

NASA Unveils New Space-Weather Science Tool

February 23 2010, by Laura Layton



This still is from a sequence of images is from a computer animation illustrating an artist's concept of Coronal Mass Ejection (CME) cannibalism. Coronal Mass Ejections (CMEs) are clouds of electrified, magnetic gas weighing billions of tons ejected from the sun and hurled into space with speeds ranging from 12 to 1,250 miles per second (about 20 to 2,000 kilometers per second). Solar researchers believe cannibal CMEs may be the source of 'complex ejecta' CME clouds; those with a larger and more complex structure than typical CMEs. These traits cause complex ejecta CMEs to trigger protracted magnetic storms when they envelop Earth. NASA's iSWA system is designed to collect and store data about space-weather activity like CMEs. Credit: NASA

(PhysOrg.com) -- When NASA's satellite operators need accurate, real-time space-weather information, they turn to the Community Coordinated Modeling Center (CCMC) of the Space Weather Laboratory at NASA's Goddard Space Flight Center in Greenbelt, Md.

The CCMC's newest and most advanced space-weather science tool is the Integrated Space Weather Analysis (iSWA) system.

The iSWA is a robust, integrated system provides information about [space weather](#) conditions past, present, and future and, unlike many other programs currently in use, has an interface that the user can customize to suit a unique set of data requirements.

"The iSWA space-weather data analysis system offers a unique level of customization and flexibility to maintain, modify, and add new tools and data products as they become available," says Marlo Maddox, iSWA system chief developer at NASA Goddard.

iSWA draws together information about conditions from the sun to the boundary of the sun's influence, known as the heliosphere. The iSWA systems digests information from spacecraft including the National Oceanic and Atmospheric Administration's (NOAA) Geostationary Operational Environmental Satellites (GOES), NASA's [Solar Terrestrial Relations Observatory](#) (STEREO), the joint European Space Agency and NASA mission Solar and Heliospheric Observatory (SOHO), and NASA's Advanced Composition Explorer (ACE).

Citizen scientists and science enthusiasts can also use the data, models, and tools of the iSWA system. Similar to the way in which armchair astronomers have used SOHO data to discover comets, enthusiasts will find the iSWA system a wonderful resource for increasing their familiarity with the concept of space weather.

"We are continuously evolving the iSWA system, and we hope that it will benefit not only NASA satellite operators, but also that it may also help space-weather forecasting at other agencies such as the Air Force Weather Agency and NOAA," says Michael Hesse, chief of the Space Weather Laboratory at NASA Goddard.

Space-weather information tends to be scattered over various Web sites. NASA Goddard space physicist Antti Pulkkinen says the iSWA system represents “the most comprehensive single interface for general space-weather-related information,” providing data on past and current space-weather events. The system allows the user to configure or design custom displays of the information.

The system compiles data about conditions on the sun, in Earth's magnetosphere—the protective magnetic field that envelops our planet—and down to Earth's surface. It provides a user interface to provide NASA's [satellite](#) operators and with a real-time view of space weather. In addition to NASA, the iSWA system is used by the Air Force Weather agency.

Access to space-weather information that combines data from state-of-the-art space-weather models with concurrent observations of the space environment provides a powerful tool for users to obtain a personalized “quick look” at space-weather information, detailed insight into space-weather conditions, as well as tools for historical analysis of the space-weather’s impact.

Development of the iSWA system has been a joint activity between the Office of the Chief Engineer at NASA Headquarters and the Applied Engineering and Technology Directorate and the Science and Exploration Directorate at NASA Goddard. The iSWA system is located at [NASA](#) Goddard.

More information: iswa.gsfc.nasa.gov/

Provided by NASA's Goddard Space Flight Center

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