International Collaboration for Space Weather Forecast
Wants, Seeds and Needs

- **Wants**: What is aimed at?
- **Seeds**: What is the strength/resource?
- **Needs**: What is needed?
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.

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

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

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

Real-time space weather monitoring

Simulation results

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

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NICT SWx Obs. Network

Magnetometer
Ionosonde
Sun and Solar wind
HF radar
Syowa, Antarctica
NICT SWx Obs. Network
Far East Mag. & HF radar network
Operational Ionosphere Obs. Network & Sun and Solar obs. systems
Solar Radio telescope
ACE receiver antenna

Mar. 2014
Mar. 2014
Mar. 2014
Oct. 2014
New Ionosonde system

Syowa, Antarctica
SEALION

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Scientific Results (Ionosphere)

Development of TEC forecast system with neural net

- Input: 12 unit (sun and seasonal parameters)
- Neural network 200 unit 1 layer
- Output: 36 unit (coefficients of spherical harmonics function)
- TEC forecast above Japan (every 1 hour, 24 hours)

- 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
- Ion density (altitude 300 km)
- Surface temperature

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.

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LSWS at the Bottomside, Plumes at the Topside (Yokoyama et al.)
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.

Scientific Results (Magnetosphere)

Geo-space observation network

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.
Available Data

• Observing data
  – Domestic and antarctic ionogram since IGY
  – SEALION ionogram, GPS and scintillation data
  – Magnetometer data
  – Solar radio data: Hiraiso(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)

Equatorial Ionospheric disturbances

Oarai

Melbourne

Radio Australia

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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.