ENV-INT INITIATIVE

Environmental **Int**elligence
for Global Sustainability

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Environmental Sciences Division

Climate Change Science Institute
AT OAK RIDGE NATIONAL LABORATORY

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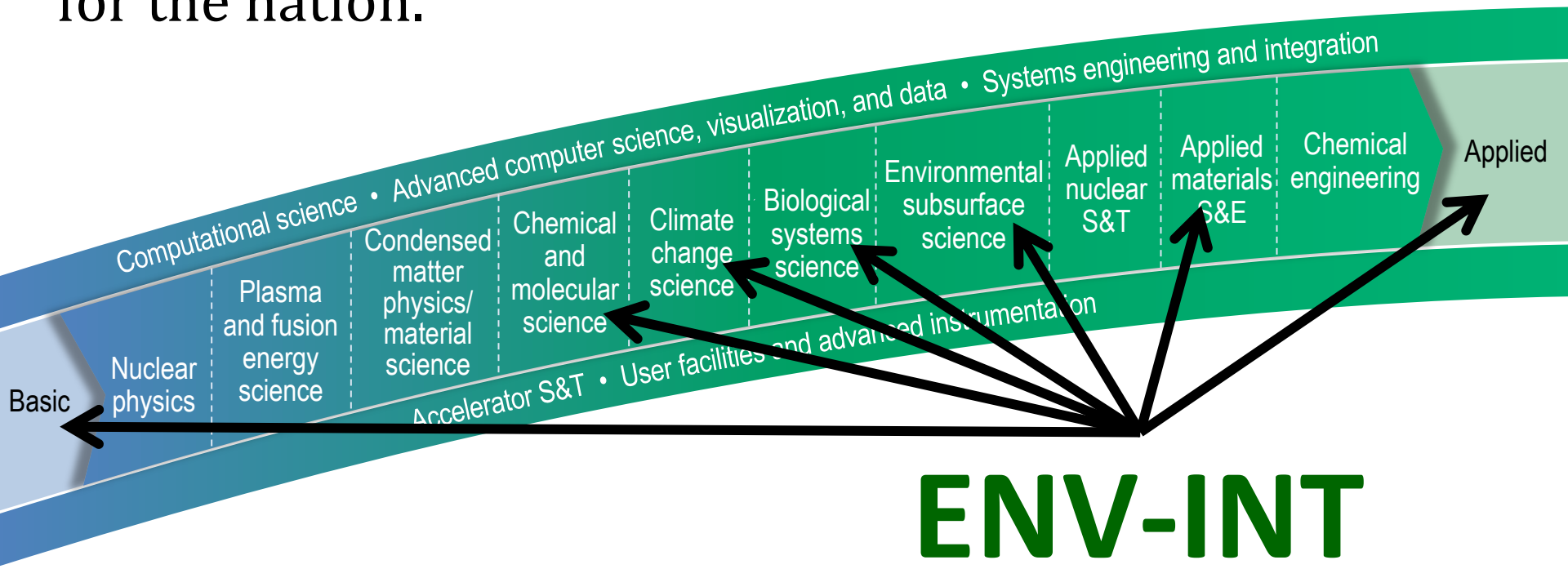
ORNL's Mission

Deliver scientific discoveries and technical break-throughs that will accelerate the development and deployment of solutions in clean energy and global security, and in doing so create economic opportunity for the nation.



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ORNL Key Capabilities

- Large scale field observations and experiments
- HPC computing, data discovery and analysis
- Environmental & climate impact assessment
- Advanced sensing technologies
- Sustainable energy systems
- Critical infrastructure
- Advanced materials

Env-Int Overview

- Anthropogenic influences are stressing natural resources in increasing complex and unpredictable ways
- The need is increasing to develop enhanced and novel ecosystem services using natural capital, for example:
  - Stabilizing atmospheric CO_2
  - recruiting non-arable land into bioenergy production
  - Simultaneously sustaining food, fiber, water, and energy supplies
- Objective: improved understanding of natural and managed ecosystems, their complex network of interactions and feedback loops across space and time scales to predict responses to forcing and to enhance management and use of ecosystems to sustain natural and human capital for current and future generations.

Env-Int Overview

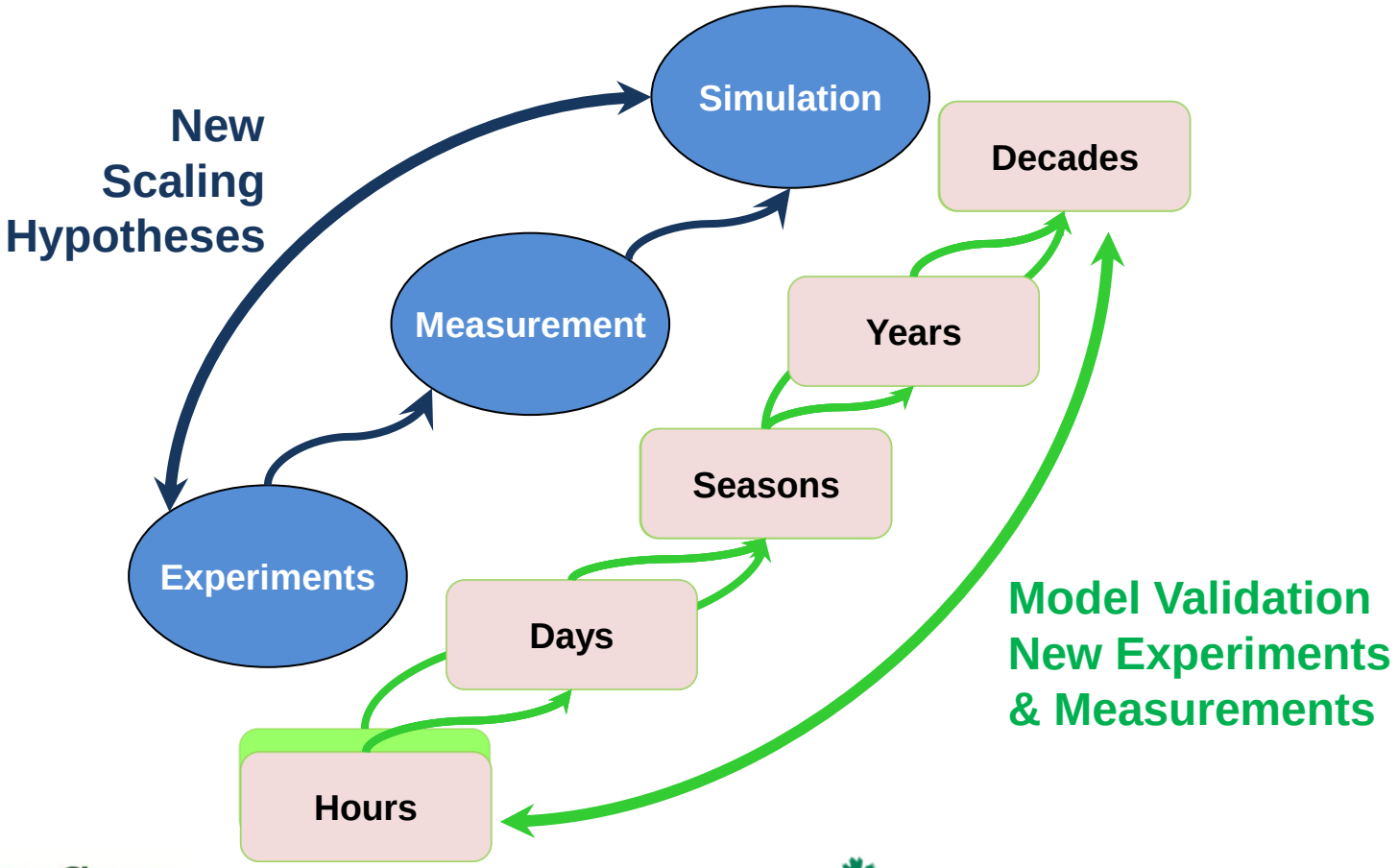
The name evokes:

- Invention – Innovative science and engineering
- Data/Information gathering, analysis, decision support
- Intelligent resource management

Examples of needed innovations:

- New molecular / genomic tools
- New sensors / measurement systems
- Advanced high-resolution simulation
- Advanced data mining, assimilation, visualization

Env-Int will Integrate models, data, experiments and observations across multiple scales of time, space, and system organization



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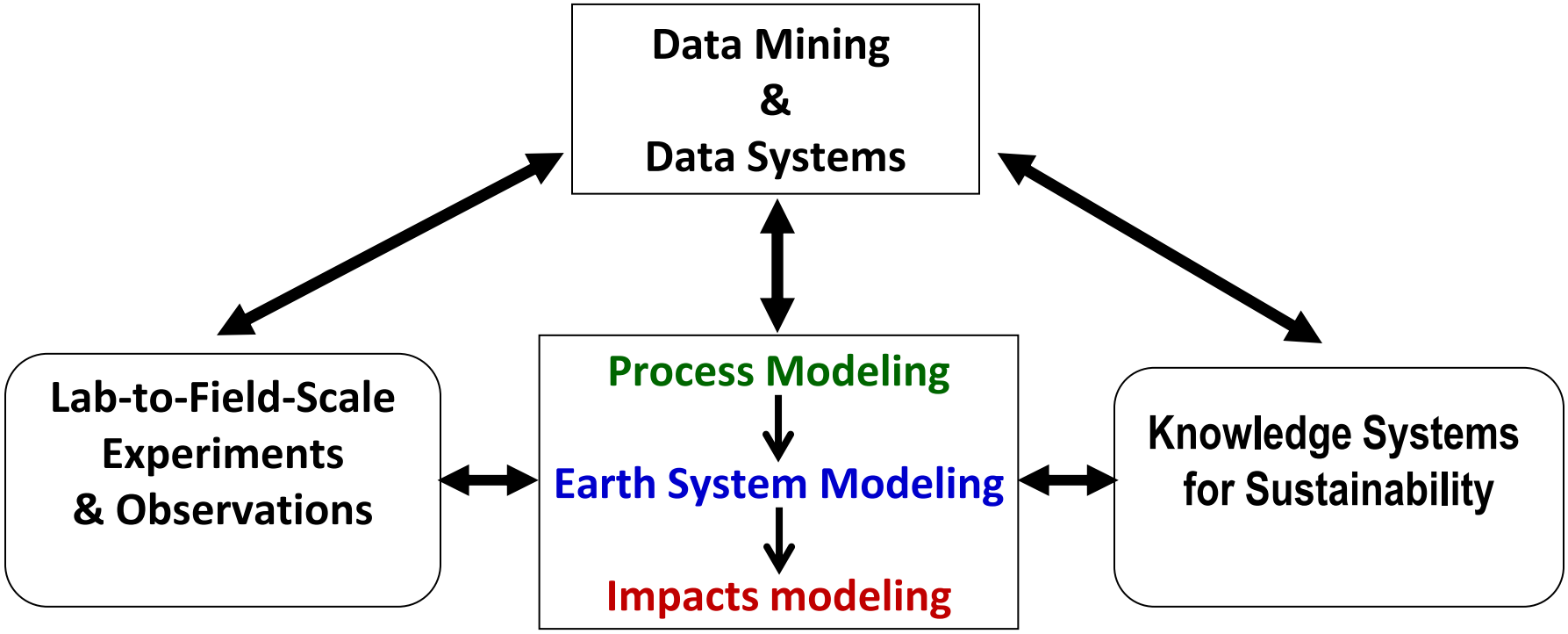
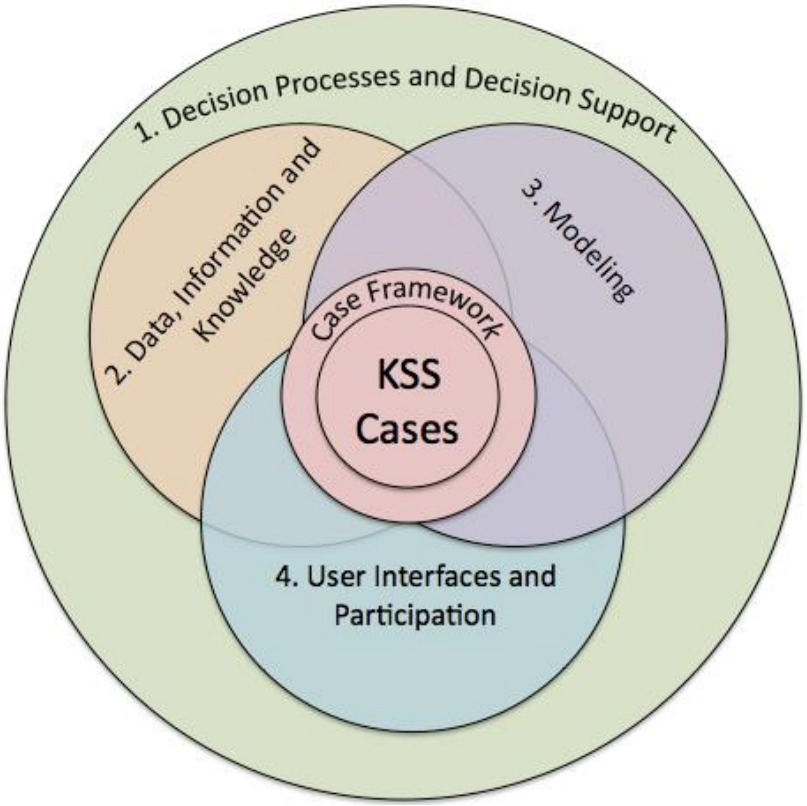
Key Theme of Env-Int: Integration

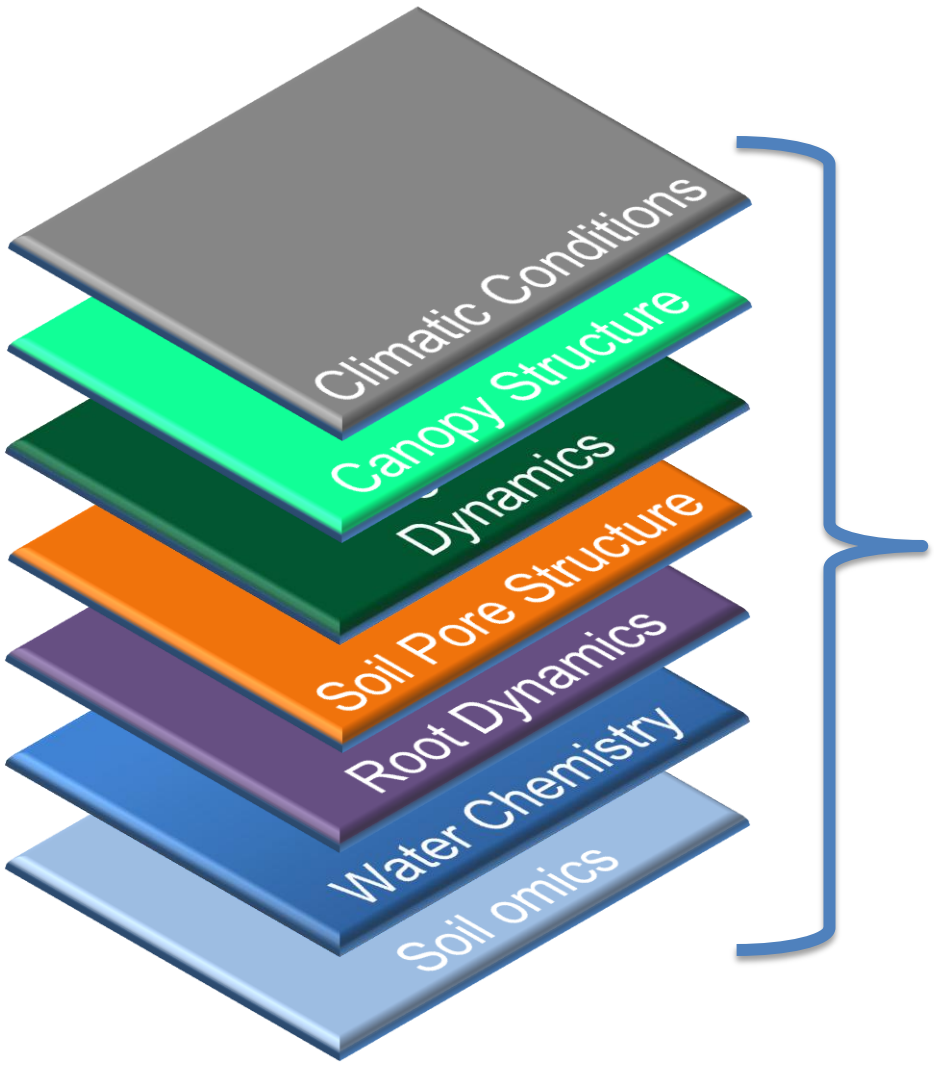


Knowledge System for Sustainability (KSS)
(Dr. Molly Jahn University of Wisconsin – Madison)

- Establish the needs of decision-makers through direct communication and partnering
- Apply state-of-the-science models that address key aspects of sustainable landscapes
- Develop an information infrastructure to deliver the data, knowledge, and model results to the decision makers in a manner that suits their needs



Understand Terrestrial Systems from Bedrock to Canopy



Pull multiple data layers into a tool box that let's us explore new relationships to climatic data

Data System

- QA/QC
- Access
- Discovery
- Model Parameters
- Analytics
- Visualization
- Collaborative Forums

Link and compare these data and relationships to new multi-scale models

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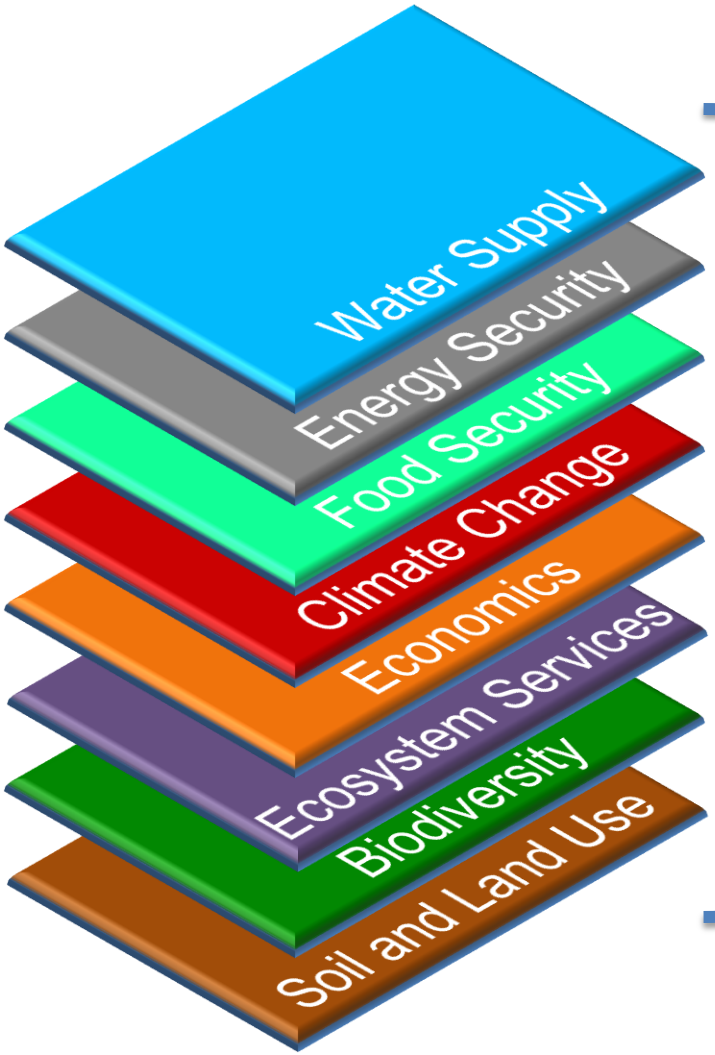
Link new scientific understanding to Decisions



Pull multiple data layers into a tool box that let's us explore impacts of change and evaluate decisions

Data System

- QA/QC
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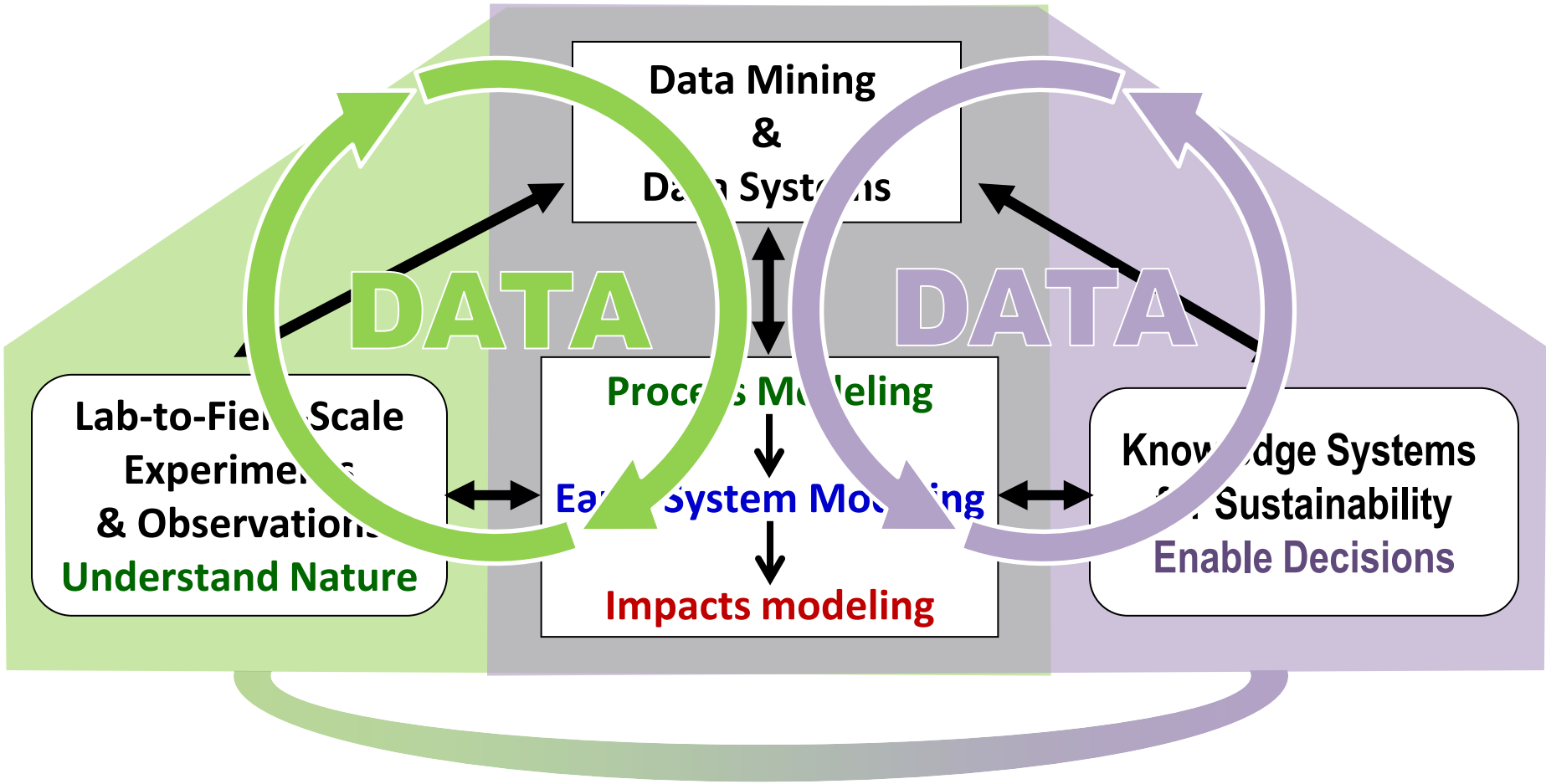
Link and compare these data and relationships to new multi-scale models

Key Theme of Env-Int: Integration



Integration of natural and human systems

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