

Modeler's perspective on O2R

M. Wiltberger

HAO/NCAR

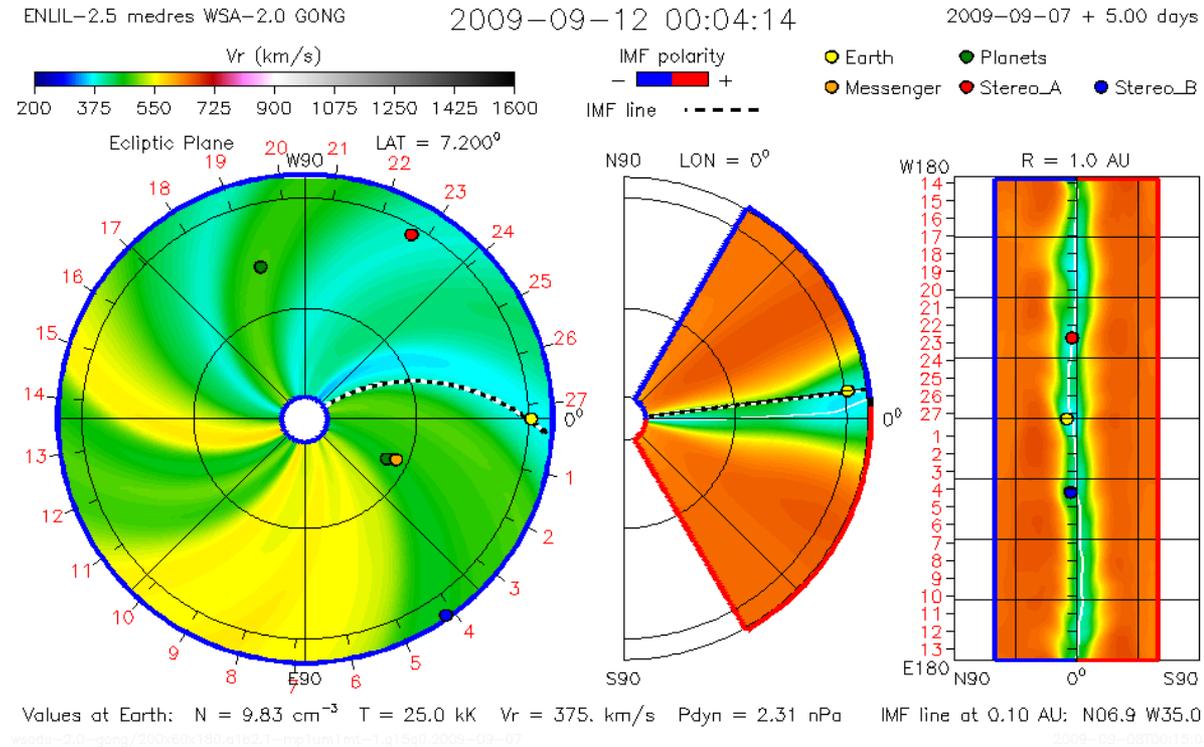


Outline

- Experience with R2O
 - Lessons learned from CISM
 - Lessons learned from SWPT Study
 - Lessons learned from Geospace competition
- Thoughts on O2R
 - Need for clear communication
 - Need for support

CISM & WSA-ENLIL

- One of the first numerical models put into operation
- CISM employed a transition scientists who worked closely with SWPC
 - Worked on getting model operational
 - Developed visuals in close consultation with forecasters and SWPC scientists



Lessons learned from SWPC Transitions

- Sophisticated models cannot be “thrown over the wall”
 - A sustained interaction is needed
- A “transition team” approach is workable
 - Forecasters, developers, computation experts, scientists, and managers
- Optimal pathways from research to operational communities is not clear
 - CISM transition provided a path finder

Quinn, J., J. Hughes, D. N. Baker, J. Linker, J. Lyon, S. C. Solomon, and M. Wiltberger (2009), Building and Using Coupled Models for the Space Weather System: Lessons Learned, *Space Weather*, 7, 05005, doi:10.1029/2009SW000462.

SWPT Study Report

Space Weather Prediction Testbed Study Report

28 February, 2009

1. Executive Summary

The NOAA Space Weather Prediction Center (SWPC) and the Air Force Weather Agency (AFWA) have requested a study of a Space Weather Prediction Testbed (SWPT). We have drafted a Concept of Operations for such a Testbed, formulated a conceptual model test plan, solicited input from the space physics research community, and evaluated implementation options.

Our principal recommendations are as follows:

- There is a clear need for some type of national facility for testing and evaluation of numerical models of the space weather environment, and transitioning them to operational agencies.
- These functions could be performed by an existing organization, such as SWPC or the CCMC, or performed by a new organization implemented in a scientifically cognizant university department, industrial organization, or federally-funded research and development center.
- The activity should be put out for competitive bids and competing proposals evaluated in a fair and objective manner.
- The research community should have an active collaborative role in the endeavor.

Purpose and Goals of a SWPT

- Primary focus is on preparing models for operations
 - Improvements maybe required in reliability, stability, and efficiency for robust real-time operations
 - Standardization of input streams and identification of input source hierarchy
 - Outputs tailored to meet the needs of forecasters and commercial user interests
- Another goal is the establishment of a robust, routine, and on-going testing and evaluation process
 - Using metrics developed in conjunction with forecasters provide quantitative information about models capabilities
 - Quantitatively assess the effects of model improves
 - Being outside the SWPC security perimeter is important
- Provide a conduit for Operations-to-Research
 - Allow access to long-term database of model runs and skill reporting

Areas of Broad Agreement

- There is a clear need do something to facilitate operational implementation of space weather models that should be supported by the research community
- Operational agencies should provide funding for work on transitioning to operations, including support for the model developer
- Interaction between operational users and model developers is needed to clarify the intersection of needs and capabilities
- The model selection process should be fair and transparent

Concerns about Intellectual Property

- Models have generally been developed by modest NASA and NSF grants and IP issues need to be addressed
 - This goes beyond monetary concerns and extends into areas of credit, prestige, and impact on future support
- It is unlikely that a single approach is going to meet all needs, but the acquisition process must respect the developers IP rights
 - These issues must be address by SWPC during the selection process
- Some developers have concerns about models being misused or that choices made during implementation process will reflect poorly on them

Concerns about competitive aspects

- A key concern raised by some model development group leaders was that the model selection process could be unfairly biased if an organization involved in T&E had its own model development program
- A negative outcome of the establishment of the SWPT would be if selected models gain significant advantage over all research grade models in the funding process
 - Should be a concern for the operational agencies as well as the developers
 - This maybe mitigated to some extent by establishing a mechanism to compare the operational model with other models
- Considerable objection was raised to assigning the operation of the SWPT without a competitive bid

Geospace Model Selection Lessons

- CCMC lead the evaluation process for the selection the geospace model
 - Metrics defined through discussion between SWPC and CCMC with some input from modelers
 - Participation by modelers was ‘pro bono’
 - SWMF was selected and support is being provided for transition to operations
- SWPC is not using this process for the selection of the ionosphere-thermosphere model

Thoughts on O2R

- Useful for scientific community to clearly understand the top needs of the forecasting community
 - Some maybe interested in working on these questions
 - A scientific visitor program maybe a useful way to kick start these collaborations
 - Long term databases will be quite help for model verification studies
- Intellectual property issues are still going to be a major issue moving forward with this
 - Do developers of operational models want a “competitor” working on improving their model