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Attachment(s):
(1) "CAWSES-II Space Weather Research Database", 645 KB pdf, 3 pages.
(2) "EOS on substorms", 800 KB pdf, one page.

: Re:
: (1) CAWSES-II Space Weather Research Database
: (2) Improving understanding of geomagnetic substorms
: (3) A Personal Note from the Editor.

Dear ISWI Participant:

I wish to bring to your attention a certain relevant database:
"CAWSES-II Space Weather International Collaborative Research
Database in Japan"; please see the first attached pdf.

The second pdf is from EOS of AGU -- for your information.

On a personal note, I want to congratulate an ICSWSE
colleague of mine: Dr Huixin Liu, who is an associate
professor here at Kyushu University. Each year, Japan's
ministry of education recognizes outstanding young
scientists (meaning, under the age of 40) with a
"Young Scientist's Prize." This year, this prize was
awarded to 90 scientists in Japan. Dr Huixin received
one of them. A big and hearty congratulations to her !

Forever cordially and faithfully yours,
: George Maeda
: The Editor
: ISWI Newsletter

CAWSES-II Space Weather International Collaborative Research Database in Japan (2009-2013)

Home

Japanese

Outline of CAWSES-II Space Weather International Collaborative Research Database in Japan (Significance and Purpose of Construction).

The ICSU-SCOSTEP (International Council for Science-Scientific Committee on Solar-Terrestrial Physics) which promoted the STEP program (1990-1997), the S-RAMP program (STEP-Results, Applications and Modeling Phase, 1998-2002) and the first CAWSES program (Climate And Weather of the Sun-Earth System, 2004-2008) carries out the successive international collaborative research project on CAWSES-II (Climate And Weather of the Sun-Earth System-II: Towards Solar Maximum, 2009-2013) which examines short term (space weather) and long term (space climate) variability of sun-earth system in the period toward the solar maximum, for its societal applications.

For the short term variability (Space Weather) of the CAWSES-II, "CAWSES-II Space Weather International Collaborative Research Database in Japan" is constructed as an infrastructure of national cooperative research as our country positively participates.

Analysis software and the database which added the analytical results in the ground and satellite observations acquired in fiscal 2009-2013 as CAWSES-II Space Weather International Collaborative Research and the common database which added calculation results to the software of the modeling/simulation are made. It is important that our country independently makes it to produce common Japanese database Researcher in the world can utilize for the space weather research, as the result, it will be an important international contribution.

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Plans for CAWSES Program

In the STEP program (1990-1997), the S-RAMP program (1998-2002), and CAWSES program (2003-2008) large data of sun image, solar radio emission, interplanetary space, magnetosphere, ionosphere and the atmosphere observations were acquired. The data of about 40TB was accumulated in the whole in today. In S-RAMP Database, analysis software, and the modeling/simulation data were added to observational data, and the following items were carried out.

As continuation and development of these Japan solar-terrestrial physics database production, the database used as the base of CAWSES-II Space Weather International Collaborative Research (2009-2013) is produced.

The CAWSES-II Space Weather International Collaborative Research Database aims to the effective combination between an observations of short term variability (Space Weather) of the solar terrestrial system and the modeling/simulation Specifically the space weather research data is chosen from CAWSES-II data, and newer cosmic -ray and the optical observational data of the upper atmosphere are added, and a database is made.

There are the following as item.

1. Solar and Cosmic rays data (Solar pictures and Electric wave images)
2. Magnetosphere data (magnetic field, plasma, particles)
3. Ionosphere data (observations each point, geomagnetism 3 ingredient, an Aurora image)
4. Atmosphere optical observational data
5. Modeling / simulation data (Magnetic field model, Electron current, Kinetic simulation. etc.)

These databases can be used for promotion of the space weather research of Japan and international contributions.

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Public Disclosure of CAWSES-II Space Weather International Collaborative Research Database in Japan

Public disclosure of the CAWSES-II Space Weather International Collaborative Research Database as well as the case of CAWSES database is done through Internet.

About concrete method and user's restrictions of data public presentation, it depends on a data provider conditions. However, the open data in Web will not be restricted in particular, if it is limited by academic usage.

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Use of a CAWSES Space Weather International Collaborative Research Database in Japan.

The collaborative researcher in and outside the country which participates in the CAWSES-II (Climate And Weather of the Sun-Earth System, 2009-2013) which studies a short-term variability (the space weather) and long term variability (space climate) of a solar terrestrial system is a main subject of use. The many researcher has overlapped also with the S-RAMP International Collaborative Researcher. In Japan, various observational data from solar-terrestrial science, analysis data, and a modeling/simulation result are gathered as space weather research, and the study group meeting of the space weather prediction is held several times every year. The participant in those meetings and study groups turns into main candidates. Moreover, since the space weather research is common to human beings, U.S., Europe, and Asia are also advanced systematically. The space weather researchers in the world are candidate users.

It is necessary to construct the database in Japan from the data which the researcher of Japan observed. On the data analysis, the software of modeling/simulation and the calculation results which are developed and expanded by the Japanese researcher must take care by Japanese researchers. By sending the Japanese space weather database from our country, when researcher in the world can use the database. Space weather international collaborative research is common to human beings. Thus, the CAWSES-II international collaborative researchers in the world use mutually. In addition, the space weather is interested in wider and larger communities in the world, and many open data in Web is referred to also from general public.

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Regulation of CAWSES-II Space Weather International Collaborative Research Database

The Web data is open for researchers and general public. When one uses the database in publication, it is required to contact the data provider shown in eath of database.

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CAWSES database production organization

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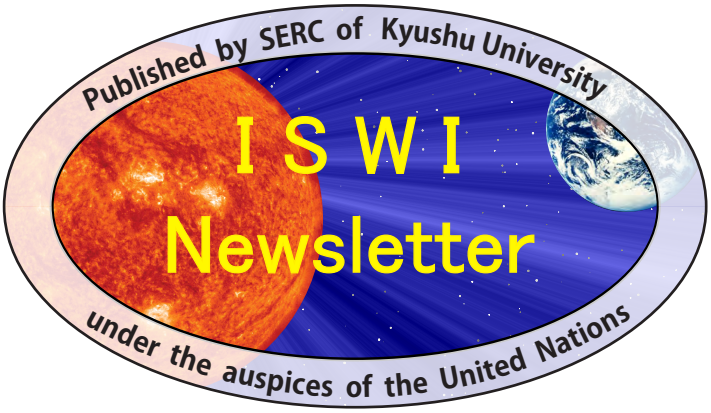
CAWSES-II Database Homepage



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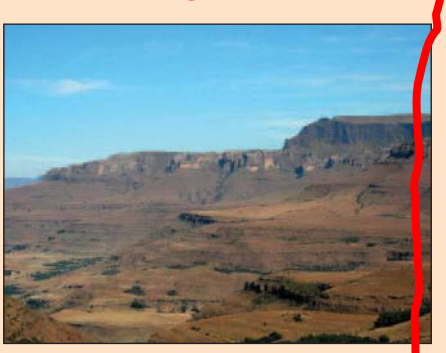
RESEARCH SPOTLIGHT

Highlighting exciting new research from AGU journals

Tracking a Jurassic reversal of the Earth's magnetic field

Roughly 180 million years ago, during the height of the Jurassic period, the Earth's magnetic field flipped, bringing the magnetic north pole once again into the Northern Hemisphere. This so-called van Zijl reversal, named for the researcher who first described it, is the second-oldest well-documented geomagnetic reversal. Such perturbations of the Earth's magnetic field, which tend to take place over about 10,000 years but possibly much less, have been identified as occurring up to several billion years ago and as recently as 780,000 years ago. An open question exists about the effect of such reversals on the properties of the Earth's magnetic field, including the structure it takes, and the consequent effects on its shape, size, and strength. Drawing on newly identified records of the van Zijl reversal, *Moulin et al.* describe the serpentine travels of the transitional magnetic pole and the variable strength of the paleomagnetic field.

Analyzing the orientations of magnetic minerals found encased within rock samples drawn from an ancient lava field in Lesotho, a small country encompassed within South Africa, and from another field in South Africa itself, the authors tracked the shifting geographic location of the ancient magnetic pole. They found that over a short period, possibly only a few centuries, the pole leapt from a location oriented around 45°S to one near 45°N. The paleomagnetic pole then drifted through around 20° latitude as it moved to the southeast. Finally, the pole moved to a stable location centered near the geographic north pole. The authors found that leading up to the magnetic reversal, the strength of the magnetic field weakened to roughly 10%–20% of its normal value, a depression that only decayed once the pole's location stabilized. (*Geochemistry, Geophysics, Geosystems*, doi:10.1029/2011GC003910, 2012) —CS



Vincent Courtillot

From rock samples in the Karoo large igneous province in southern Africa, scientists mapped a 180-million-year-old reversal of the Earth's magnetic field.

Declining sea ice to lead to cloudier Arctic

Arctic sea ice has been declining over the past several decades as global climate has warmed. Moreover, sea ice has declined more quickly than many models predicted, indicating that climate models may not be correctly representing some processes controlling sea ice.

One source of uncertainty in models is feedback from cloud cover. Sea ice can affect cloud cover, as melting sea ice and increased evaporation from the ocean surface can lead to increased cloud formation. In the Arctic, clouds have an overall warming effect on the surface, so greater cloudiness in this region could lead to even more sea ice melt.

Liu et al. analyzed satellite observations of cloud cover and sea ice from 2000 to 2010 to evaluate feedbacks between sea ice and cloud cover. They found that a 1% decrease in sea ice concentration leads to a 0.36–0.47% increase in cloud cover and that 22–34% of variance in cloud cover can be explained by changes in sea ice. So as sea ice declines, the researchers predict that the Arctic will become cloudier. (*Geophysical Research Letters*, doi:10.1029/2012GL051251, 2012) —EB

Improving understanding of geomagnetic substorms

Substorms, the frequent, brief magnetic disturbances that originate in Earth's magnetotail, cause acceleration of particles in the magnetosphere and their precipitation into the ionosphere, resulting in sudden brightening and increased movement and expansion of aurorae. *Sergeev et al.* review recent progress that has been made in understanding the onset and dynamics of substorms. In particular, recent observations have confirmed that magnetic reconnection—the breaking up and rejoining of magnetic field lines and release of energy—in the Earth's magnetotail, which sends fast plasma streams into the inner magnetosphere, is closely associated with substorm onset. Large-scale reconfiguration of the magnetic fields in the magnetotail and local instabilities interact in complex ways, leading to the onset of substorms.

Although scientists do not yet have a complete understanding of substorms, the authors note that the combination of observations from a variety of operational satellites and planned missions, along with improved modeling capabilities, is likely to help scientists answer some of the open questions about substorm dynamics. (*Geophysical Research Letters*, doi:10.1029/2012GL050859, 2012) —EB

A general approach to spontaneous imbibition

Spontaneous imbibition occurs in a porous medium when, driven by capillary forces, a wetting fluid such as water displaces a nonwetting fluid like oil or air. This is a common phenomenon, relevant to many processes such as groundwater contamination, steam migration in geothermal systems, carbon dioxide sequestration, and oil recovery.

Statistical physics indicates how the position of the leading edge of the water scales with time. However, although the phenomenon has been studied for more than 90 years, not even simple questions like the influence of viscosities on spontaneous imbibition were well understood. In fact, even the classic theoretical framework commonly used for describing spontaneous imbibition has been debated recently.

Schmid and Geiger derived a master equation for scaling groups used to rigorously characterize all key parameters in spontaneous imbibition. The result has practical and theoretical implications: First, it forms the missing piece for a multitude of models. Furthermore, the result suggests that the classical description of imbibition is satisfactory. (*Water Resources Research*, doi:10.1029/2011WR011566, 2012) —EB

—Ernie Balcerak, Staff Writer, and Colin Schultz, Writer

Cont'd next column.