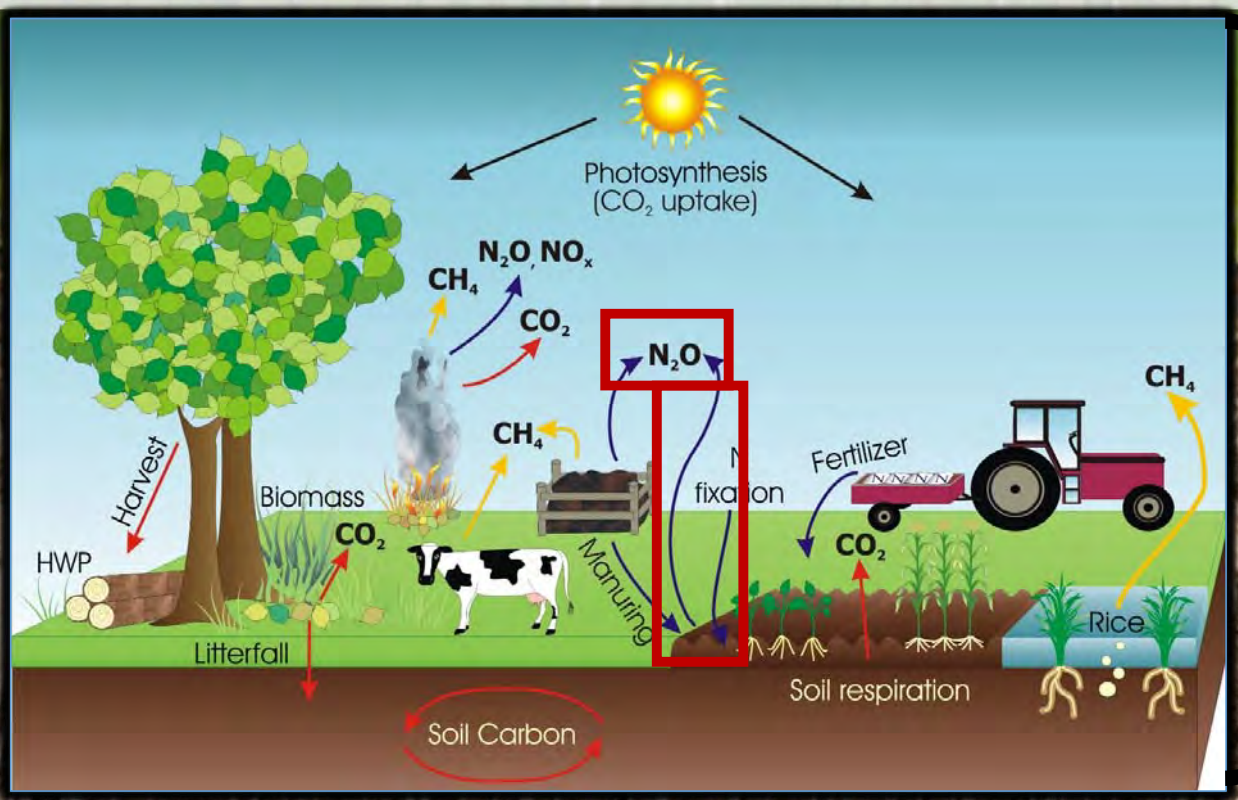

Image courtesy of Amy Swan of the NREL at Colorado State University

The COMET Tools Provide a Systems Approach to GHG Inventories and Conservation Scenario Analysis

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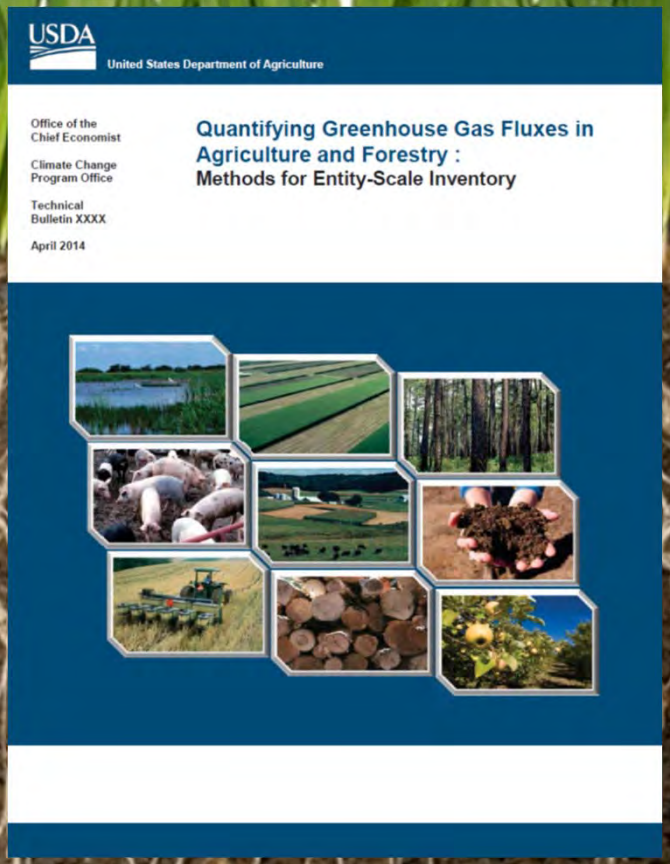
Calculation Methods

- Implements the peer-reviewed, USDA-sanctioned entity-level inventory methods.
  - **Soil-related GHG emissions:** DayCent dynamic model, also used in the U.S. National Greenhouse Gas Inventory, + several empirical models.
  - **Livestock-related GHG emissions:** statistical models based on USDA and university research, largely consistent with models used in the U.S. National Inventory.
  - **Energy-related GHG emissions:** based on the models used in the USDA/NRCS Energy Tool along with supplemental peer-reviewed research results.



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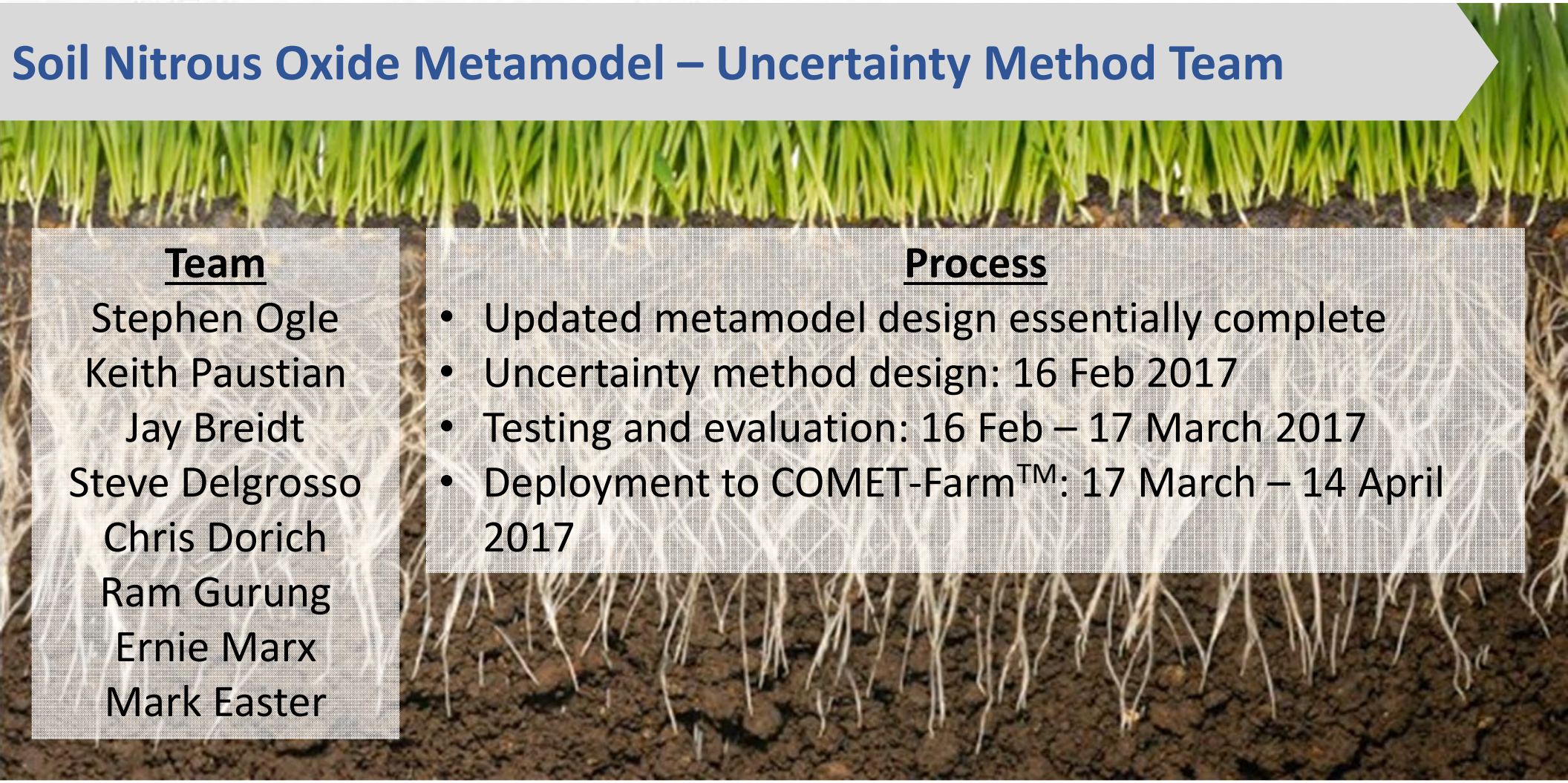
Soil Nitrous Oxide Metamodel – Uncertainty Method Team



Team

Stephen Ogle
Keith Paustian
Jay Breidt
Steve Delgrosso
Chris Dorich
Ram Gurung
Ernie Marx
Mark Easter

Process

- Updated metamodel design essentially complete
- Uncertainty method design: 16 Feb 2017
- Testing and evaluation: 16 Feb – 17 March 2017
- Deployment to COMET-Farm™: 17 March – 14 April 2017

Components of the Soil Nitrous Oxide Uncertainty Method

- Structural uncertainty elements:
  - DayCent model structural uncertainty
  - Metamodel structural uncertainty
- Input Uncertainty
  - PRISM weather model uncertainty (West, Central, East)
  - SSURGO soils data uncertainty
- Combine these into a Monte Carlo Markov Chain

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Components of the Soil Nitrous Oxide Uncertainty Method

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