

A stylized teal map of Asia and Oceania serves as the background for the title. The map shows the outlines of the continents and major islands in a light teal color against a white background.

# International Collaboration for Space Weather Forecast

# Wants, Seeds and Needs

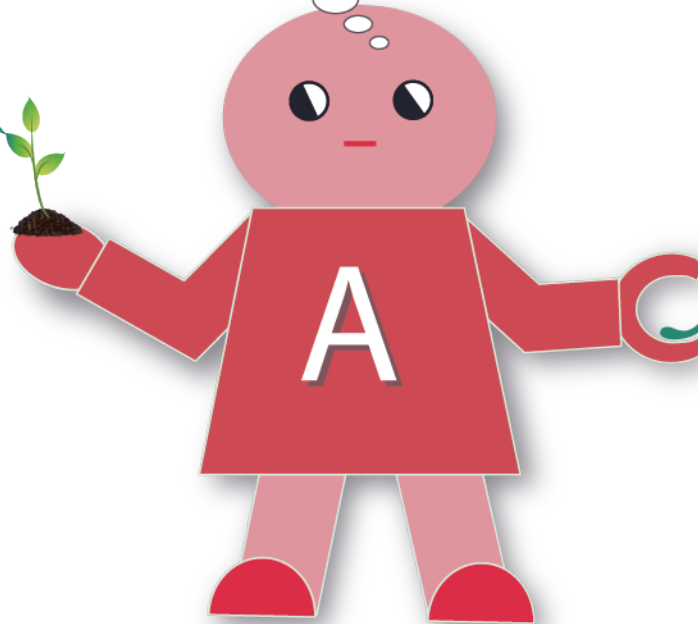
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Wants

What is aimed at?

Seeds

What is the  
strength/resource?



Needs

What is needed?

## Questionnaire submitted in advance



On the base of this questionnaire, SOC will prepare the matrix of needs/seeds



A 3x3 matrix titled 'Needs' with 'Seeds' on the left. The columns are labeled A, B, and C. The rows are labeled A, B, and C. The diagonal cells (A,A), (B,B), and (C,C) contain the letter 'O'. The cell (A,C) also contains the letter 'O'. All other cells are empty.

		Needs		
		A	B	C
Seeds	A			O
	B	O		
	C			

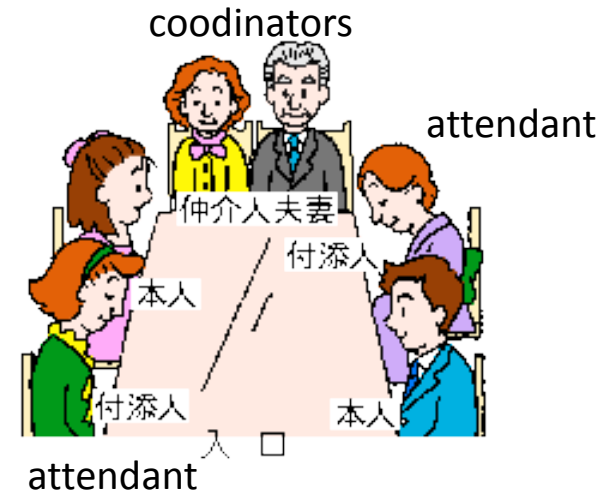
Matrix of needs/seeds



We SOC will send a questioner to invited speakers in which we ask their needs, seeds and wants.

We should prepare some options in each item for answering easily.

# Omiai “お見合い”



“Omiai” is a name of meeting of unmarried man and woman who hope to find a partner. Usually there is a (couple of) coordinator(s)

# Discussion based on the table for “Omiai”



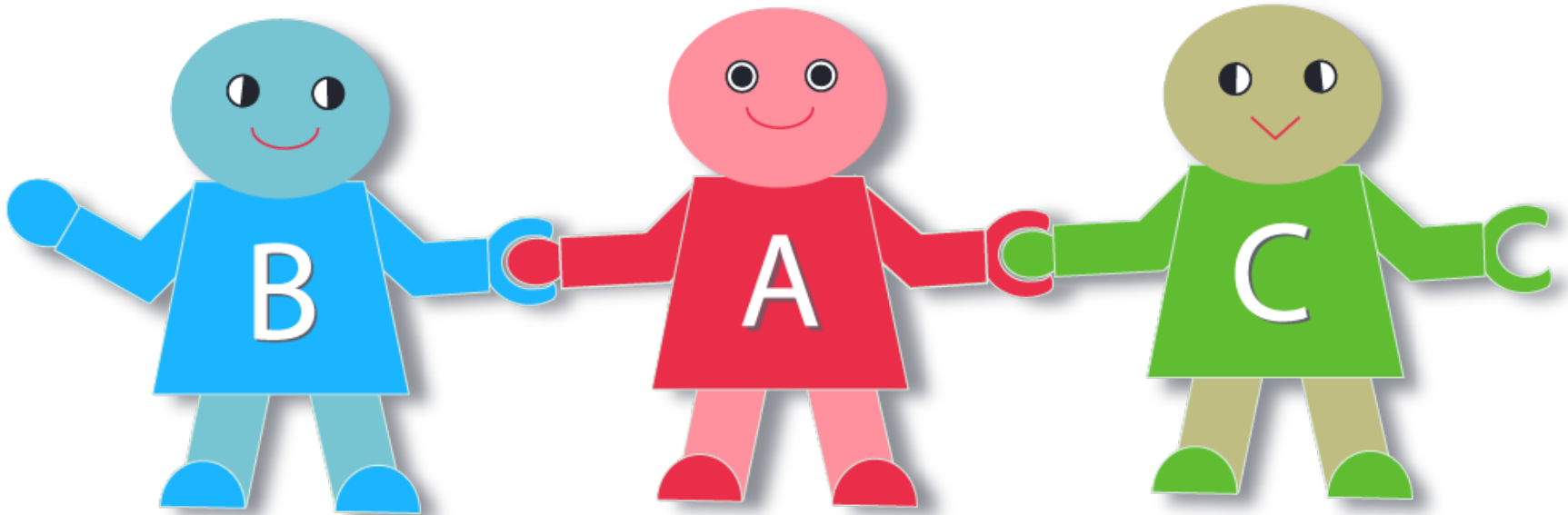
Using this table, each institute has a small meeting with the potentially matching partners.

the meeting time should be limited (15-20 min) SOC keeps the time. Each institute will have three potential partner institutes. In addition they can choose another one which they like.

After the meeting we have plenary meeting for discussing the results.

# Goal

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Collaboration

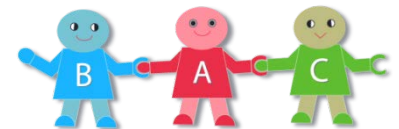
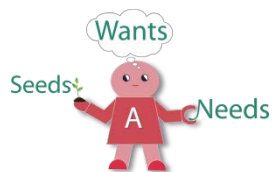
# Follow up

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We should follow up the results in future AOSWA WS.

# Thank you for your cooperation





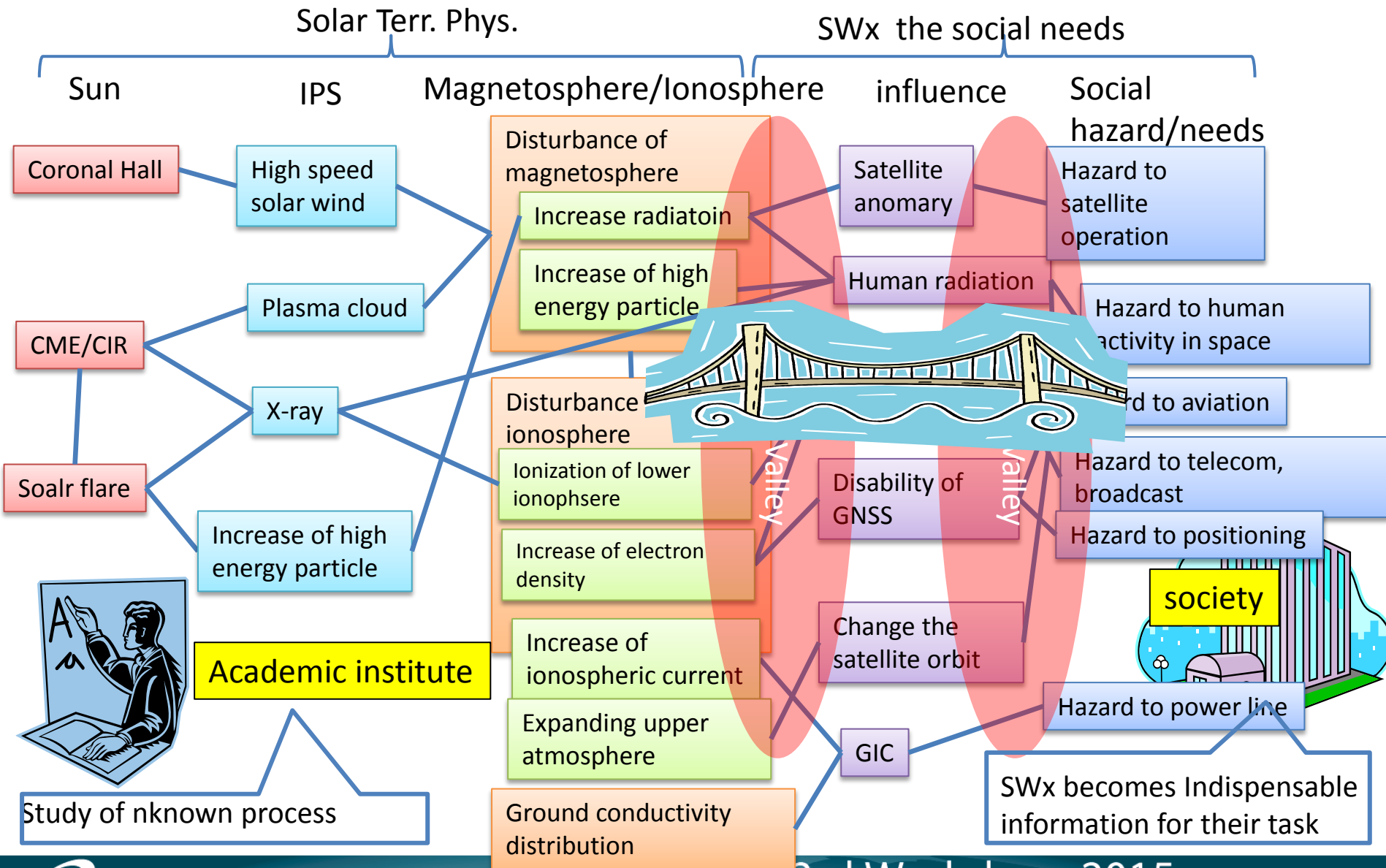


# The Seeds, Needs and Wants of NICT Space Weather activities

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# Relation of Needs-Seeds in SWx



# NICT Space Weather Forecast Center

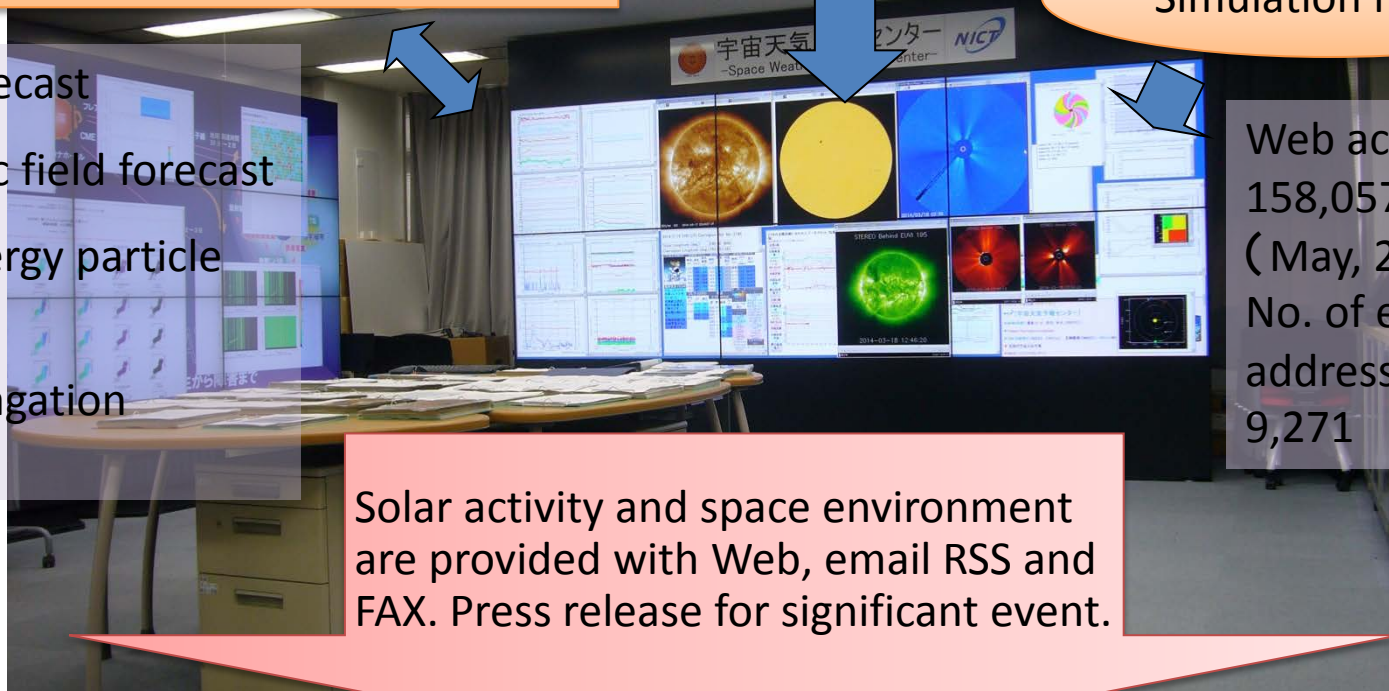


Forecast information and data exchange and sharing among ISES SW forecast center

Real-time space weather monitoring

Simulation results

- Flare forecast
- Magnetic field forecast
- High-energy particle forecast
- HF propagation forecast



Web access:  
158,057/month  
(May, 2013)  
No. of e-mail  
addressee:  
9,271

Solar activity and space environment are provided with Web, email RSS and FAX. Press release for significant event.

Domestic users: satellite operator, aviation office and companies, power plant companies, HF telecommunicator /broadcaster, resource survey, Univ. and research institutes, amateur HF operators



# NICT SWx Obs. Network



& HF radar network

ACE receiver antenna

● Ionosonde

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

Mar. 2015

SEALION



Syowa,  
Antarctica



New Ionosonde  
system

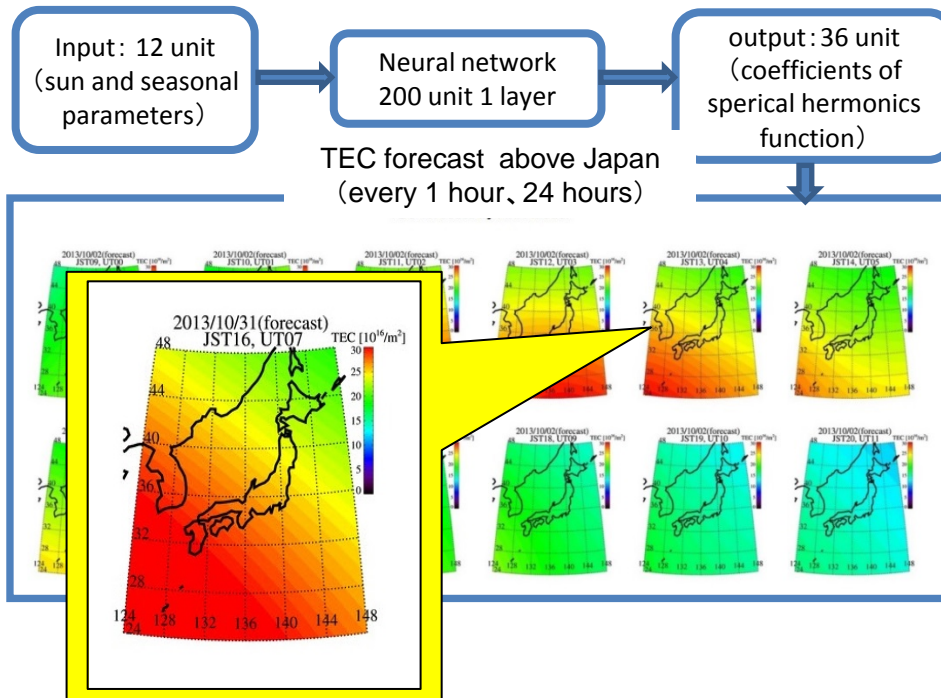


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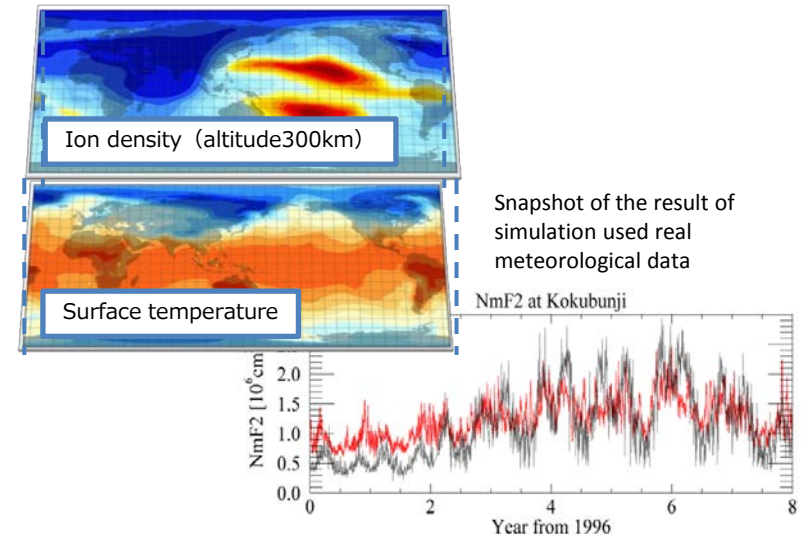
# Scientific Results (Ionosphere)

## Development of TEC forecast system with neural net



- Trial of TEC forecast system used sun and season parameters
- Next step: add magnetic activity as input parameter

## Long-term simulation of atmosphere-ionosphere Input real meteorological data

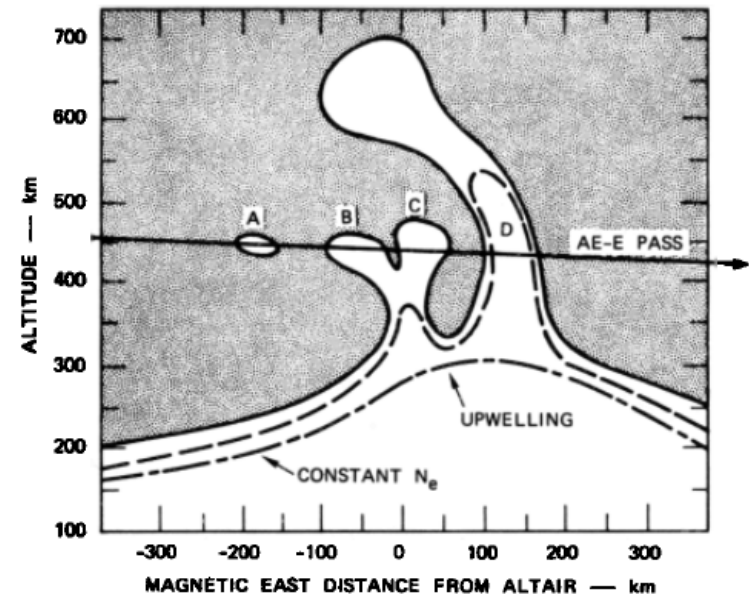
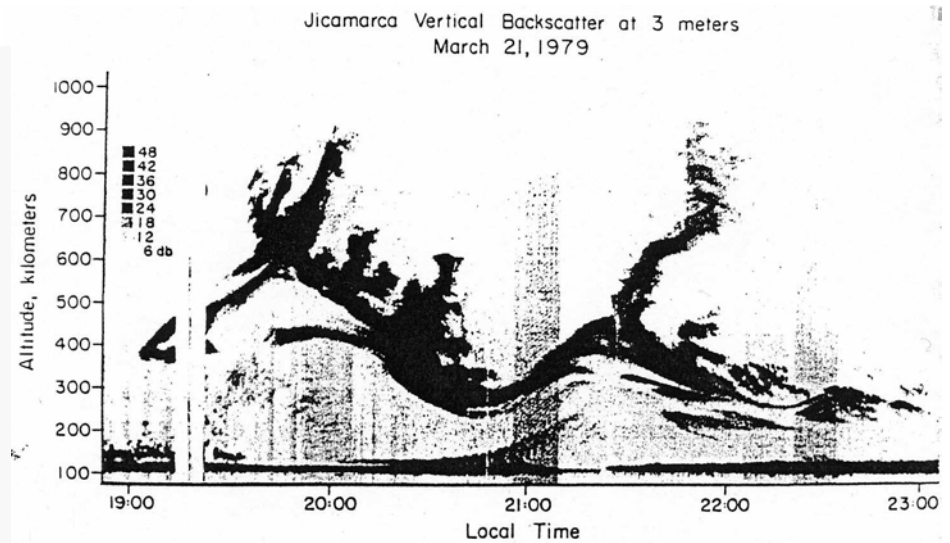
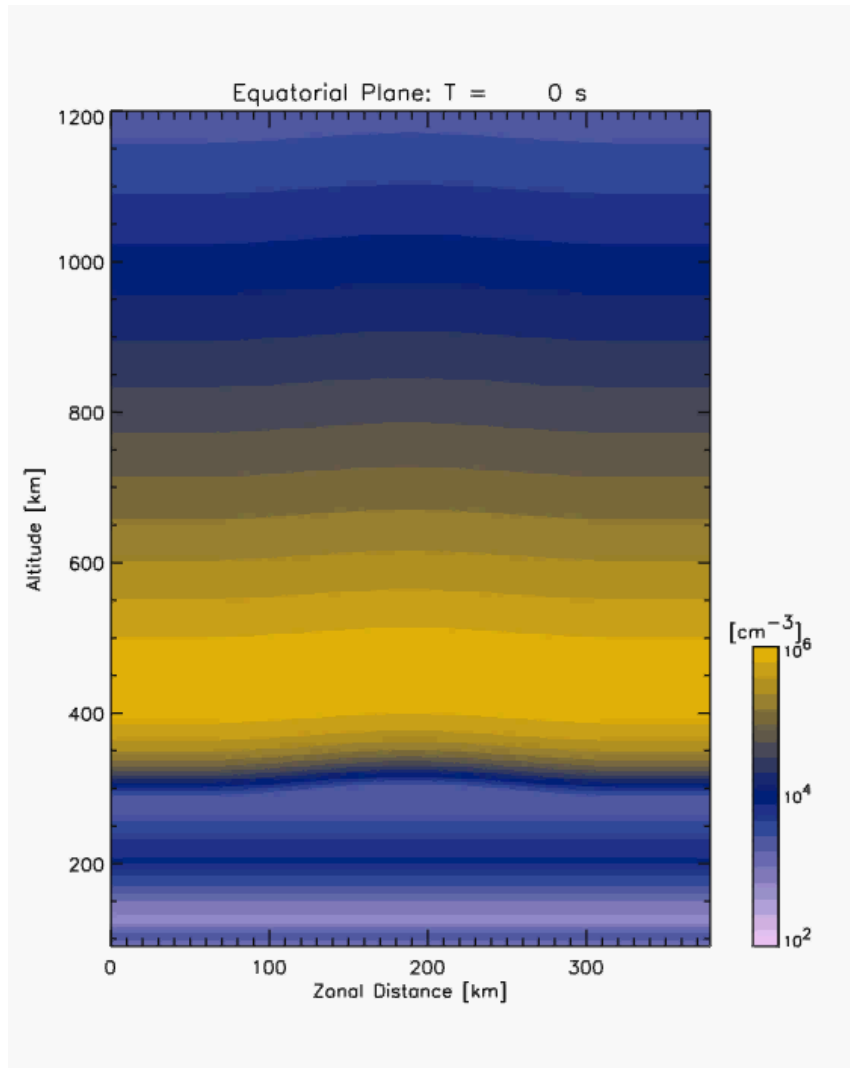


Comparison between simulation of observation of NmF2 above Kokubunji

- Now we can calculate long-term ( e.g., several decade) simulation with development of super computer and code.
- It is very new one to calculate atmosphere-ionosphere simulation with real meteorological data. We hope to use it for validation of our model and for discussion of the origin of climate change.

# LSWS at the Bottomside, Plumes at the Topside

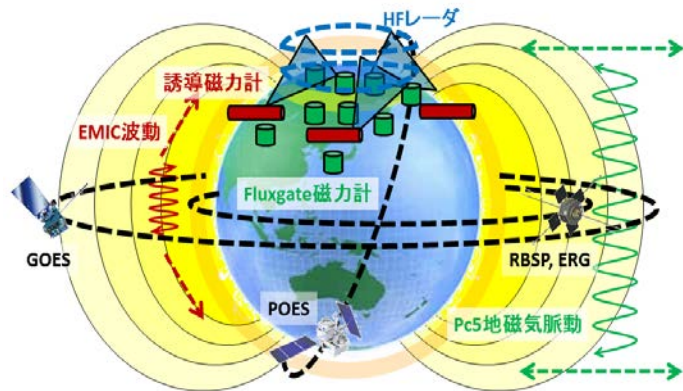
(Yokoyama et al.)



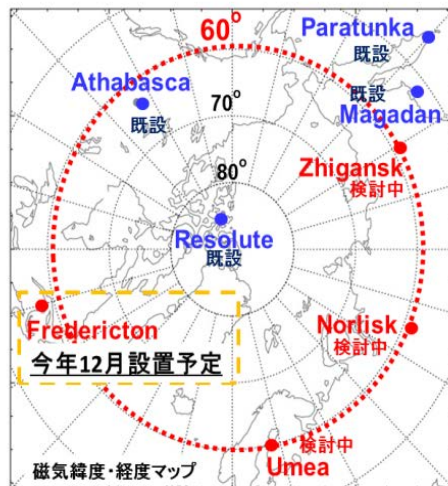


# Scientific Results (Magnetosphere)

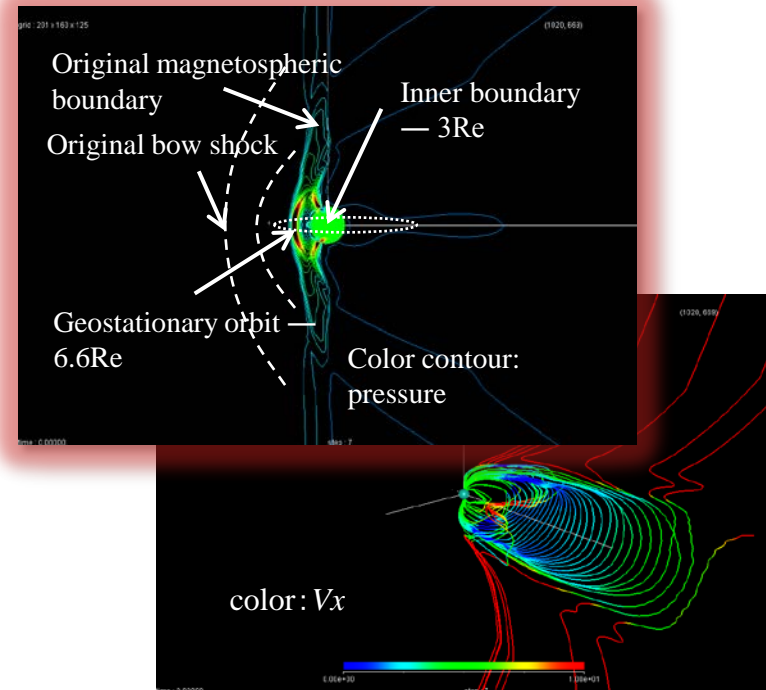
## Geo-space observation network



We promote to build geo-space observation network for understanding the variation of radiation belt and developing the forecast model. Now we plan to install magnetometer at Fredericton, Canada.



## Development of high resolution magnetospheric simulation code: extreme event



(top) simulation results under extremely strong solar wind  
(bottom) same but under quiet condition. magnetopause crossing can be seen under the extreme event.

We develop an robust and high resolution global MHD simulation code which can show realistic results even in extreme situation.

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# Available Data

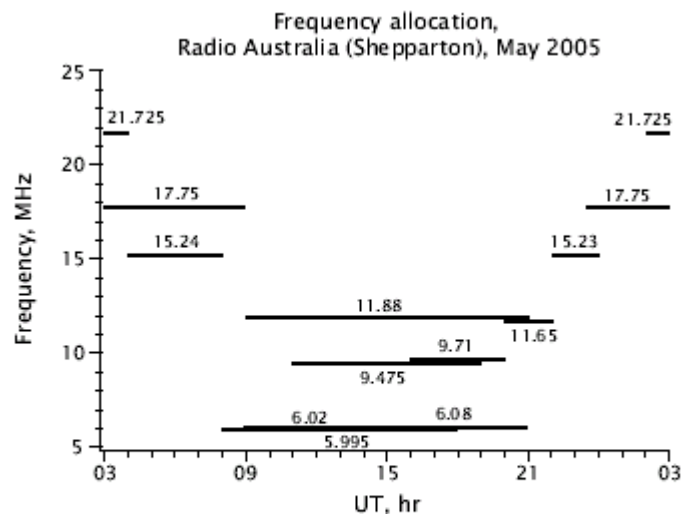
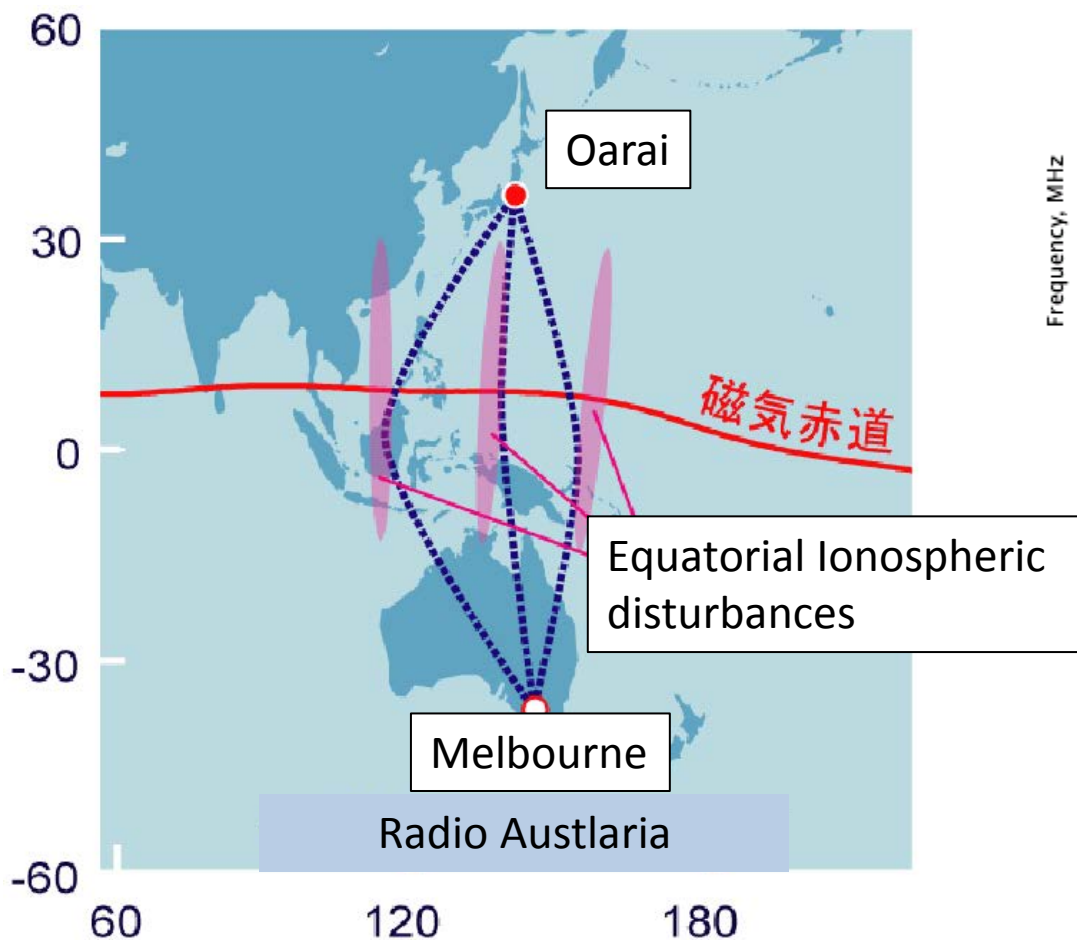
- Observing data
  - Domestic and antarctic ionogram since IGY
  - SEALION ionogram, GPS and scintillation data
  - Magnetometer data
  - Solar radio data : Hiraio(present) and Yamagawa(near future)
- Simulation data archive
  - Comparing with observation results for evaluation and scientific discussion
  - MHD magnetosphere model
  - GAIA: atmospheric/ionospheric model



# Highest priority 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

# Trans-Equatorial Propagation (TEP)



# 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.

