

# ECOLOGICAL FORECASTING

Ramakrishna Nemani

Predicting the future states of ecosystems in response to perturbations in weather/climate, chemical composition of atmosphere, disturbance due to humans, insects/pests at appropriate time scales.

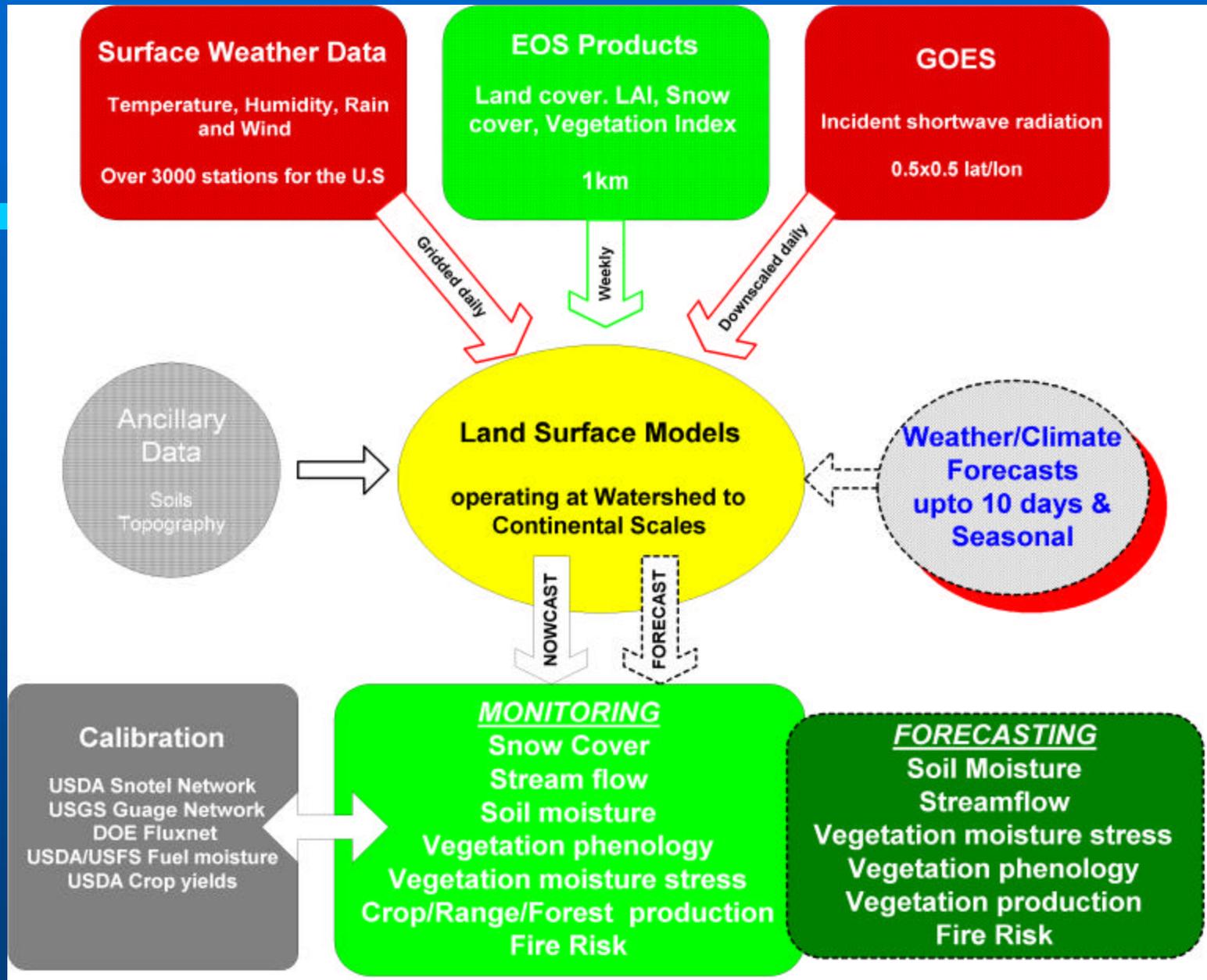
# ECOLOGICAL FORECASTING

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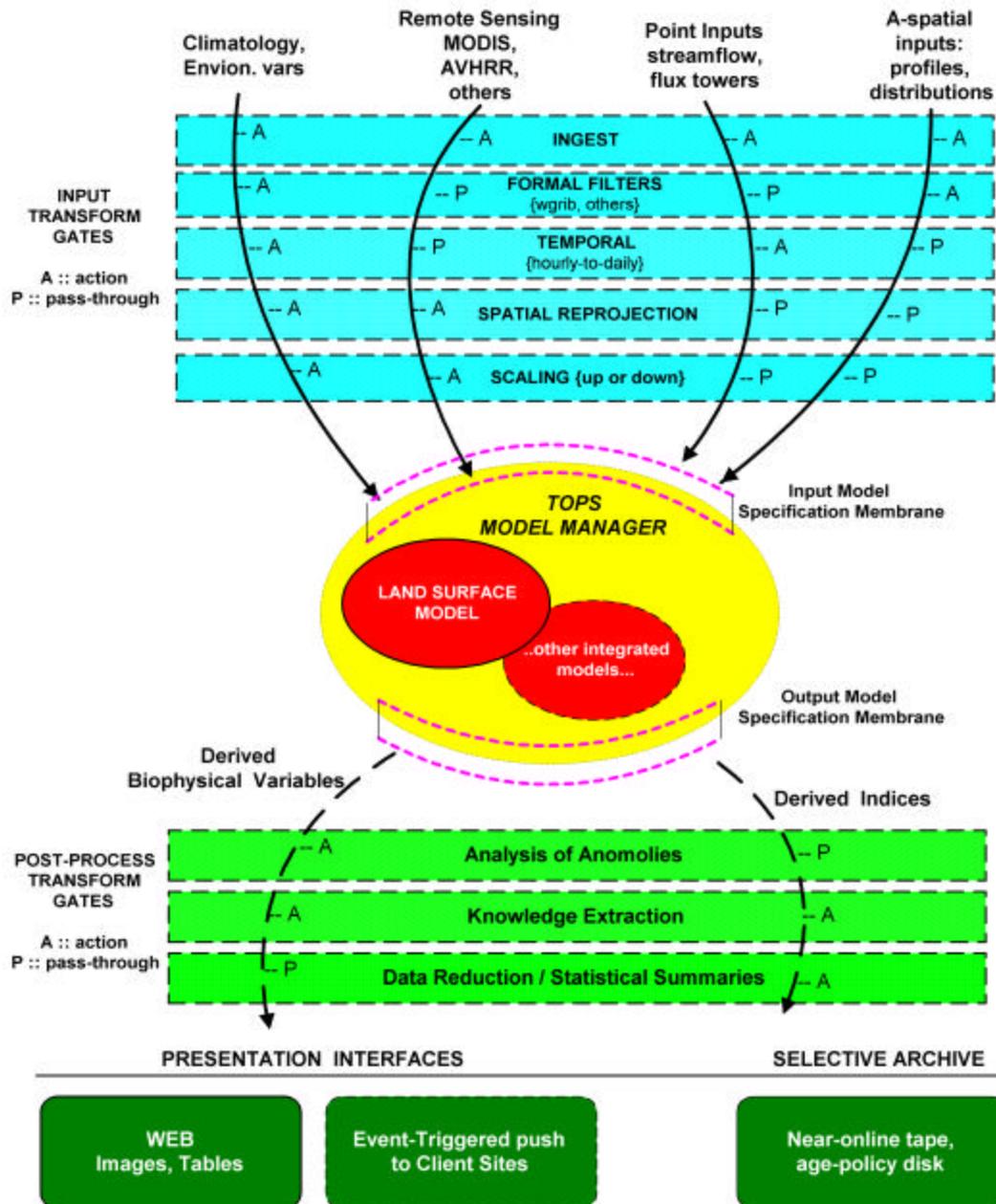
Real-time integration of remote sensing, surface meteorology, and ecological models to provide ecosystem nowcasts.

Forecasting future states of ecosystems, making use of weather/climate forecasts

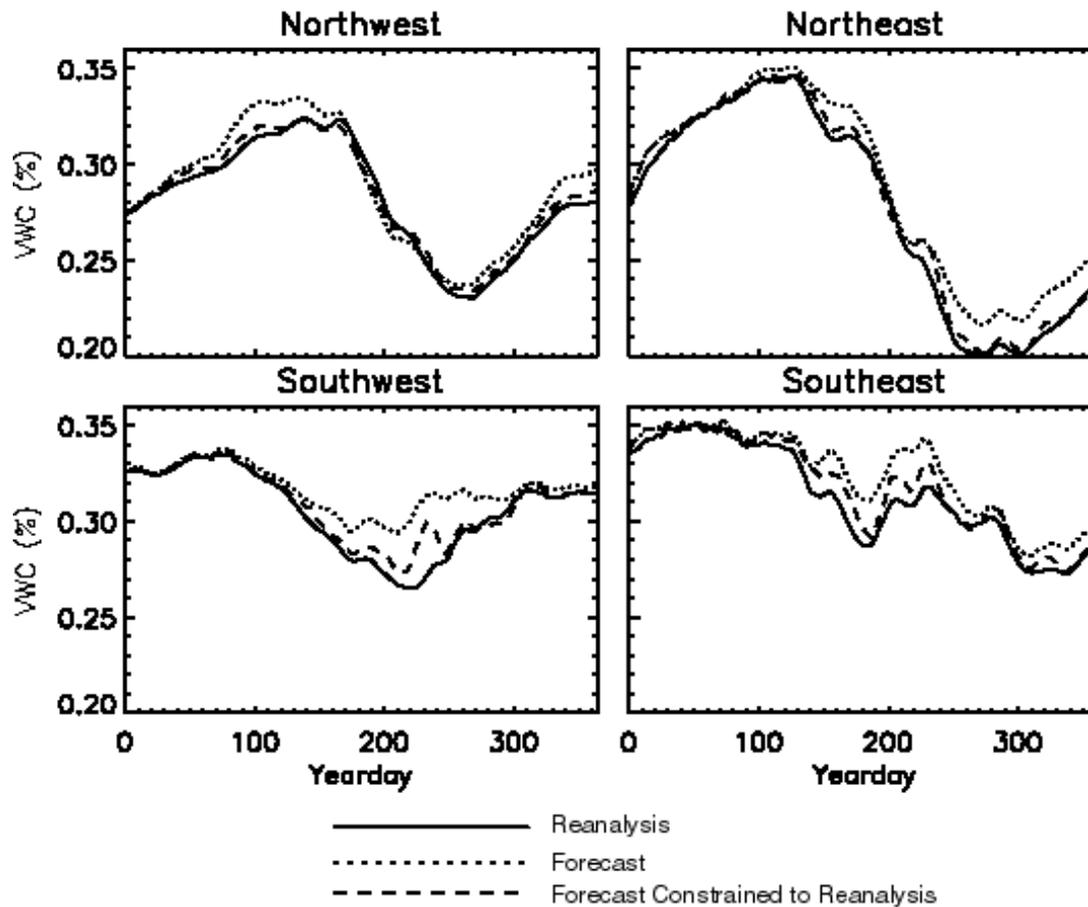
# Terrestrial Observation and Prediction System



# TOPS Concept Logic



## Simulated volumetric water content



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# Distributed Application Framework for Earth Science Data Processing

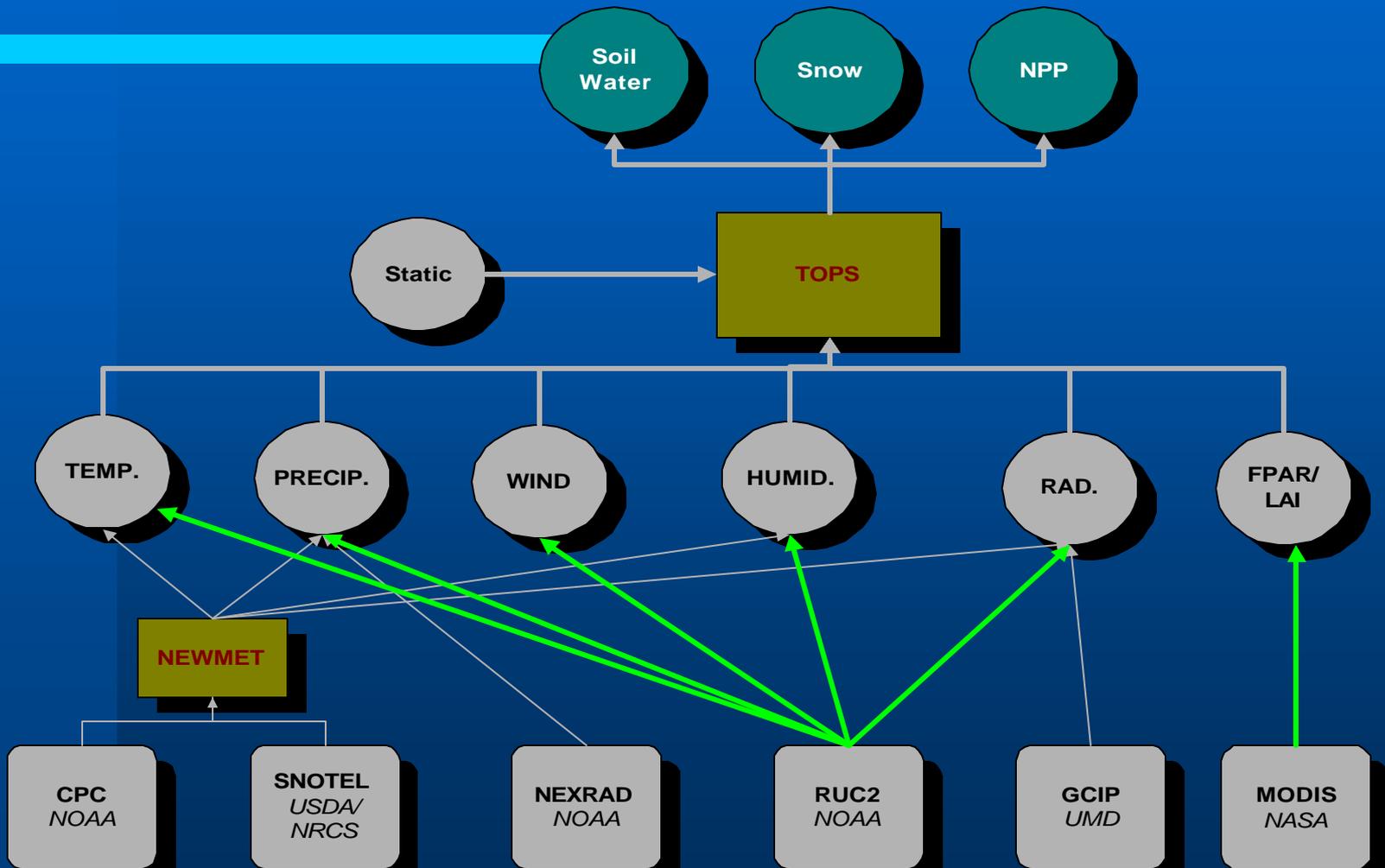
*Petr Votava, NTSG*

# Objective

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***To develop a flexible and extensible application framework suitable for efficient processing, archiving, analysis, and distribution of Earth science data.***

# TOPS Data Flow



# Goals

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- **Flexibility**
  - Ease of integration of new models and data sources
- **Failover**
  - Out of several sources of the same data use the “best” available one
- **Automation**
  - Automate the generation of the forecasts, analysis of the results, and model adjustments

# Challenges

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- **Data Heterogeneity**
  - Many formats, “moving targets”
  - Use ESML to unify I/O interface
- **Ease of Integration**
  - Legacy code
  - Java with RMI, CORBA, and JNI
- **Performance**
  - Distributed architecture
  - Resource Scheduler



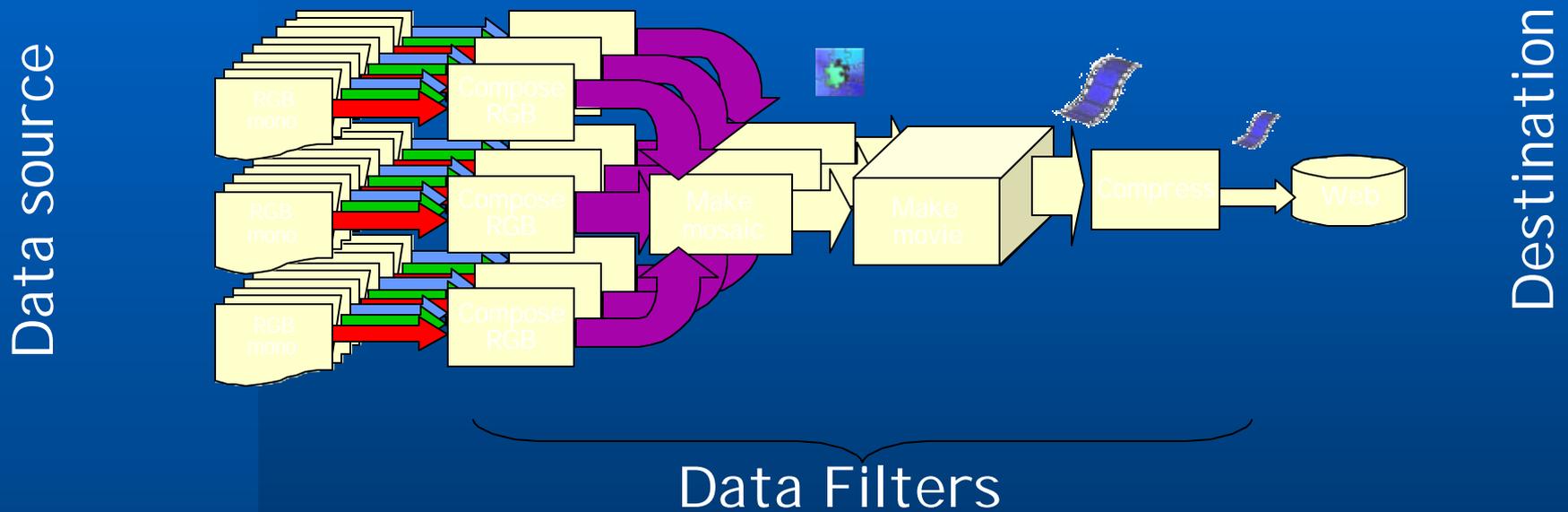
# **Automated Data Management**

*Keith Golden, NASA Ames*

# Automated data management

- Support integration of remote sensing, meteorology, and ecological models
- Users describe data products to be generated; programs to generate them are automatically synthesized and executed.
- Automatically generate semantic descriptions of data products to facilitate later searches and data mining.

# Data-flow programs



*Output* of one command directed to input of another

*Data filters:* manipulate data

1. Contents of output depend on contents of input
2. Reasoning about filters depends on representation of information

# Current Status

