

SEC Modeling/Data Activities and Future Plans

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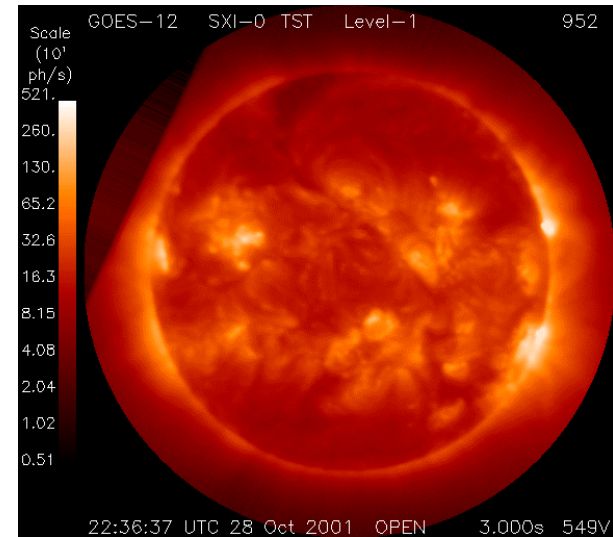
Goal: To utilize real-time, data-driven, operational models for quantitative prediction of space weather through a partnership with international research and operations centers.

- **New Models and Data in Operations**
- **Priorities for Space Weather Operations**
- **Process for Acquiring New Models**
- **Anticipated Benefits of the CCMC**



SEC is Moving Forward With New Data and Models

- **Solar X-ray Imager – Launched on GOES-12, July, 2001**
- **Solar Imaging Workshop held to identify future instruments**
- **New energetic particle measurements to fly on GOES N-Q:**
 - Electrons at energies > 30 keV**
 - Proton at energies > 80 keV**
- **Ongoing partnerships with other agencies:**
 - ACE and IMAGE**
- **New models are being moved to operations**



Target Space Weather Models

Solar Activity

Magnetosphere

Atmosphere

Solar Wind

Ionosphere

Solar Protons

Background Solar Wind

CME Propagation

Ring Current/Radiation Belts

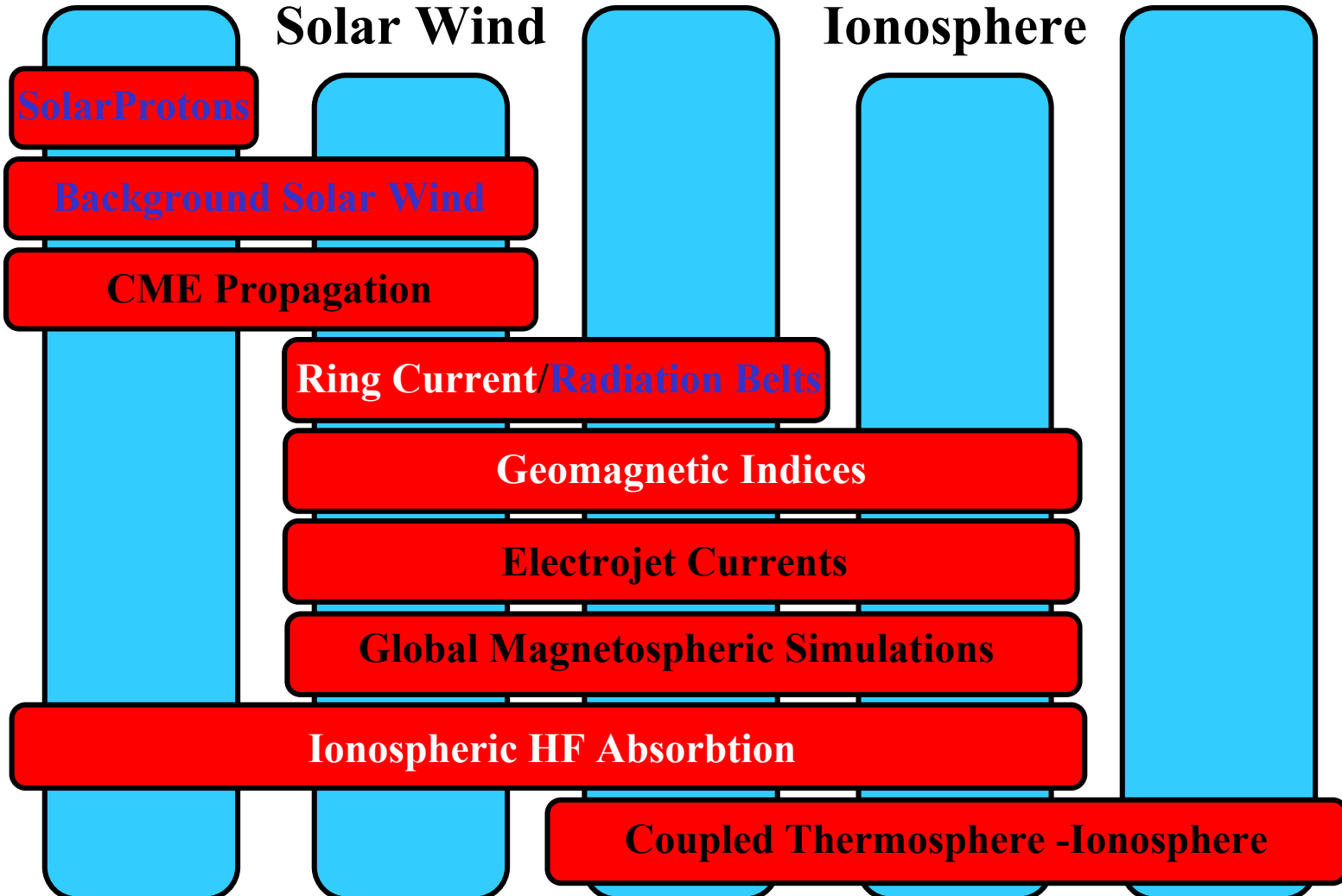
Geomagnetic Indices

Electrojet Currents

Global Magnetospheric Simulations

Ionospheric HF Absorbtion

Coupled Thermosphere -Ionosphere



Using Models Operationally: What are the Difficulties?

Forecast centers require models that can give useable output with little or no forecaster involvement.

- **Research goals are typically different from operational needs**
 - **Specific science issues often are not directly applicable to operations**
 - **Software interfaces, visualization tools, etc. are specific to an individual scientist's needs**
 - **Researchers typically use pre-selected, filtered input data**
- **Researchers need incentives to address operational issues**
 - **There is little reward for a researcher who solves operational problems**
 - **Documentation, standardization, interaction with operations center, etc. are not supported**



Why SEC is excited about the CCMC:

- **Numerous models are being developed for space weather, and real-time data are available to drive and to validate models**
- **CCMC can prioritize its efforts based in part on operational needs**
- **CCMC can conduct quantitative tests of models and evaluate strengths and weaknesses of different models/techniques**
- **CCMC can encourage the development of “black box” versions of existing codes enhance the level of documentation**
- **Quantitative assessment also provides guidance for scientific effort**

Model development and testing at the CCMC can accelerate our improvement of space weather services.



Summary

- **NOAA Space Environment Center is moving forward with a broad range of numerical models – Solar, Interplanetary, Magnetosphere, Ionosphere/Thermosphere.**
- **Interagency and International activities are accelerating the development of models – NSWP, MURI, ISES/RWC, STC, ...**
- **Process is in place for prioritization and selection of candidate models.**
- **CCMC can increased availability of models for operational use and increased effectiveness of models through research advances.**

