

2012 Space Weather Workshop (04.26.2012)

# Japanese Space Weather Activities and Asia-Oceania Space Weather Alliance

S. Watari, Ken T. Murata, and T. Nagatsuma

National Institute of Information and Communications Technology

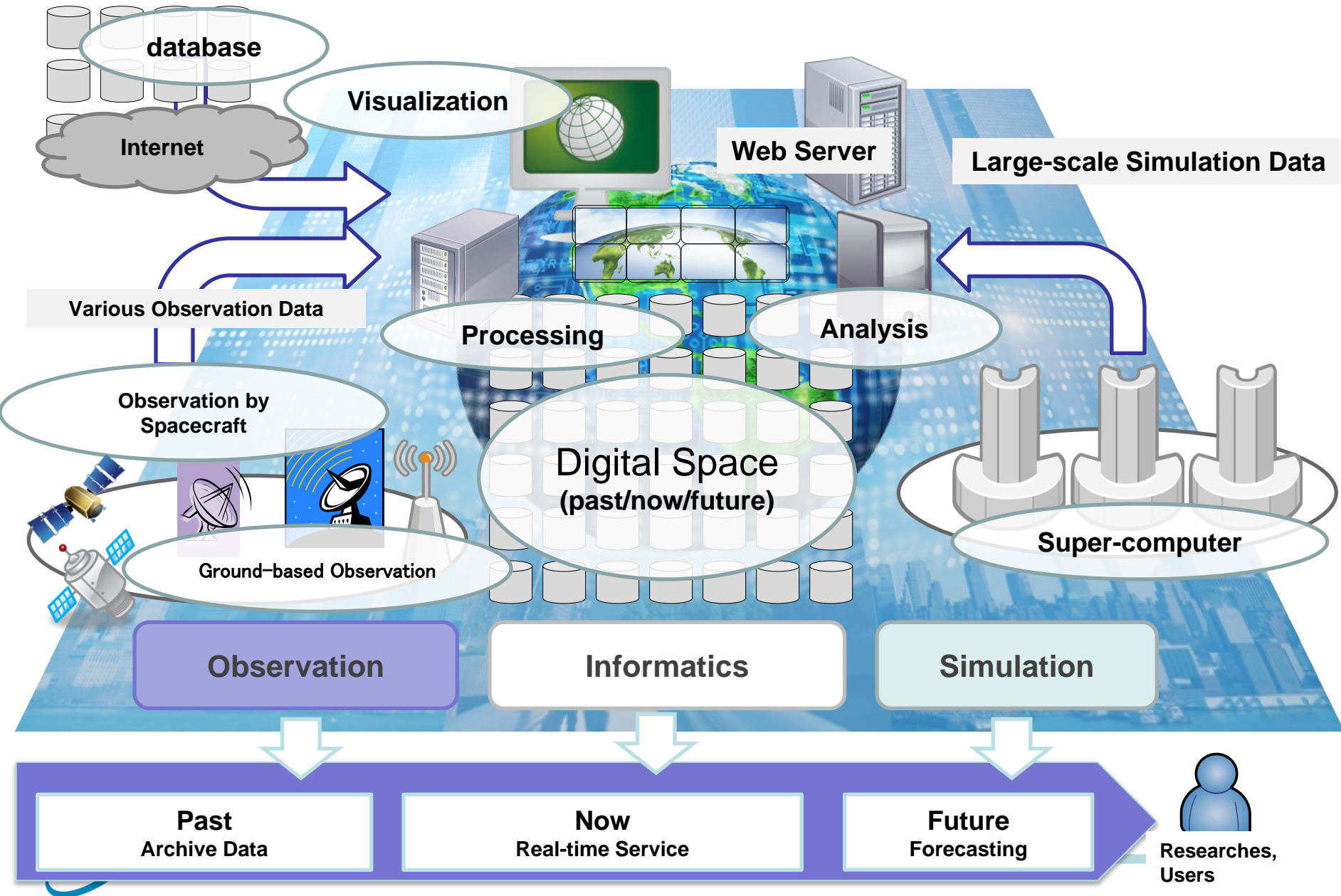


# Contents

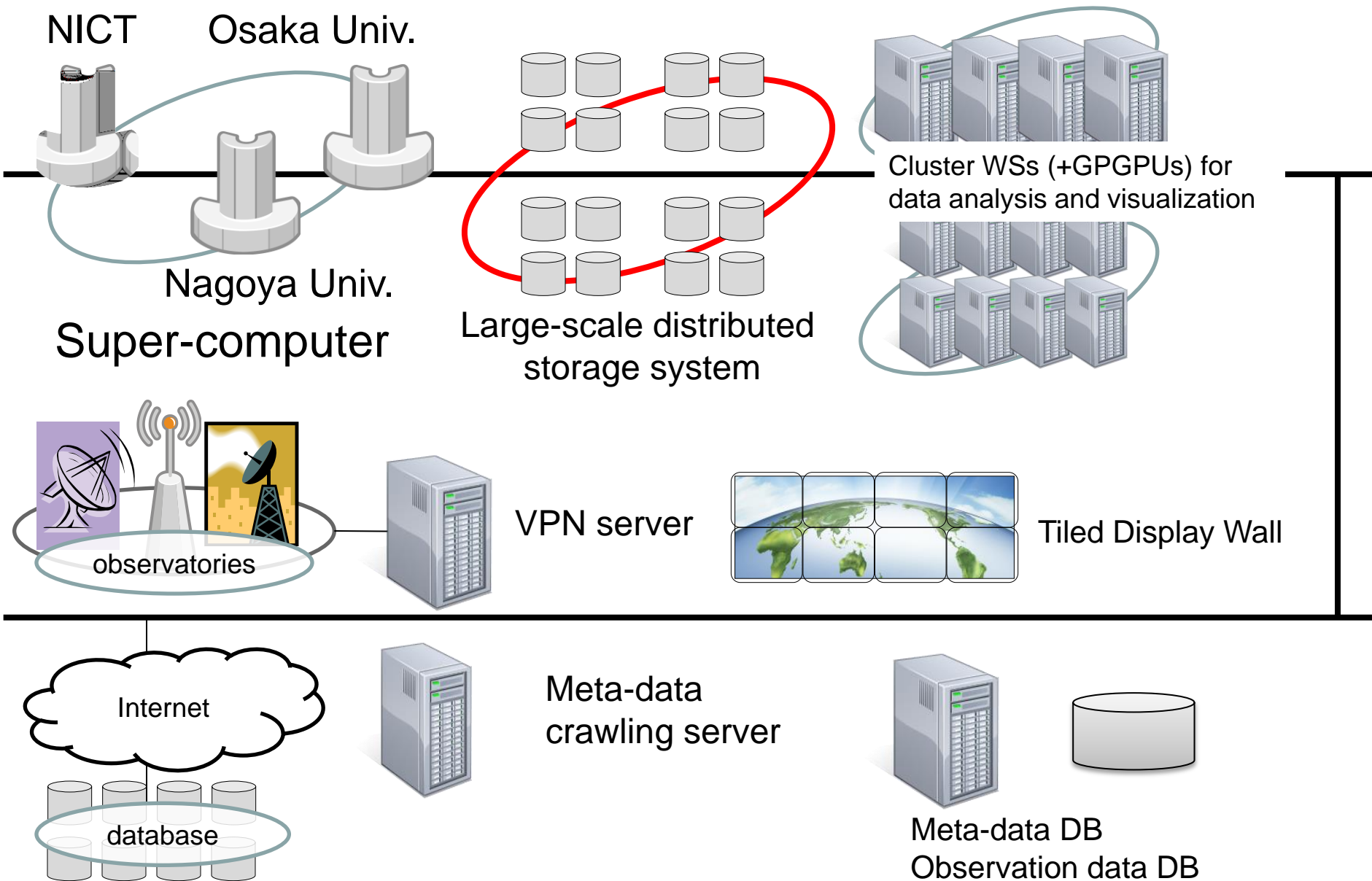
1. Activities of National Institute of Info. & Com. Thech. (NICT)
2. Asia-Oceania Space Weather Alliance (AOSWA)
3. Other activities

# 1. Activities of NICT

# NICT Space Weather Cloud



# NICT Space Weather Cloud



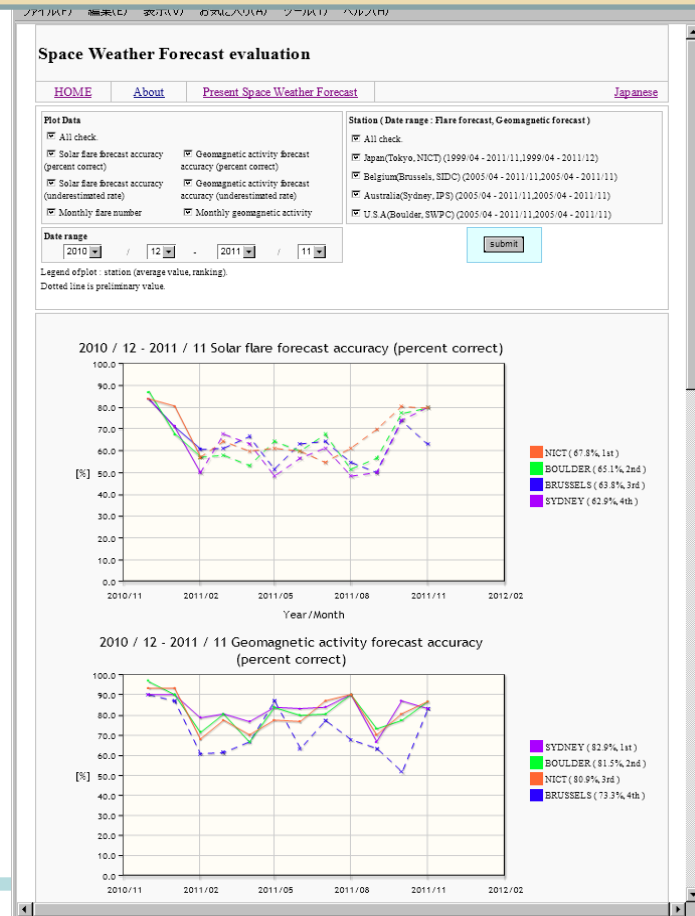
# Evaluation of ISES forecast centers

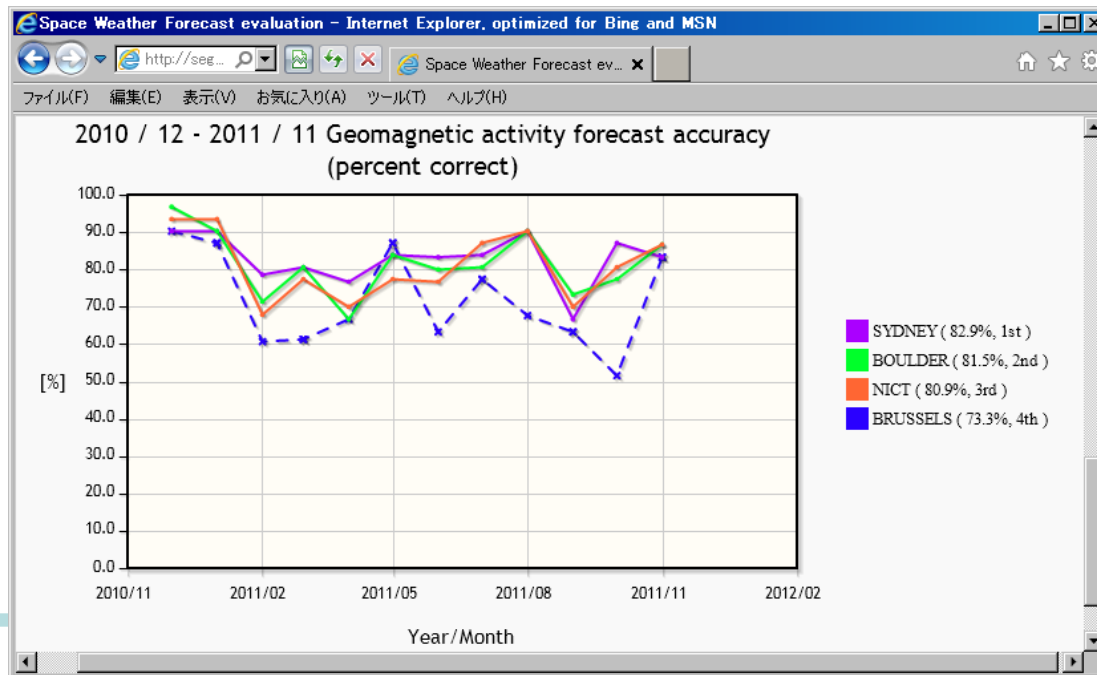
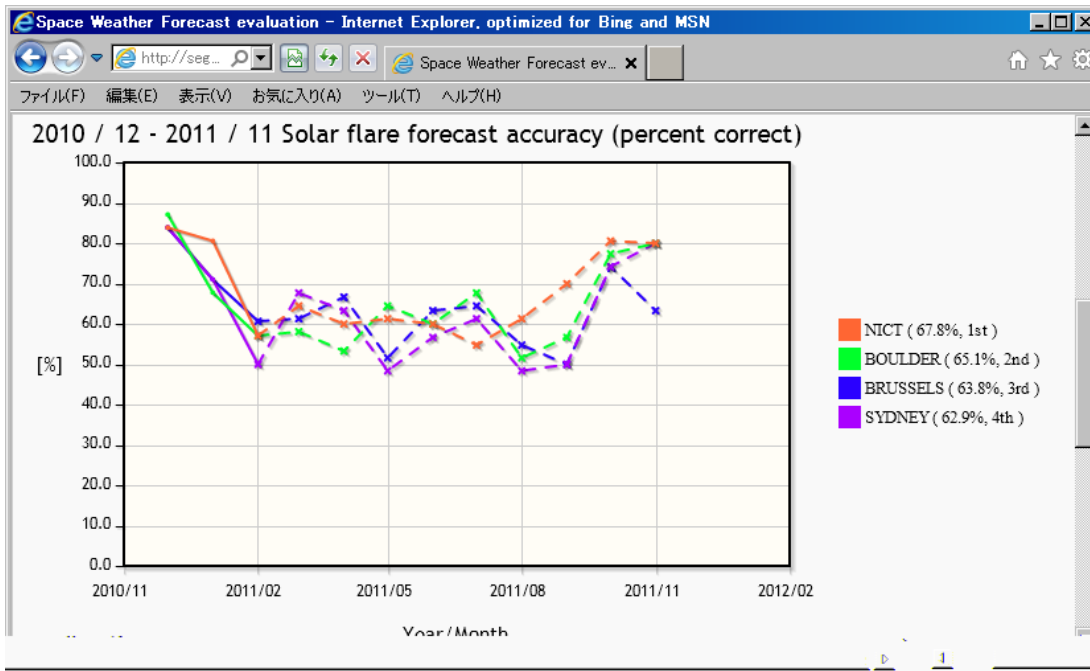
ISES forecast centers exchange their forecast using UGEOA code. NICT started evaluation of the forecasts under agreements of each forecast center.

[http://seg-web.nict.go.jp/cgi-bin/forecast/eng\\_forecast\\_score.cgi](http://seg-web.nict.go.jp/cgi-bin/forecast/eng_forecast_score.cgi)

[http://www2.nict.go.jp/aeri/swe/swx/swcenter/isesforecast\\_e.html](http://www2.nict.go.jp/aeri/swe/swx/swcenter/isesforecast_e.html)

[Present Space Weather Forecast from ISES]		
Tokyo[Japan] (1500JST)	Flare forecast on :18(1days)	Eruptive
	Magnetic forecast on :18(/days)	Quiet
	Proton forecast on :18(/days)	Quiet
Beijing[China] (1530JST)	Flare forecast on :17(2days)	Eruptive
	Magnetic forecast on :17(2days)	Quiet
	Proton forecast on :17(2days)	Quiet
Burussels [Belgium] (2010JST)	Flare forecast on :17(2days)	Active
	Magnetic forecast on :17(2days)	Quiet
	Proton forecast on :17(2days)	Quiet
Sydney [Australia] (0900JST)	Flare forecast on :18(1days)	Eruptive
	Magnetic forecast on :18(1days)	Quiet
	Proton forecast on :18(1days)	Quiet
Boulder[USA] (1230JST)	Flare forecast on :18(1days)	Eruptive
	Magnetic forecast on :18(1days)	Quiet
	Proton forecast on :18(1days)	Quiet

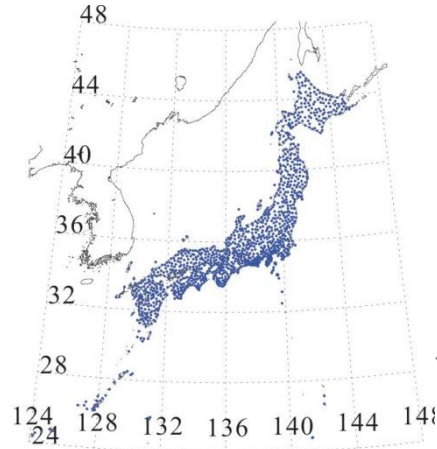




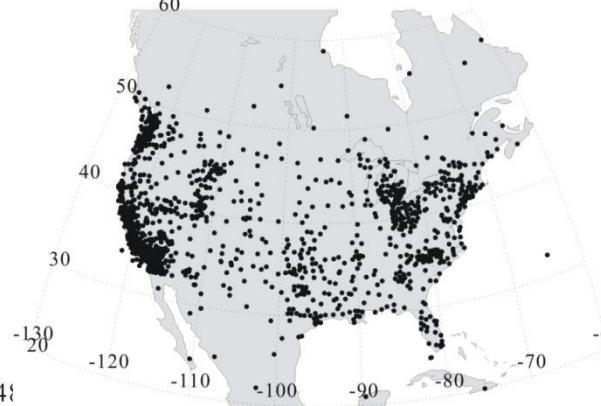
# Ionospheric Disturbance via High-Resolution GPS-TEC Maps

Number of GPS Receivers

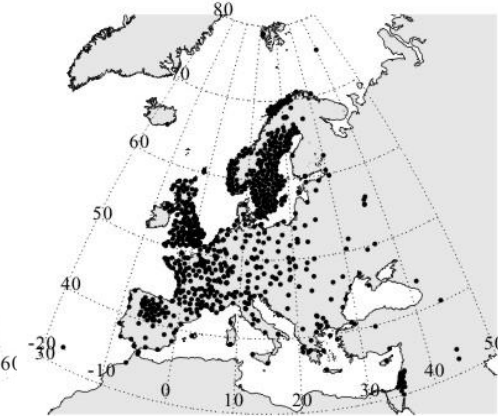
~1,200 receivers



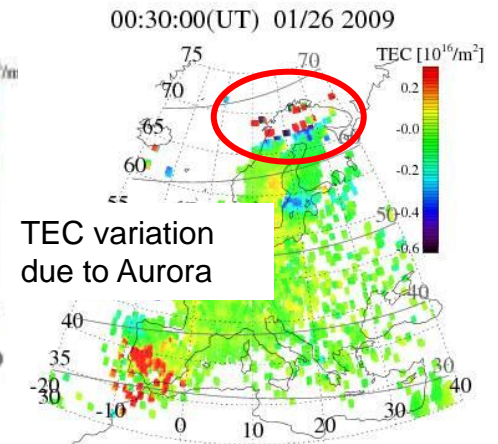
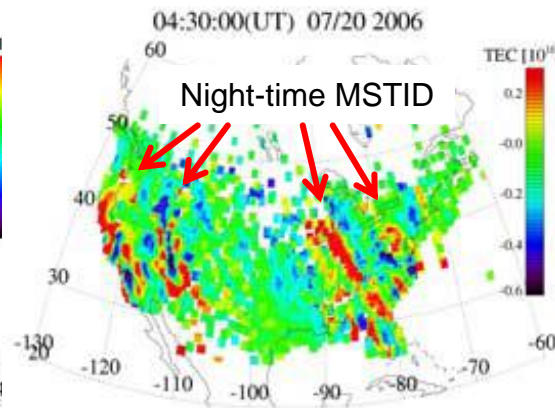
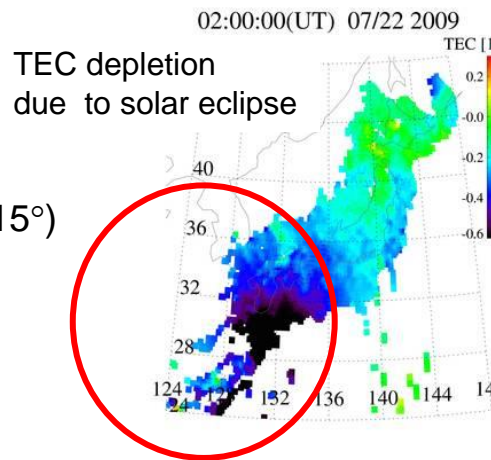
~1,600 receivers



~830 receivers



TEC Map  
(30sec, 0.15°x0.15°)



Asia-Oceania GPS-TEC map...





# e-SW Web site (in Japanese)

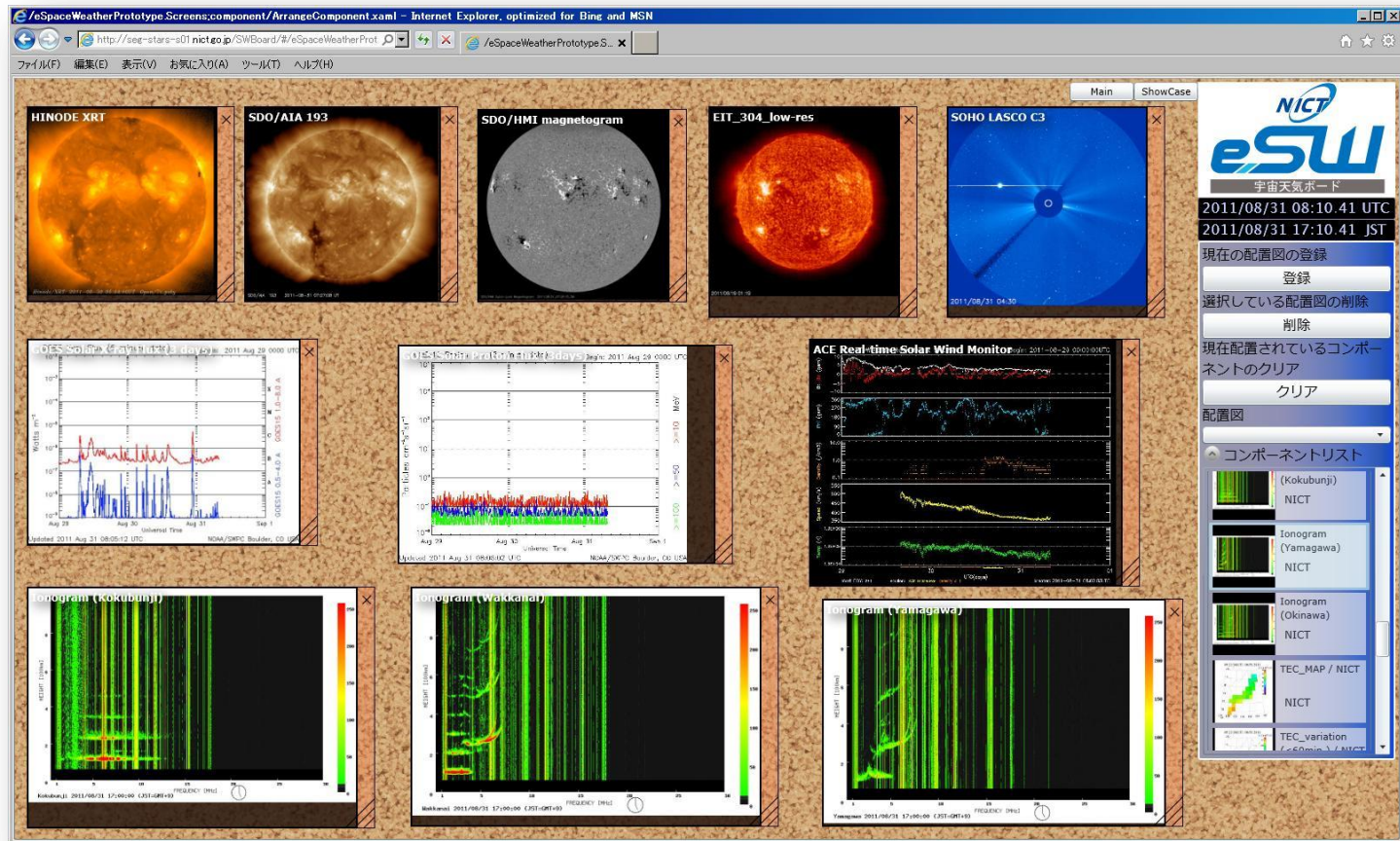
Portal of products provided by NICT Space Weather Cloud



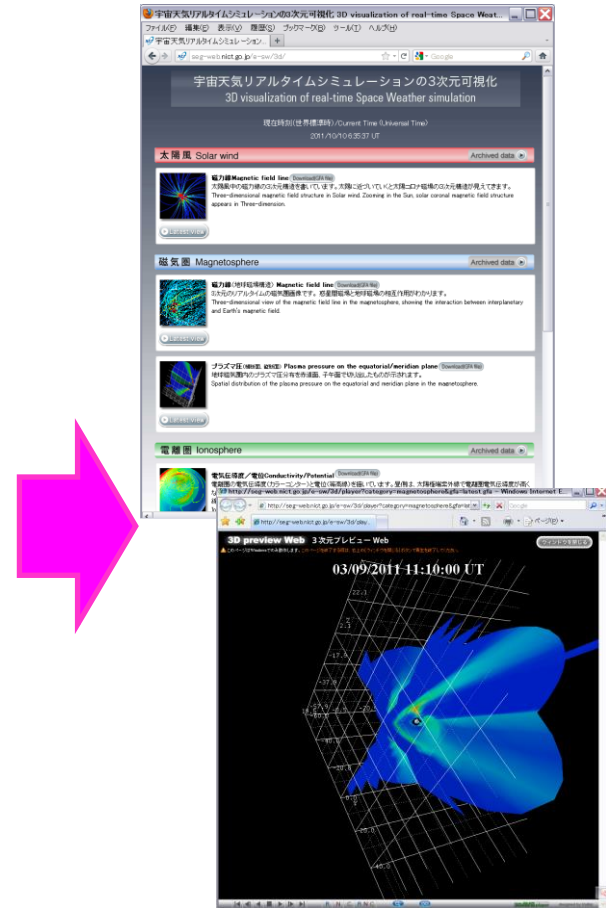
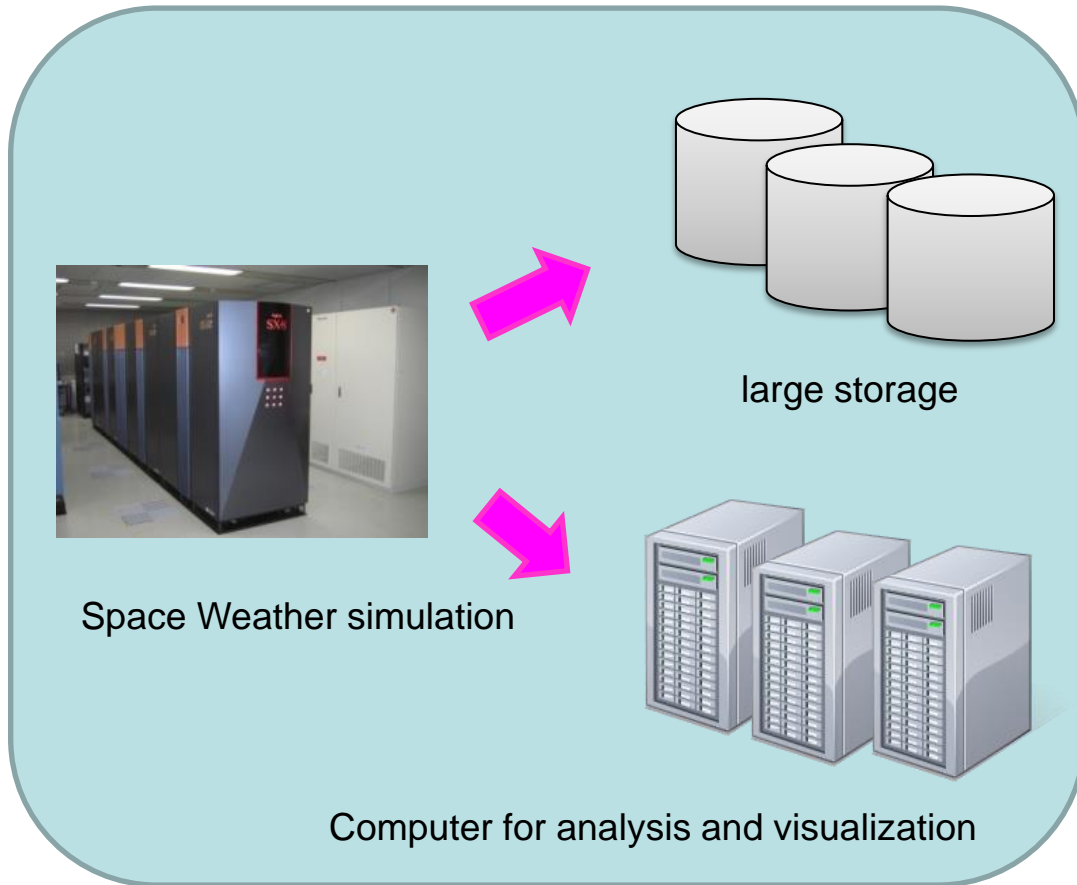
<http://e-sw.nict.go.jp>

# Space Weather Board

Users can arrange their favorite space weather data and can save their original layouts.



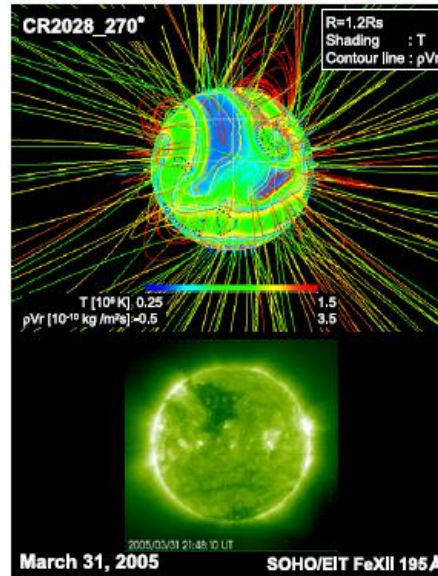
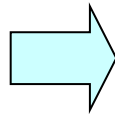
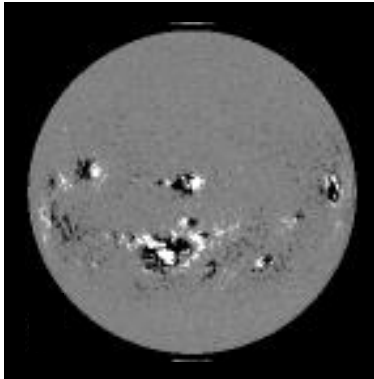
# Analysis and Visualization of Space Weather Simulation



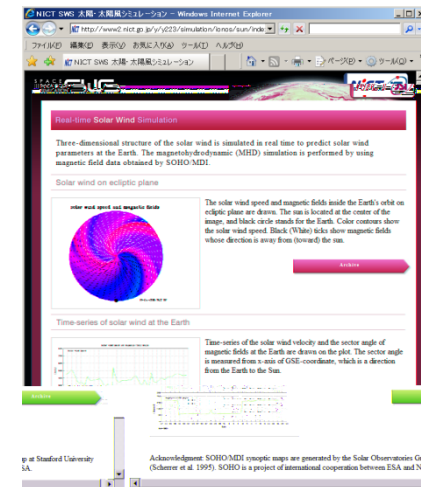
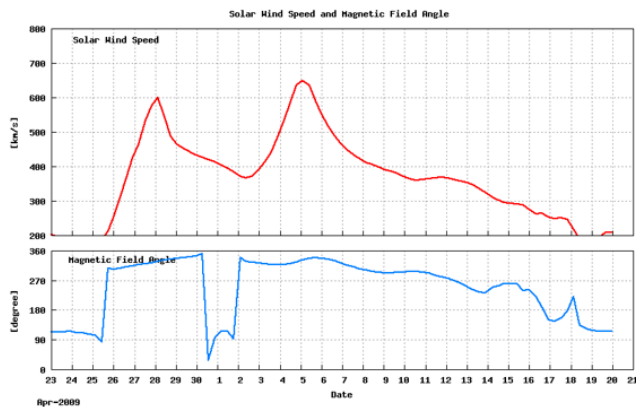
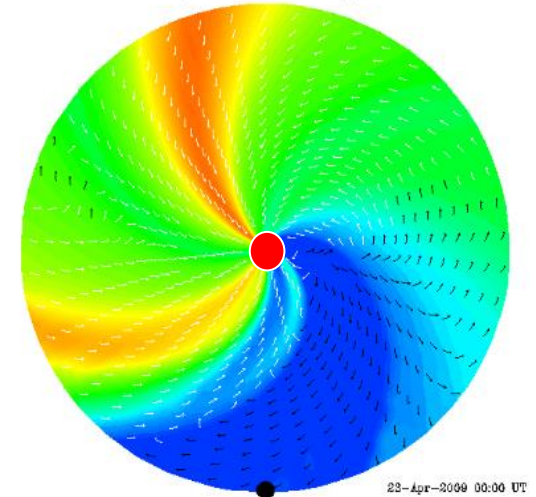
Web service

# Computer simulation of the Sun and solar wind

Magnetic field (solar surface) data via SOHO/MDI



solar wind speed and magnetic fields

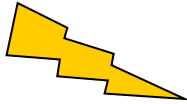


Publication on Web

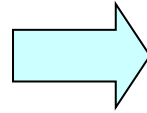
# Computer simulation of Earth's magnetosphere



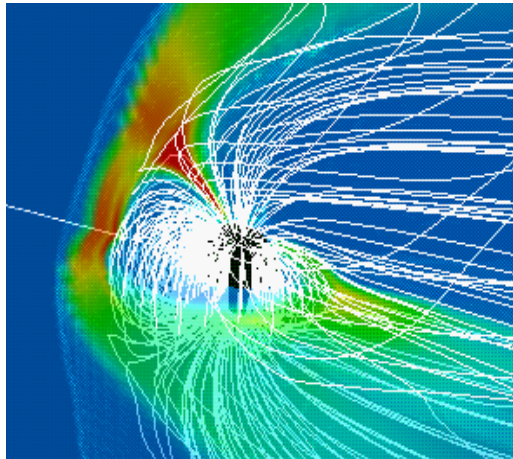
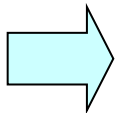
Real-time observation data of solar wind via ACE satellite



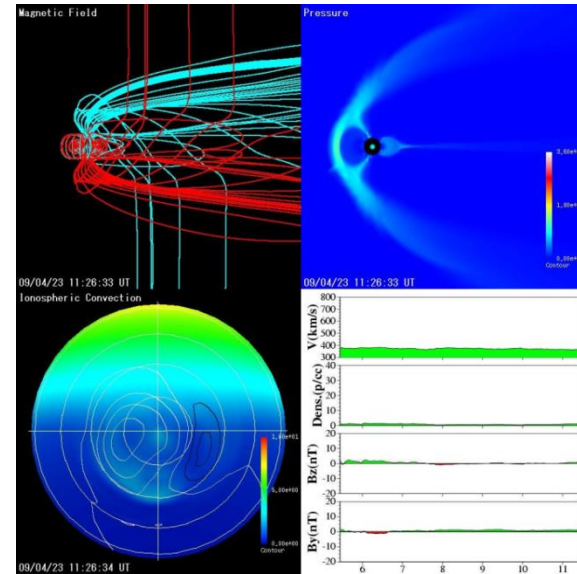
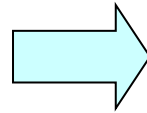
Real-time data receiving at NICT (Koganei)



Super computer (NEC SX-8R) at NICT (Koganei)



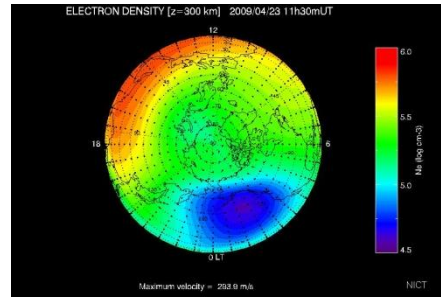
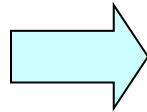
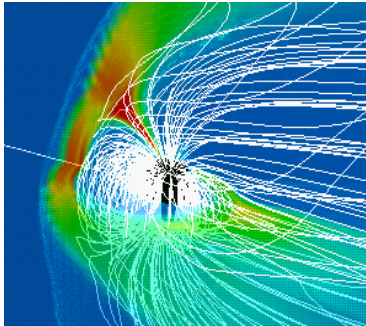
Visualization and database



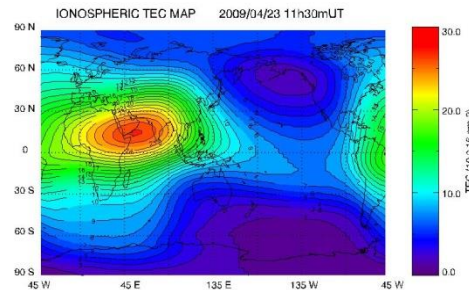
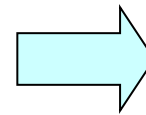
Publication on Web

# Computer simulation of Ionosphere and Thermosphere

## Simulation results from Magnetosphere simulation



Electron density

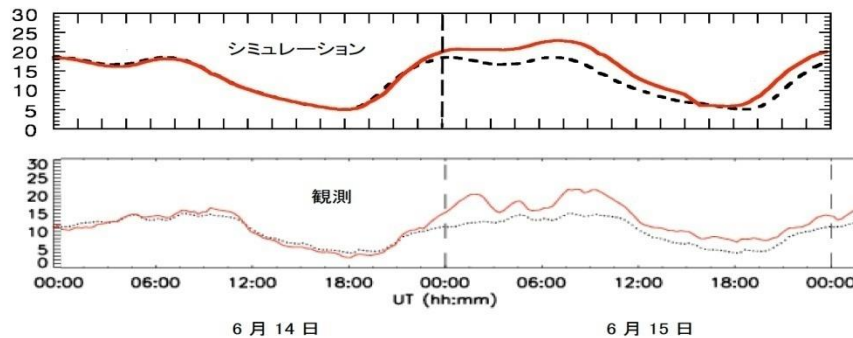


TEC map

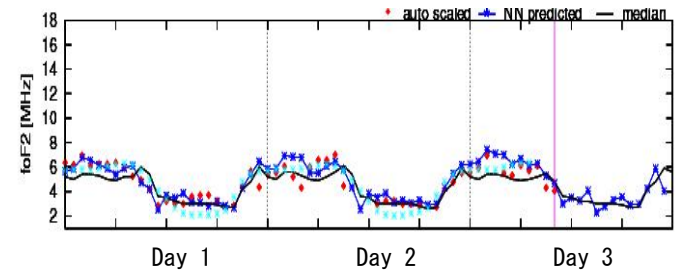
NICT

Publication on Web

## Example 1



## Example 2



# Weekly Space Weather News (in Japanese)

Space weather caster reports week summary of space weather.

<http://www.seg.nict.go.jp/wsw/index.html>



<http://www.youtube.com/user/nictchannel>



# Brief explanation on Space Weather (in Japanese)



## Titles

1. Sunspot
2. Solar cycle
3. Ionosphere
4. Ionosonde
5. SWF
6. CME
7. Magnetosphere
8. SOHO
9. Aurora
10. Sporadic E
11. Solar wind
12. Proton Event
13. Radiation belt
14. F10.7
15. Solar flare
16. TEC observation using GPS
17. Solar radio bursts
18. Plasma babble
19. Geomagnetic index
20. Geomagnetic storm
21. Ionospheric storm



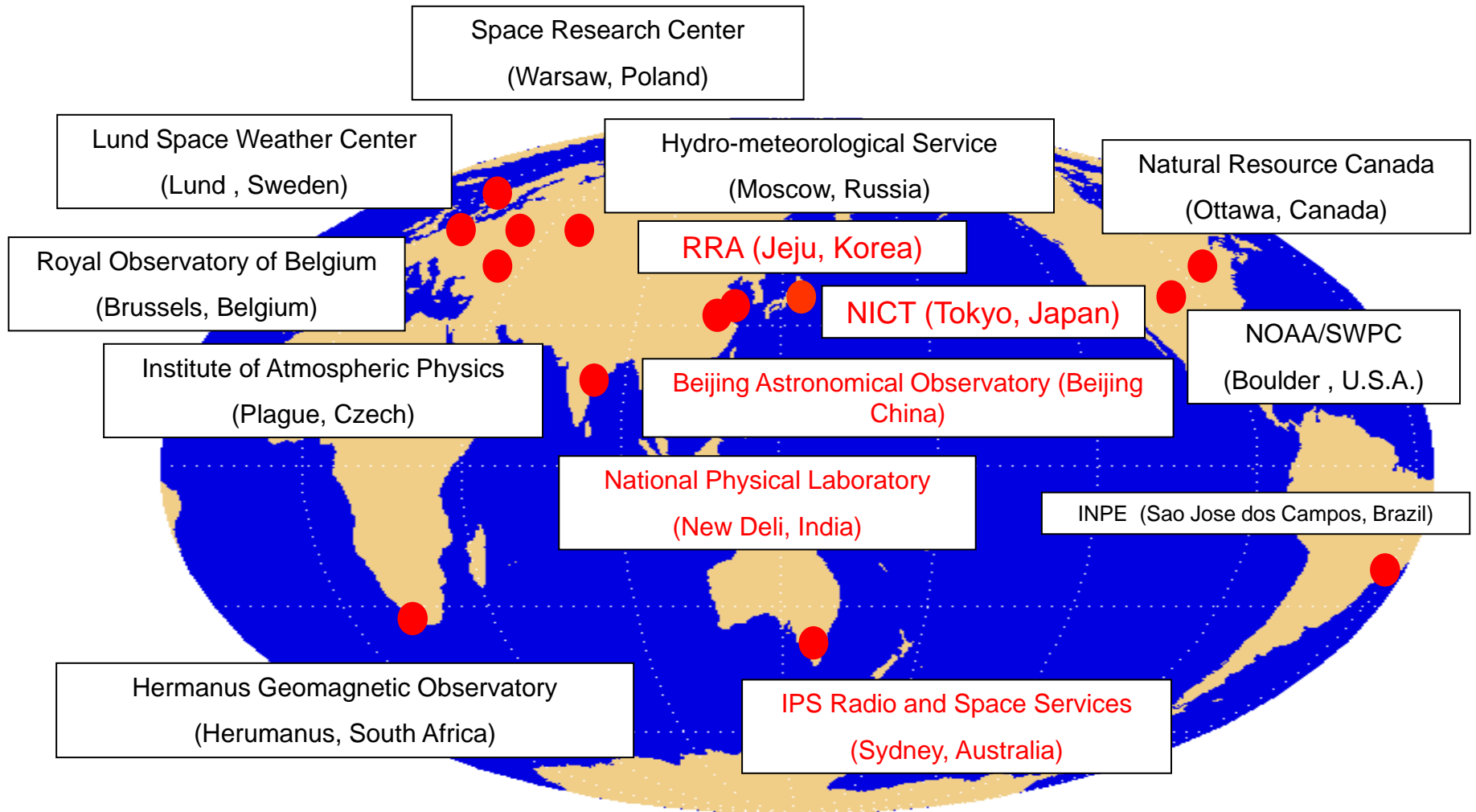
Solar wind





## 2. Asia-Oceania Space Weather Alliance (AOSWA)

# Regional Warning Centers of International Space Environment Service (ISES)



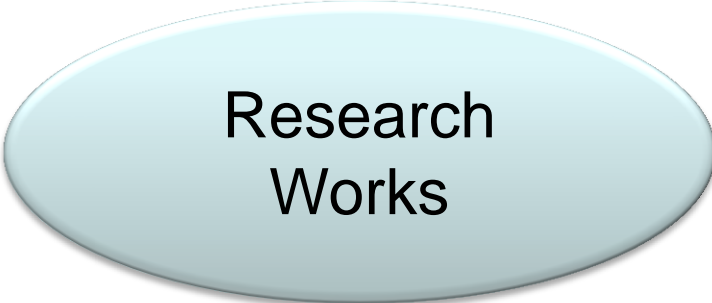
**Indonesia:** Space Weather Program in progress at LAPAN

**Thailand:** Princess Sirindhorn Neutron Monitor with the highest cut-off energy  
Plan of Thailand GPS and Ionospheric Data Center in KMITL

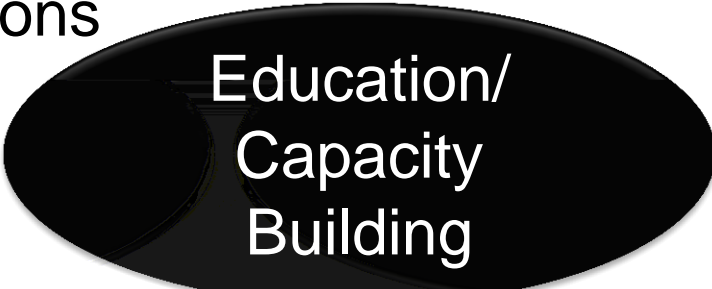


Operational Forecast, Data Preservation  
(Application and Stewardship)

Workshop/Collaboration/  
Data Exchange



Four functions



Information Exchange  
(Web site/News Letter)

Space Weather School/  
Text book & Contents

# AOSWA Associate Member

Associate member is 16 institutes in 10 countries.

## **Australia**

- Ionospheric Prediction Service (IPS) / RWC Australia

## **China**

- Center for Space Science and Applied Research (CSSAR)  
- National Astronomical Observatories of China (NAOC)

## **India**

- National Physical Laboratory (NPL) / RWC India

## **Indonesia**

- National Institute of Aeronautics and Space (LAPAN)

## **Japan**

- National Institute of Info. & Com. Tech. (NICT)  
- RISH, Kyoto University  
- STEL, Nagoya University

## **Malaysia**

- National Space Agency of Malaysia (ANGKASA)  
- Universiti Kebangsaan Malaysia (UKM)

## **Pakistan**

- Pakistan Space and Upper Atmosphere Commission (SUPARCO)

## **Republic of Korea**

- Radio Research Agency (RRA) / RWC Korea  
- Korean Astronomy and Space Science Institute (KASI)  
- Kyung Hee University

## **Thailand**

- ICAO Asia and Pacific Office

## **Vietnam**

- Institute of Geophysics



# Regional Space Weather Workshop

Space Weather Workshop @ USA since 1999

The screenshot shows the NOAA Space Weather Prediction Center website. The main heading is "Space Weather Workshop" with the subtitle "The Meeting of Science, Research, Policy, and Operations". The dates are "April 24-27, 2012 - Boulder, Colorado". A prominent link says "Register here for the 2012 Space Weather Workshop". Below this, there are links for "About Space Weather Workshop", "2012 Conference Schedule", and "Click here to Register". A section titled "2012 Space Weather Week Documentation" lists several documents: "2012 Space Weather Workshop Agenda and Abstract Booklet", "2012 Space Weather Workshop Participant List", "2012 Poster Abstracts", and "2012 Poster Layout". At the bottom, there is a section "About Space Weather Workshop" with a brief description of the event's purpose.

European Space Weather Week since 2004

The screenshot shows the website for the Ninth European Space Weather Week. The title is "Ninth European Space Weather Week" with the dates "November 5 - 9, 2012, Brussels, Belgium". The logo for ESWW is displayed. A navigation menu on the left includes "HOME", "PROGRAM", "SPECIAL EVENTS", "REGISTRATION", "ABSTRACTS", "DEADLINES", "COMMITTEES", "LOCAL INFORMATION", and "SOCIAL PROGRAM". The main content area states: "We are pleased to announce that the Ninth European Space Weather Week will take place at the Académie Royale de Belgique, Brussels, Belgium between 5 and 9 November 2012." It also mentions that the meeting is jointly organized by the STCE, the SIWWT, and the COST ES0803 communities and ESA. A section titled "This year's edition focuses on" lists five sessions: "Session 1: European Space Weather Landscape: Current Perspectives and Requirements for the Future", "Session 2: Innovations and Key Challenges in Space Weather Science", "Session 3A: Solar Variability Effects on Climate", "Session 3B: Coupled Space Weather Modelling", "Session 4A: Spacecraft Operations and Space Weather", "Session 4B: Space Weather in the Solar System", and "Session 5: COST ES0803 Final Results".

**AOSWA**  
Asia-Oceania Space Weather Alliance

Asia-Oceania regional space weather workshop since 2012



# The 1st AOSWA Workshop

(22-24 February 2012, Imperial Mae Ping Hotel, Chiang Mai, Thailand)

Asia-Oceania Regional Space Weather Workshop

Next workshop is in China hosted by NAOC, CSSAR, and CMA



Approximately 80 people from 30 institutes in 10 countries including the ICAO Asia and Pacific Office in Bangkok, Thailand

# AOSWA Web site

**AOSWA**  
Asia-Oceania Space Weather Alliance  
Preparatory Committee

Top Introduction Workshop AOGS Associates Event Application Education Contact Link

**Event Information**

2012/04

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

2012/05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

**Associates of AOSWA**

•Number of Associates 16  
(10 countries)

•Number of Mailing List Member

Australia	2
China	4
India	2
Indonesia	10
Japan	25
Malaysia	2
Pakistan	1
Philippines	1
South Korea	7
Taiwan	1
Thailand	9
USA	1
Vietnam	2
Total	67

•AOSWA Friends  
---->Member List  
(A password is required to view the list.)

**AOGS 2012**

**AOSWA session**

**Welcome to AOSWA**

Welcome to the Asia-Oceania Space Weather Alliance (AOSWA) Web site.  
For the development of research and practical operation of space weather, regional collaborations are inevitable. As have been conducted in the United States and Europe, space weather alliance is expected for a long time. Here we kicked off the regional alliance for space weather among Asian and Oceania countries.  
The main objective of the AOSWA is to make a regional linkage of information of space weather for operations and researches. On this web site, event and project information are opened for every country and organization in this region (and other regions) concerning with space weather. You are welcomed to make contact with us for more information.

**What's New**

2012-03-30	Welcome our new associate, Pakistan Space & Upper Atmosphere Research Commission (SUPARCO). <b>New</b>
2012-03-26	Added workshop's report. <b>New</b>
2012-02-23	Welcome our new associate, International Civil Aviation Organization, Asia and Pacific Office (ICAO APAC office). Added workshop's abstract.
2012-02-17	Updated workshop's program.
2012-02-13	Added workshop's program.
2012-02-09	Added workshop's program.
2012-01-05	The deadline for abstracts has been changed to Jan 11.
2011-12-14	Call fo paper of the 1st AOSWA Workshop
2011-11-10	Welcome our new associate, National Astronomical Observatories, Chinese Academy of Sciences (NAOC).
2011-10-14	Update of STARS5 for Windows
2011-08-09	Introduction of NICT STARS Project
2011-08-09	Introduction of NICT Space weather Board
2011-08-08	AOGS2011(2011/08/08-12)
2011-05-30	Sample movie of NICT "Space Weather News" in English
2011-04-26	2011 Space Weather Workshop (April 26 - April 29 in Boulder, Colorado)

Copyright © National Institute of Information and Communications Technology. All Right Reserved.

http://aoswa.nict.go.jp

# 3. Other Activities



# International Council for Science (ICSU)

NICT hosts the International Program Office (IPO) of the ICUS/WDS.

- **World Data Centre (WDC)**

- WDC for Solar Terrestrial Physics (NOAA/NGDC)
- WDC for Solar-Terrestrial Science (IPS)
- 
- 
- 

- **Federation of Astronomical and Geophysical Data Analysis Services (FAGS)**

- **International Space Environment Service (ISES)**
- Solar Influences Data Analysis Center (SIDC)
- International Service of Geomagnetic Indices (ISGI)
- International GNSS Service (IGS)
- 
- 
- 

since 2009

**World Data System  
(WDS)**

# Japanese contribution to Space Weather Activities of United Nation (UN)

UN/COPUOS (Committee on the Peaceful Uses of Outer Space)

ISWI (International Space Weather Initiative) WG

UN International Space Weather Science and Education Center started this April in **Kyushu University (Prof. Kiyofumi Yumoto)**.

Long-Term Sustainability WG

Expert Group C (Space Weather)  
**Chair: Prof. Takahiro Obara (Tohoku University)**

# Ionospheric Studies Task Force (ISTF) of International Civil Aviation Organization (ICAO) Asia and Pacific Office

Chair of Ionospheric Studies Task Force

**Dr. Susumu Saito, Electronic Navigation Research Institute (ENRI), Japan**

The task force will develop strategies for collecting, analyzing and sharing ionospheric data and will discuss other issues related to the ionospheric studies as a step towards the implementation of GNSS applications including GBAS and SBAS.

First Meeting of Ionospheric Studies Task Force (ISTF/1)

February 27-29, 2012 in Tokyo

Participants from 9 countries (Australia, Hong Kong China, India, Republic of Korea, Singapore, Thailand, USA, Philippines, and Japan)

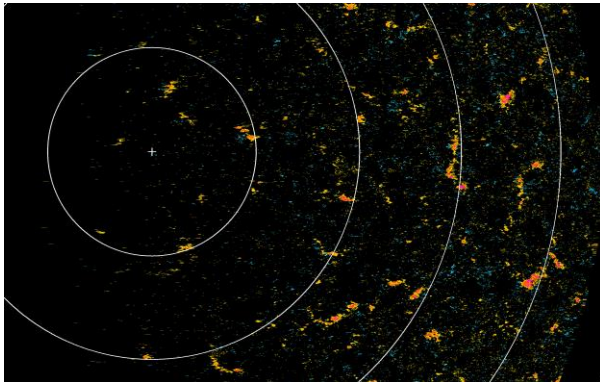


# Reversal of solar polar magnetic field revealed by Hinode (courtesy of NAOJ/JAXA)

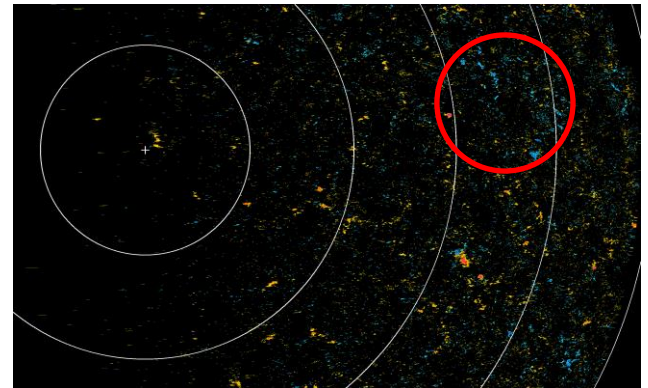
(Shiota, Tsuneta, Shimojo, & Hinode Team)

## north pole

September 2008

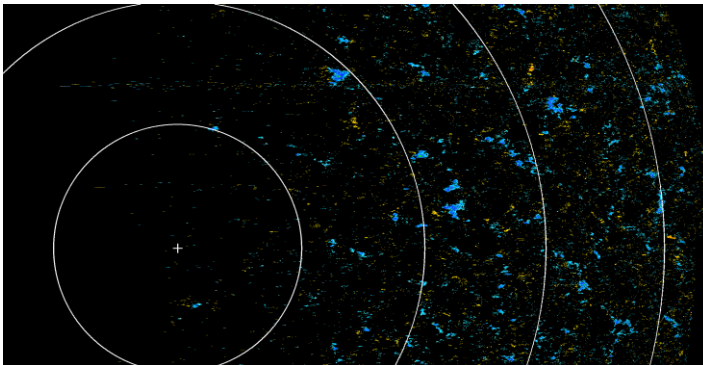


October 2011

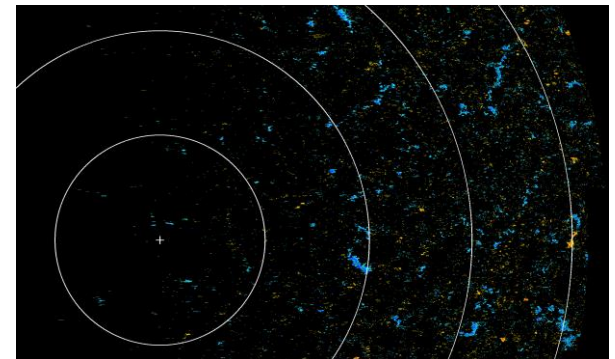


## south pole

March 2009



March 2012



Thank you !!



The graphic displays a weekly forecast for solar wind and geomagnetic activity. It features a grid of icons representing different levels of disturbance: 'やや乱れ' (slight disturbance) and '静穏' (quiet). The NICT logo is present at the bottom right of the grid.

太陽風・地磁気			
weekly space weather			
12(木)	13(金)	14(土)	15(日)
やや乱れ	やや乱れ	静穏	静穏
16(月)	17(火)	18(水)	
静穏	静穏	やや乱れ	

太陽風・地磁気