

Plans for and process of component model development and assessment

Brian O'Neill (NCAR)
SDWG Meeting, February 19-20, 2013



SSC Request

- “a need for more standard information from the working groups on their activities and procedures. ... made available through WG web pages”
- Request #1: Priorities for short-term (~next year) component model developments, including scientific motivation
 - Includes “Coupling across components and understanding interactions”
 - Due by March
- Request #2: What metrics/diagnostics are used for component model assessment
 - Due by June (Breckenridge)
- Raises question: What is larger procedure for introducing new or modified CESM-IAM (or water, impact) model linkage?



Request #1: Short-term component model developments

- iESM plans
- THESIS plans, initial steps
- Others?

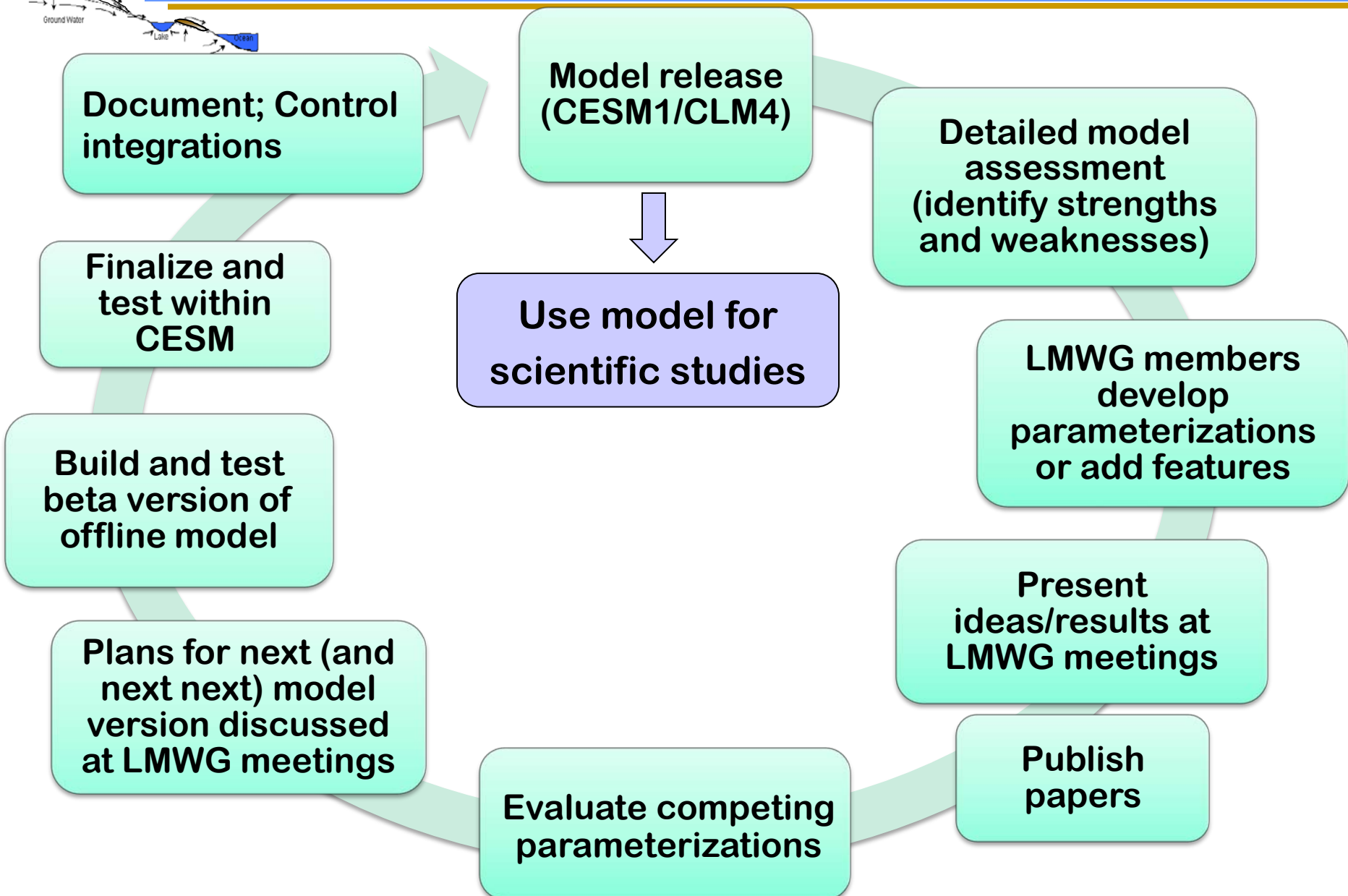
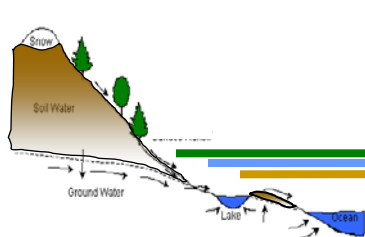


Request #2: Metrics/diagnostics for component model assessment

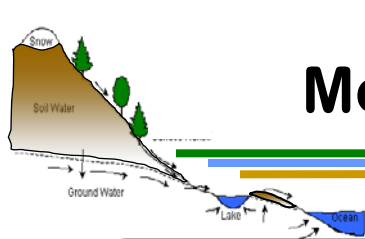
- Standard set of tests to carry out to demonstrate that linkage is (1) functional and (2) achieves goal of facilitating interaction with broad community
- Will depend on what is being linked (land use, air pollutants, urban area, etc., one-way vs two-way) and which model is being linked to (GCAM, iPETS, IMAGE, etc.)
- Can generic philosophy be defined?
 - Demonstrate that linked model produces same results as uncoupled model?
 - Move toward defining **standards** for model interfaces that meet community needs



Model Development Process - LMWG



Model **Linking** Development Process – **SDWG?**



Document; **Control integrations**

Model release
(with **linking functionality**)

Detailed model assessment
(identify strengths and weaknesses)

Finalize and **test** within CISM

Use model for scientific studies

SDWG members **develop or modify linking capacity**

Build and test beta version of **offline model**

SSC approval

Present ideas/results at SDWG meetings

Plans for next (and next next) model version **discussed** at SDWG meetings

Community review?

WG evaluates and approves new or alternative linkages

Publish papers

Draft: elements of procedure for model linkage development

- Developers vet new elements or modifications with the community, through SDWG meetings and community review period(?)
 - Ensures new elements are functional and benefit the broader IAM community
- Adding major new elements/functionality to CESM code base requires approval of both SDWG and SSC (co-chairs communicate SDWG outcome based on sense of WG? Vote if necessary?)
- Modifications of existing elements/functionality approved within WG (based on sense of WG, vote if necessary?)
- Tests are not intended to validate the IAM or impact model, but rather the functionality of the linkage





CESM is primarily sponsored by the National Science Foundation and the Department of Energy



Next steps

Model linkage development:

- iESM code review?
- Draft of development/review procedure

WG activity - between now and Breckenridge

Breckenridge:

- Update/check in on modeling activity? (side meeting?)
- Session on new scenario process and Shared Socio-economic Pathways (SSPs)?
- New topics: Abstracts for talks/posters on any societally relevant topic related to CESM



IAM – CLM/CESM activity?

Topic:

- Climate and water -> productivity -> land use change -> emissions, biophysical effects -> climate and water
- Which processes drive outcomes? New insights for CESM, IAM land modeling

Approach:

- **Scenario comparison (sensitivity, uncertainty)** or historical validation?
- **Regional focus**, but some models global
- Investigate both directions of influence:
 - What is the influence of productivity changes on regional land use, emissions and climate outcomes, and which uncertainties are key?
 - What is the influence of regional climate and hydrology change on land use and emissions outcomes?



IAM – CLM/CESM activity?

Participants:

- Most successful strategy is likely to be connecting to existing activities rather than starting from scratch
- Investigate carrying this out as part of Latin America Modeling Project
 - Work out a way for input into design for those not attending LAMP meetings?
- Look into connection to AgMIP and possible US regional focus

