

NICT space weather Activity Report

Mamoru Ishii

Space Weather and Environment Informatics Laboratory
Applied Electromagnetic Research Institute
National Institute of Information and Communications Technology
4-2-1 Nukui-kita, Koganei 184-8795 JAPAN



RECENT ACCOMPLISHMENTS

NICT SWx Obs. Network



Mar. 2014



&HF radar network



Mar. 2014

ACE receiver antenna

● Ionosonde

Solar Radio telescope
Operational Ionosphere Obs. Network &
Sun and Solar obs. systems

Mar. 2015

2016-2020?

SEALION

Syowa, Antarctica



Oct. 2014

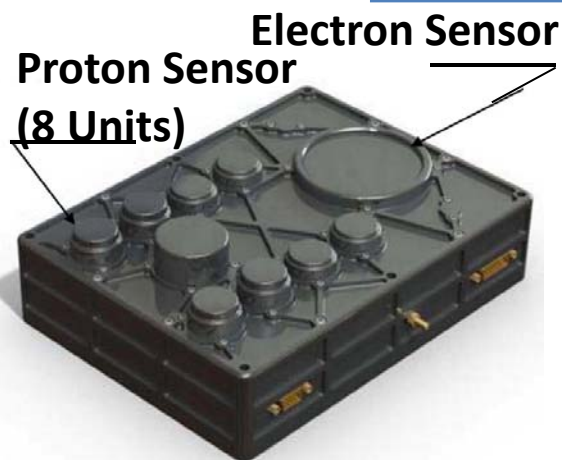
New Ionosonde
system



Space Environment Data Acquisition Monitor (SEDA) will be on board Himawari-8,9



Items	Description
Number of Channels	Protons : 8 (individual 8 sensor elements) Electrons : 8 (8 stacked plates in one elements)
Energy Range	Protons : 15 MeV – 100 MeV Electrons : 0.2 MeV – 5 MeV
Time Resolution	10 sec.
Field of View	Protons : ± 39.35 deg. Electrons : ± 78.3 deg.



- High-energy particle environment over Japanese sector will be monitored by SEDA.
- Near-real time SEDA data will be provided from JMA to NICT. We will provide SEDA data as part of space weather information.

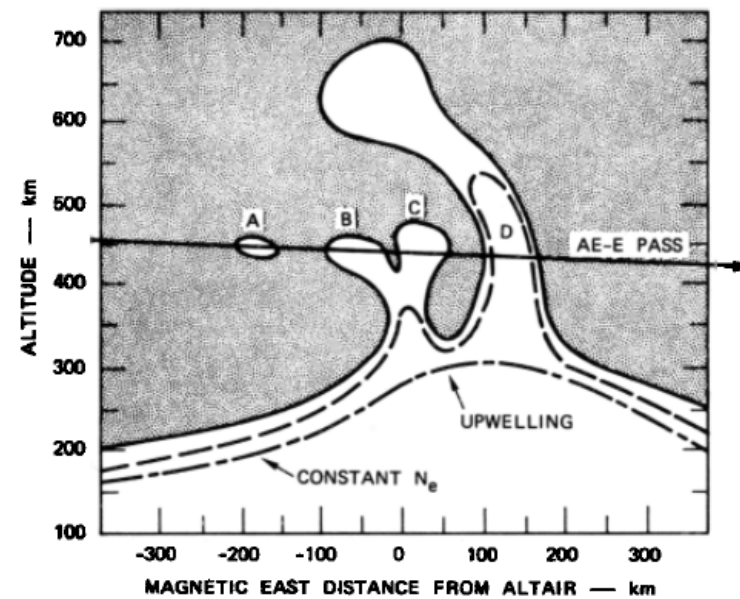
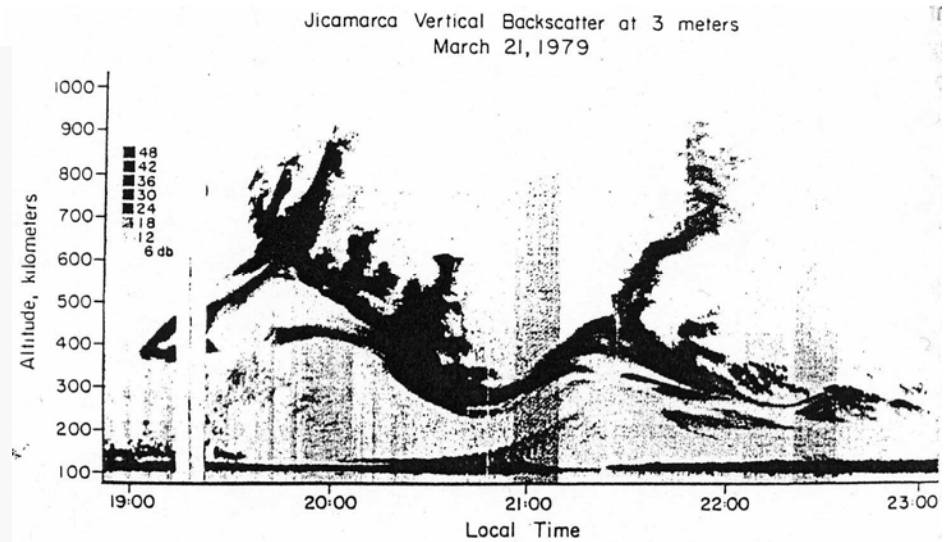
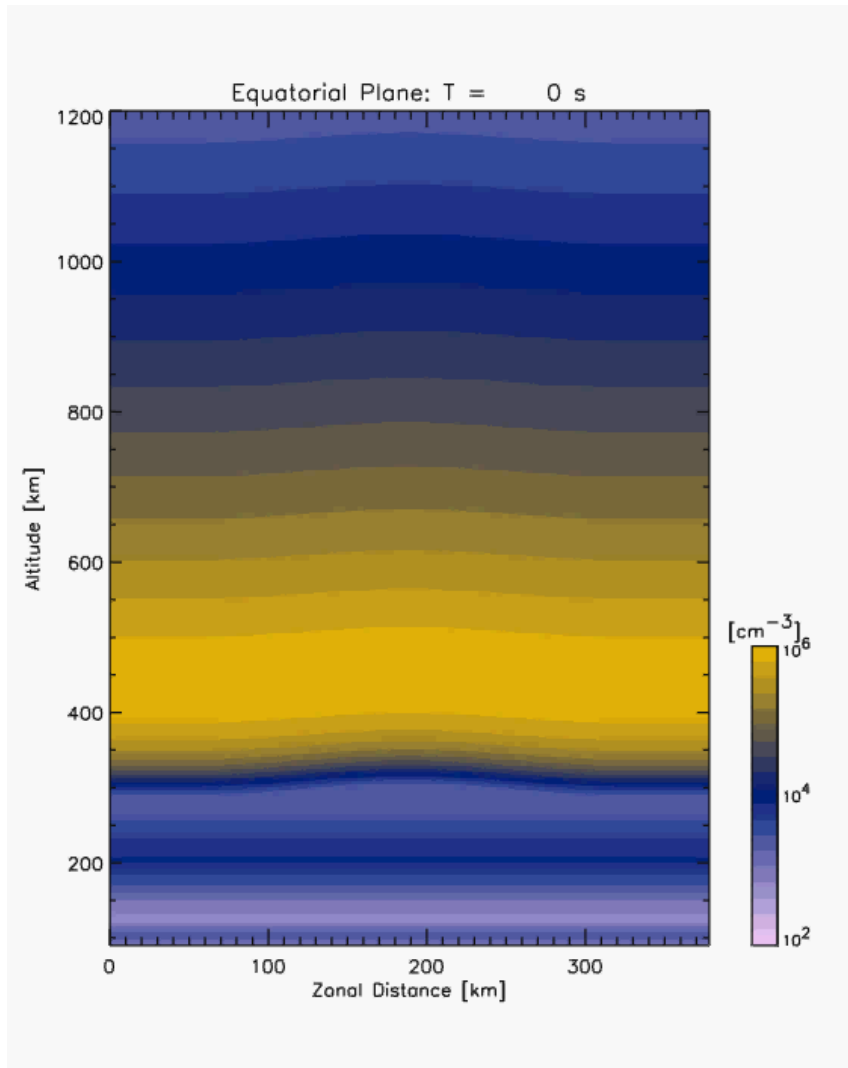
Longitude: ~ 140 deg.

Himawari-8 Launch: Oct. 7, 2014 (Planning)

Himawari-9 Launch; 2016

LSWS at the Bottomside, Plumes at the Topside

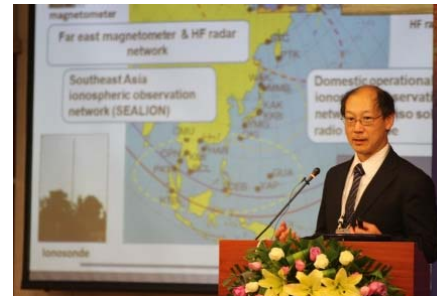
(Yokoyama et al.)





- AOSWA: Asia-Oceania Space Weather Alliance
- **Grown up from SEALION cooperation spirit**
- Kick off: December 2010 with five countries
- Objective: make a regional linkage of information of space weather for operations and researches
- Recent meeting: Nov 4-7, 2013, Kunming , China
- **Next: Mar. 2-5, 2015, Fukuoka, Japan**

Please come and join us!



Candidate of Next AOSWA workshop



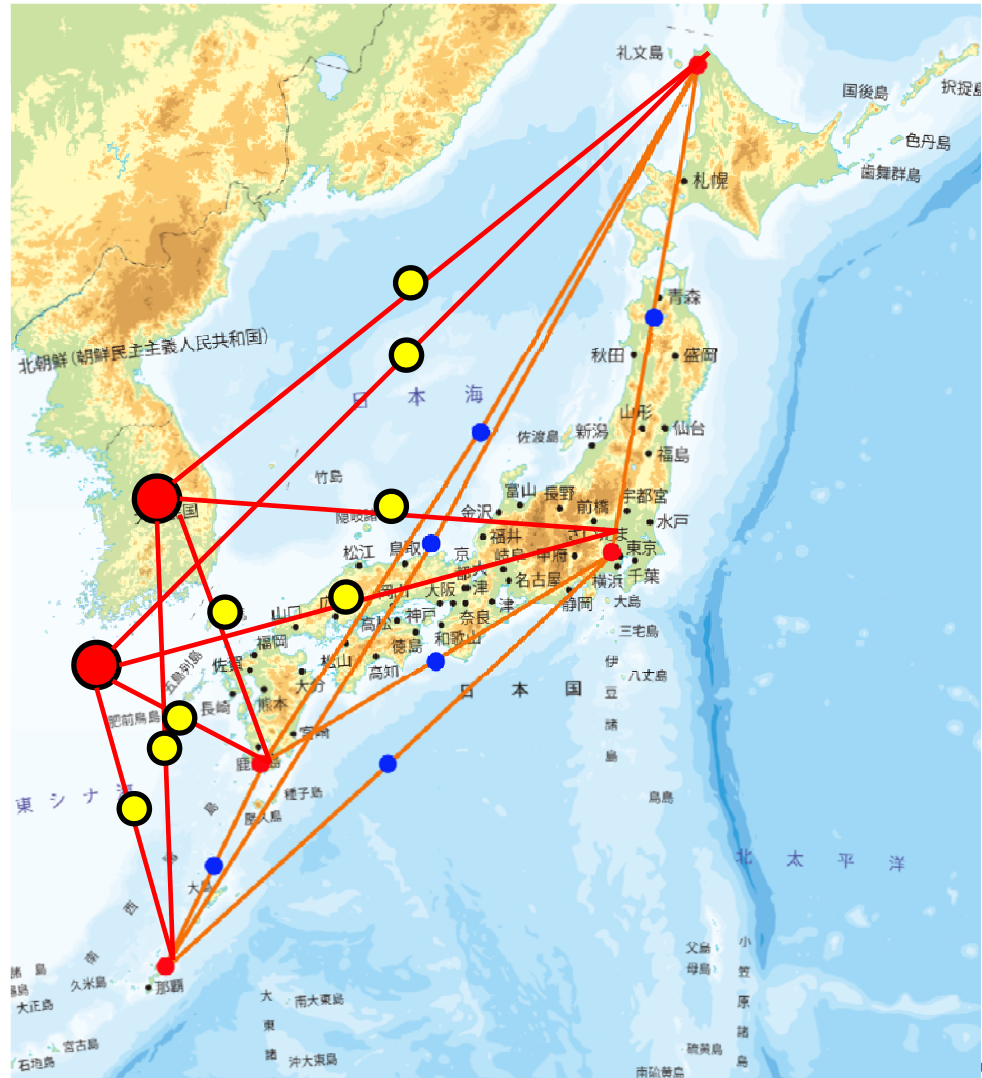
HIGHEST PRIORITY DATA NEEDS

Ionospheric information above ocean

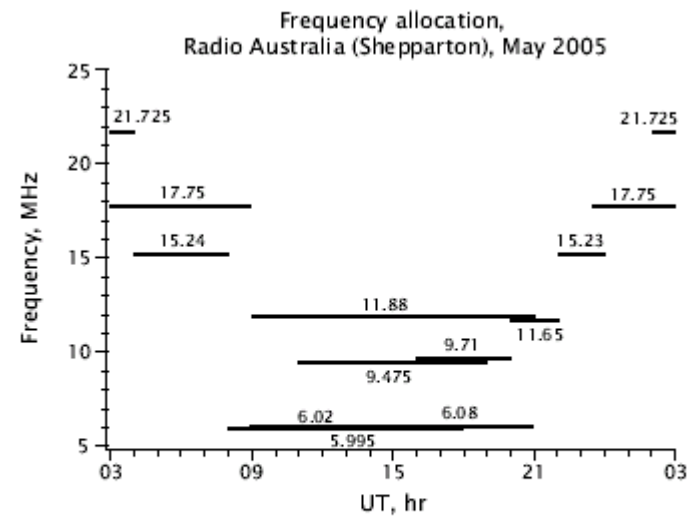
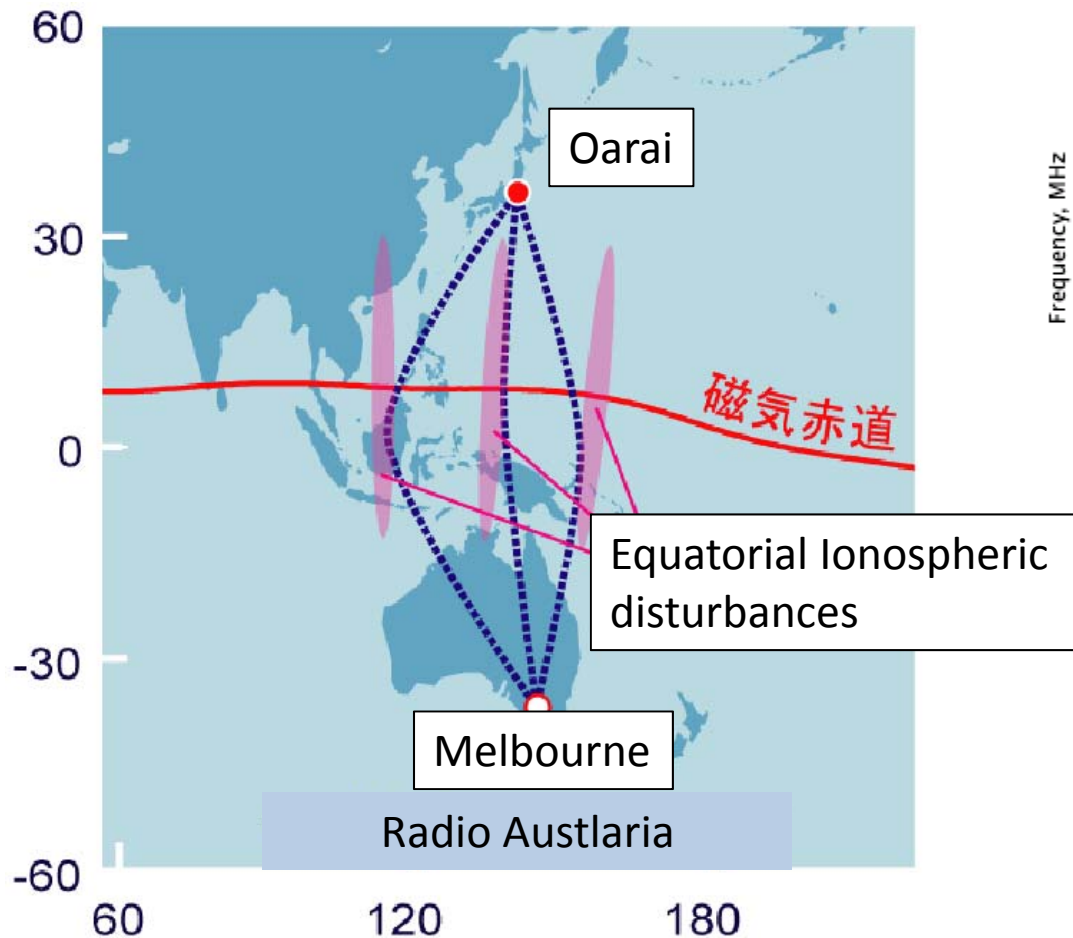
- It is necessary to get ionospheric information above ocean for use of aviation.
- Candidate of observation methods
 - Oblique sounding with ionosonde
 - Trans equatorial propagation
 - GPS buoy
 - Satellite occultation

Oblique sounding with ionosondes

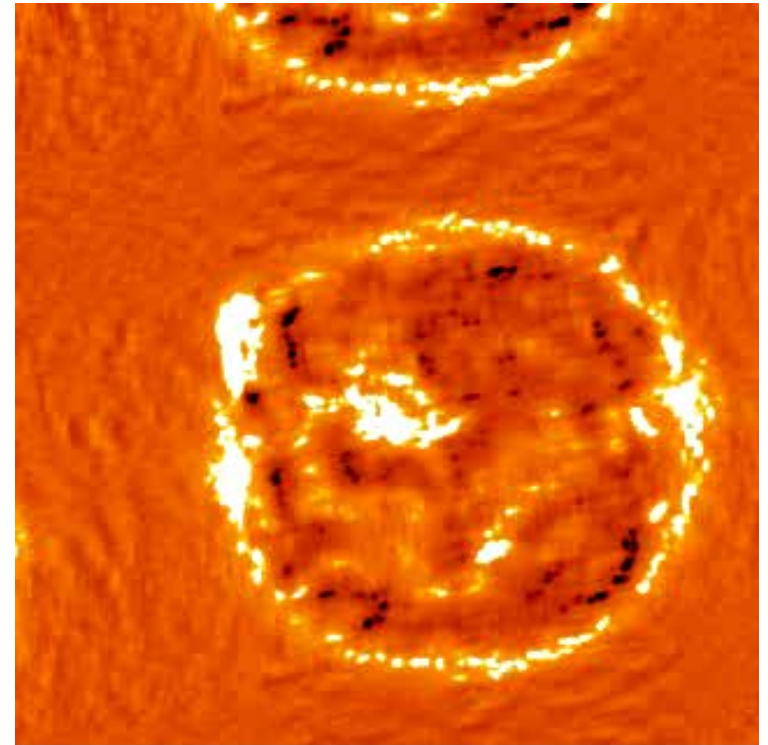
- NICT are now routinely operates oblique sounding ionogram every 15 min.
- NICT and KSWC are discussing international oblique sounding project with VIPIR system.
- Development and observation with simple receivers will make possible to increase observation points.



Trans-Equatorial Propagation (TEP)



The issue of Nobeyama Heliograph



From April 2015, an international consortium, ICCON, will begin the operation of NoRH instead of NAOJ.

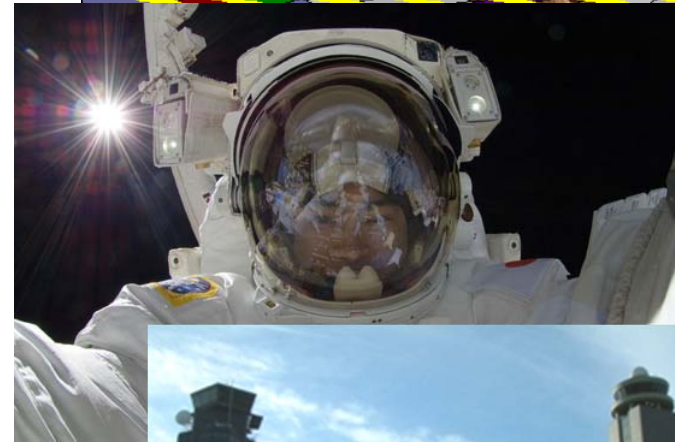
We need more contribution for the stable operation of NoRH and for producing more scientific outputs.

Any contribution is welcome for the continued operation.

LATEST INFORMATION ON USER IMPACTS

Survey of Space Weather user needs

- Questioner
 - Asked 23 fields, 50 organizations/companies by telephone
 - 11 organizations uses space weather information
- Interview
 - 10 organizations/companies: Airline pilot, resource survey, electric power company, airplane navigation, exposure control of astronauts
- Needs
 - SW Information easy to use for non-scientists
 - Revise our web site for easy access of our data
 - Build training course for business use of space weather

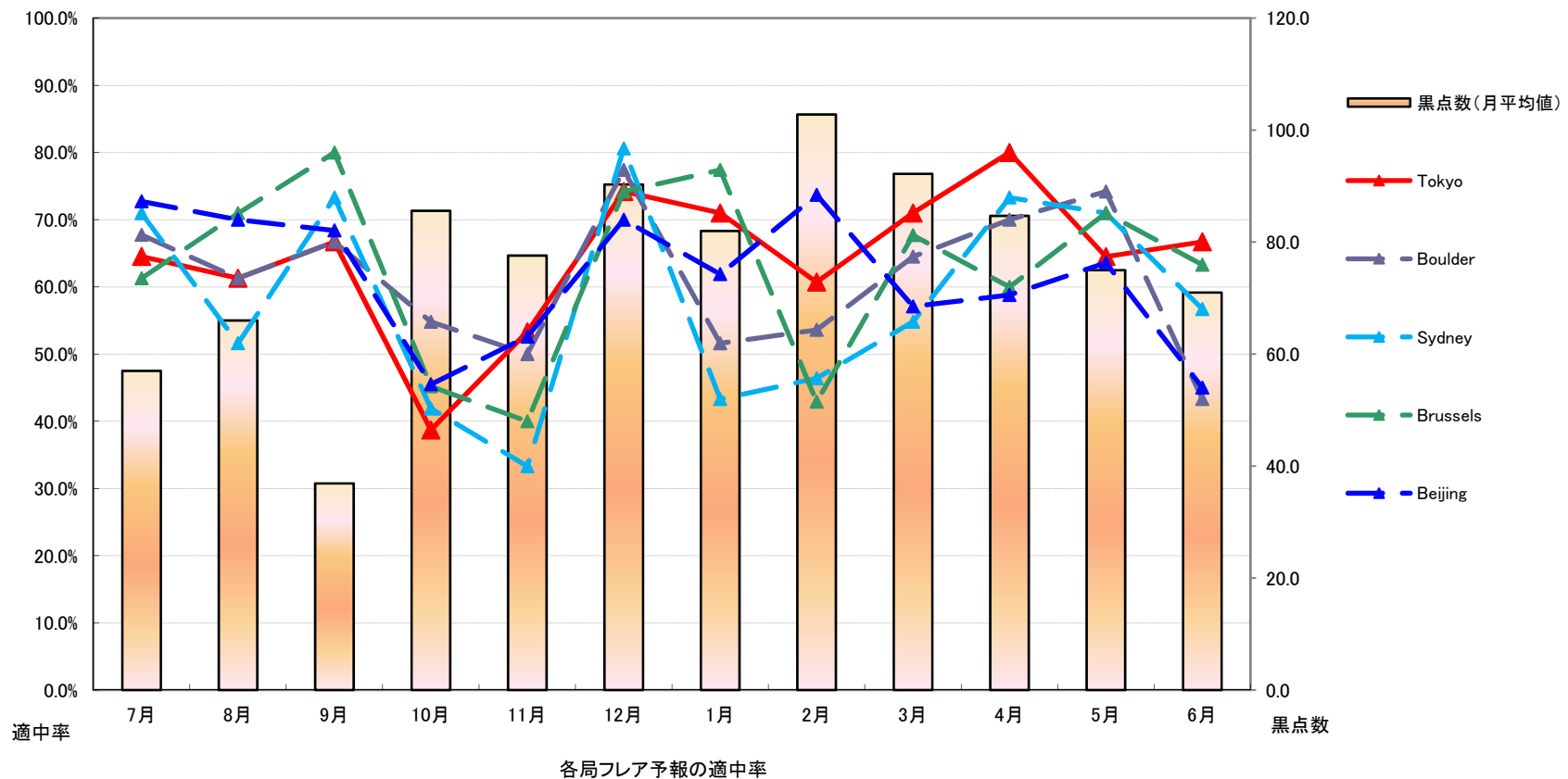


The wall to be overclimbed

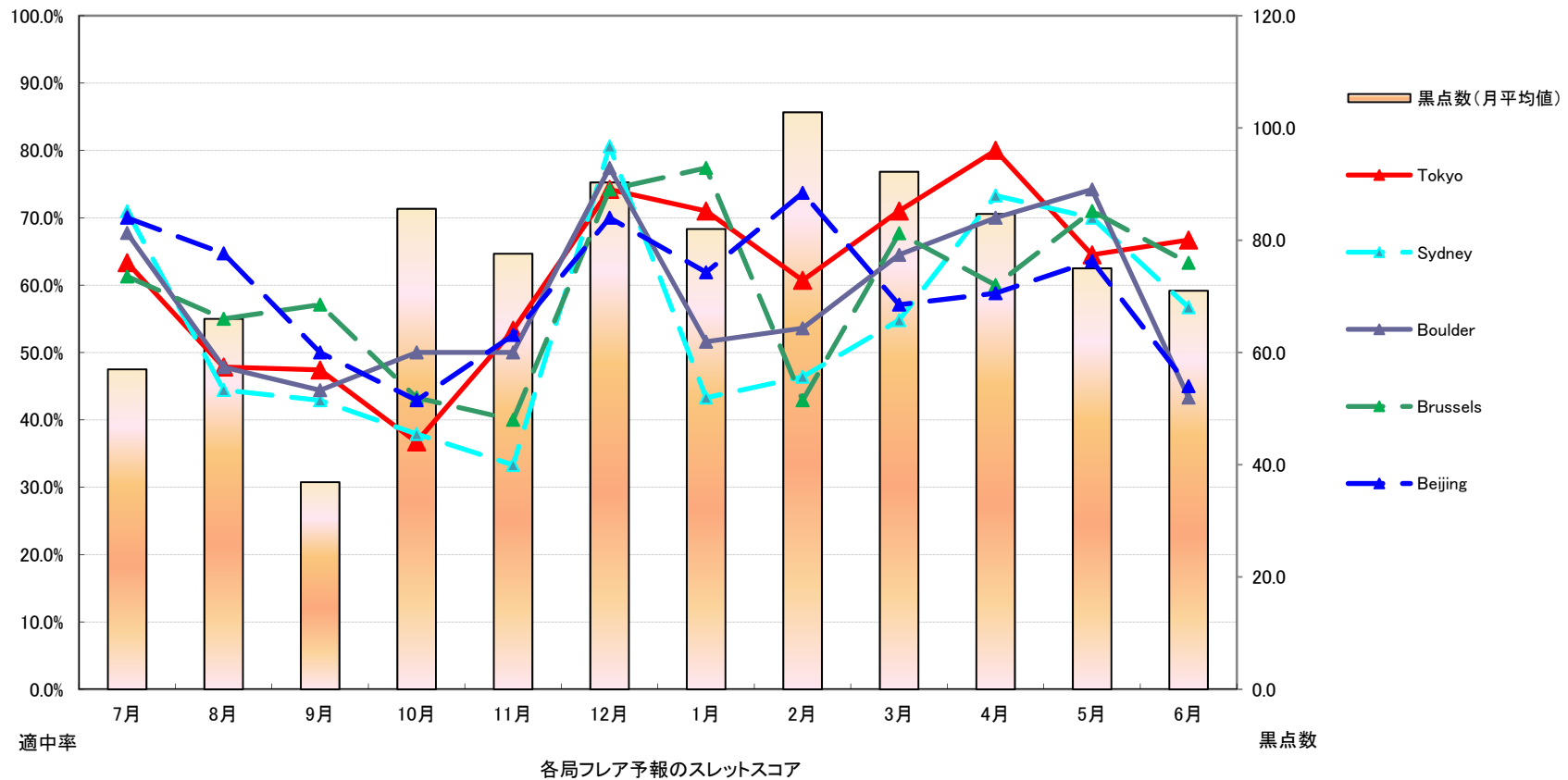
- Feedback of event information
 - The ultimate target of operational space weather is “Taylor-made SWx” in which SWx information are adjusted for each customer.
 - For the achievement, it is necessary to feedback the event information; what happen in which SWx events in detail (**quantitatively**).
 - However nowadays almost ally customer does not provide these kinds of information.

FORECAST VERIFICATION SUMMARY

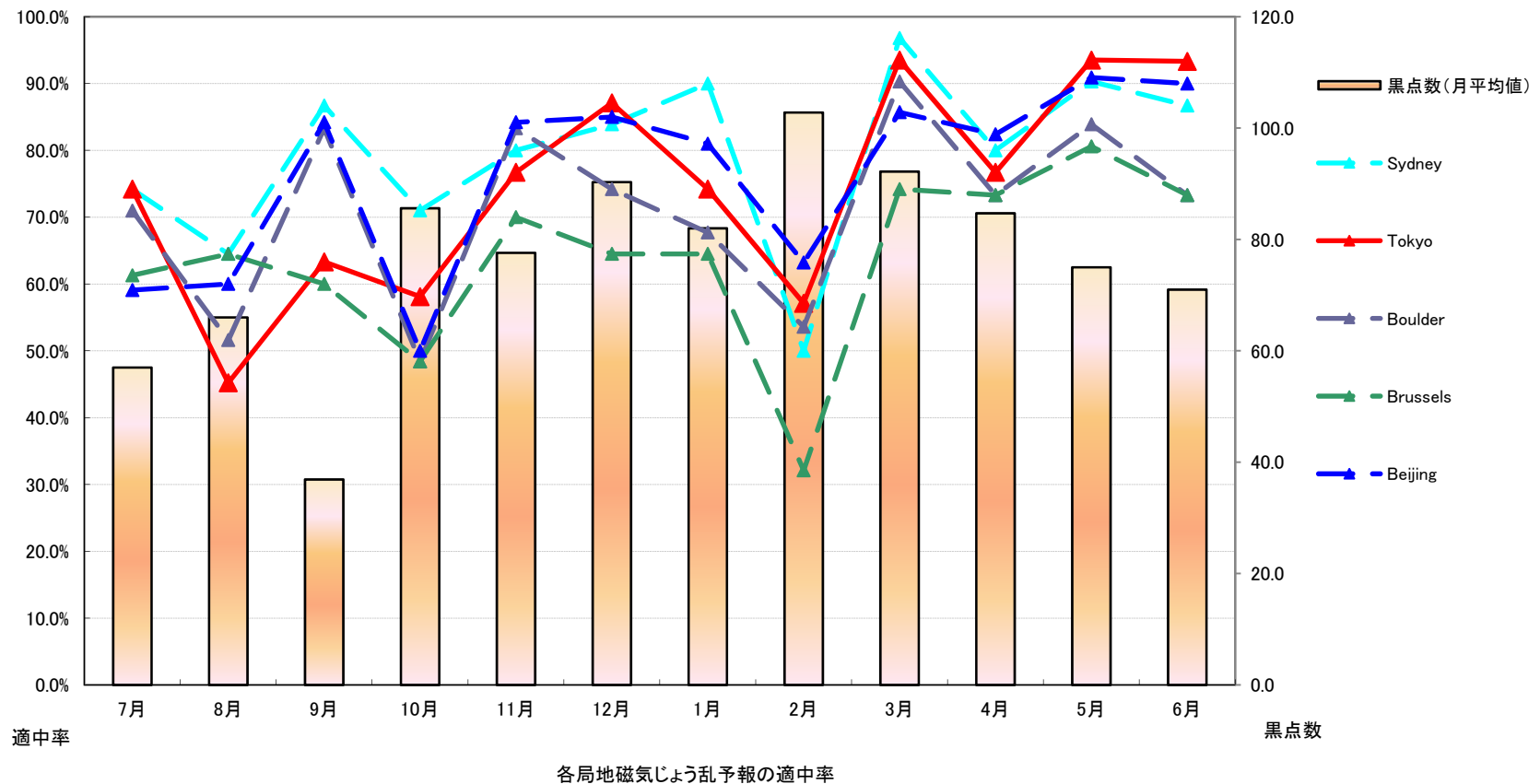
Hit rate of Flare forecast



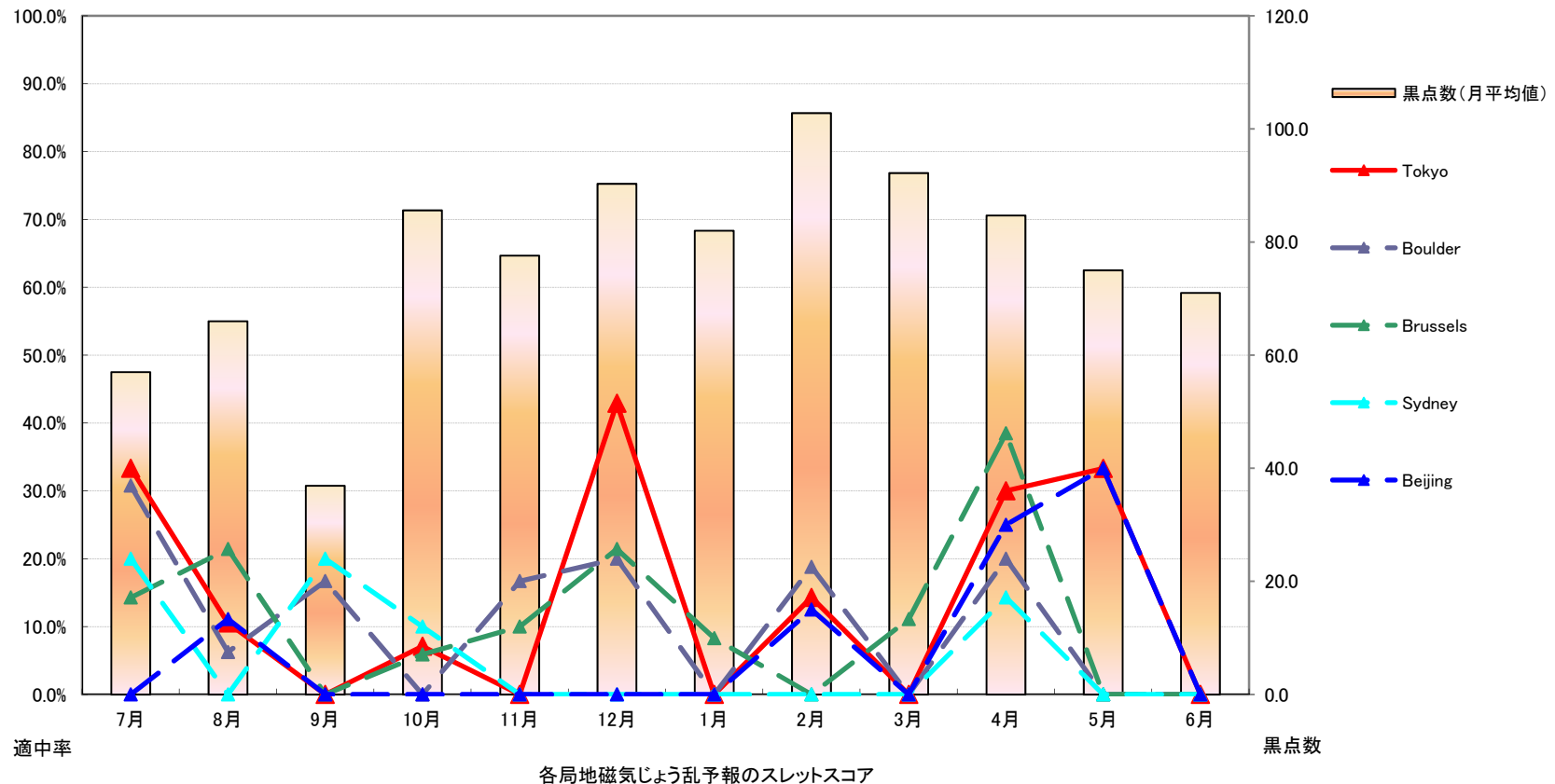
Threat score of Flare forecast



Hit rate of Magnetic activities



Threat score of magnetic activities



Summaries

- Operational activities
 - Forecast briefing is held on everyday
 - Provide SW forecast information with email, Web, FAX, and telephone
 - Survey SW user needs
- NICT Scientific activities
 - Two main targets: nowcasts and forecasts of space weather in the ionosphere and along geostational orbit
 - Model/simulation as the core technique and observation as following the core.
- Cooperative activities: AOSWA, intern students

- Toward the “Taylor-made space weather” but needs for particular users are difficult to get.
- We need to determine the hazardous level of SWx.
- Ionospheric information above the ocean.