



National Institute of Information and Communications Technology

Japanese Activity for Extreme Space Weather Event

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NICT Space Weather Forecast Center

Web access : 160,000/month
No. of e-mail address : 10,000

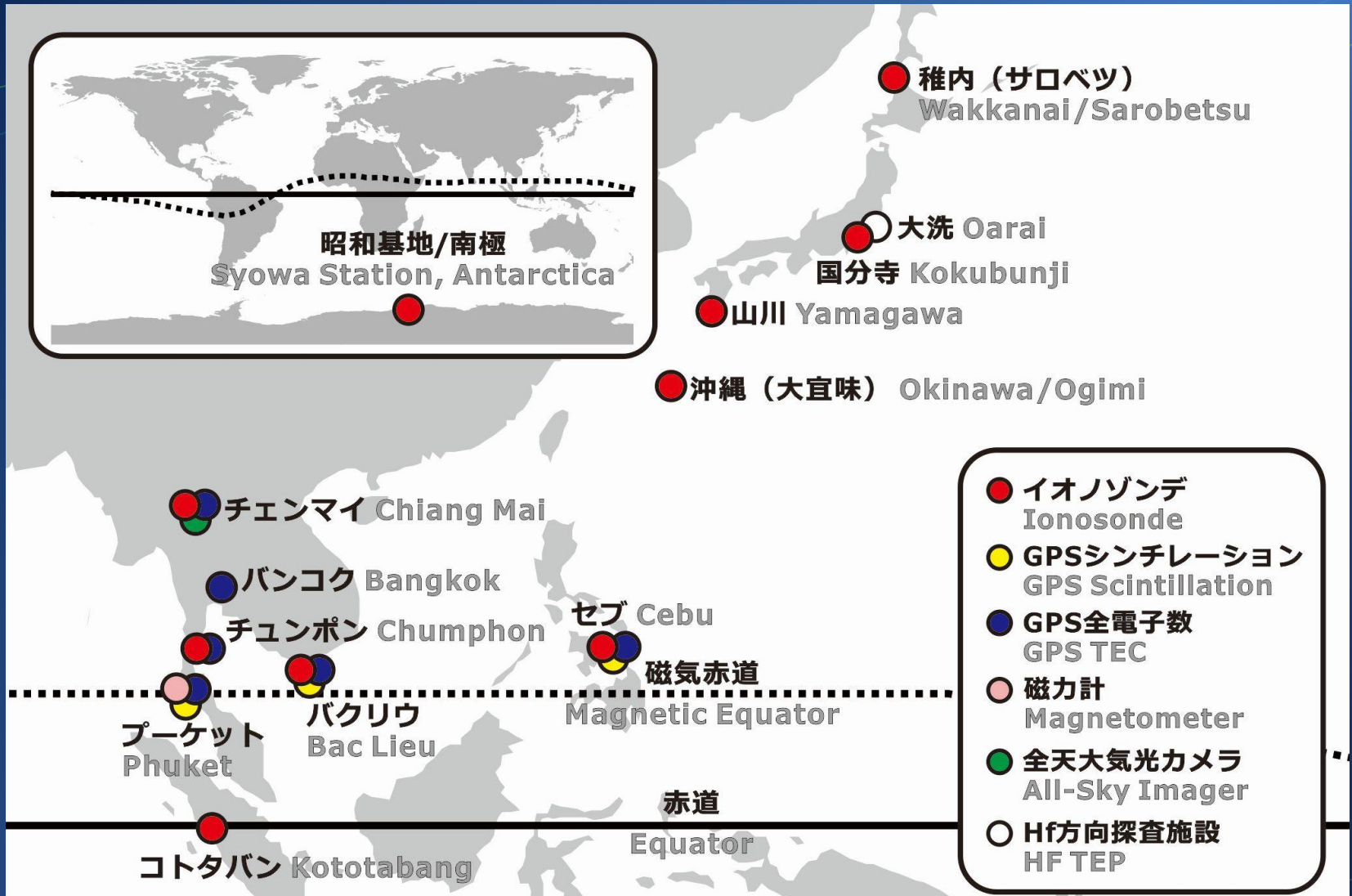
Forecasting Parameters

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

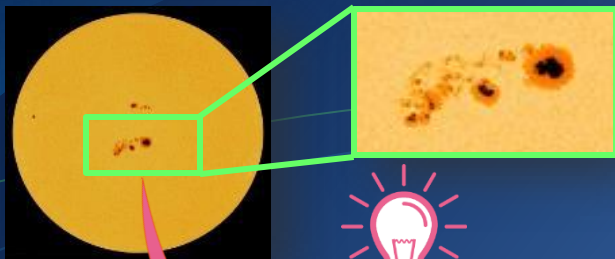
NICT Space Weather Forecast Center

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

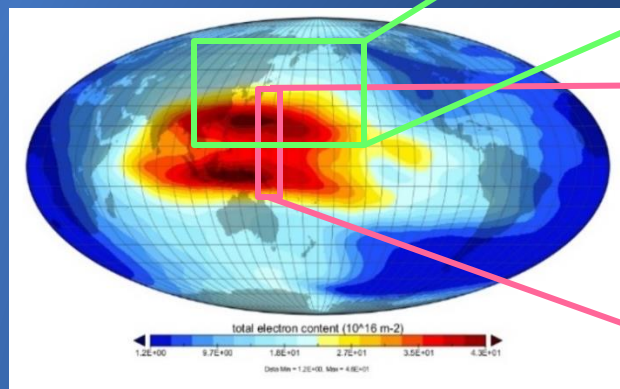
Ionospheric Observation network



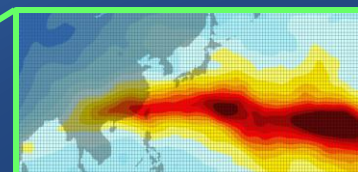
Research Activities for space weather forecast in NICT



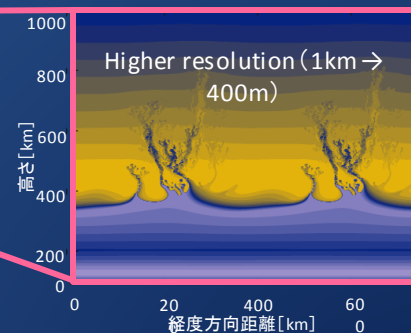
- Development of AI system for flare forecast: We reached 0.9 of True Skill Score (TSS)
- Space environment Database with Himawari-8 data was established.
- Some improvements were done in global and regional atmosphere-ionsphere models: make higher resolution and connection.



Global atmosphere-ionsphere model (GAIA)

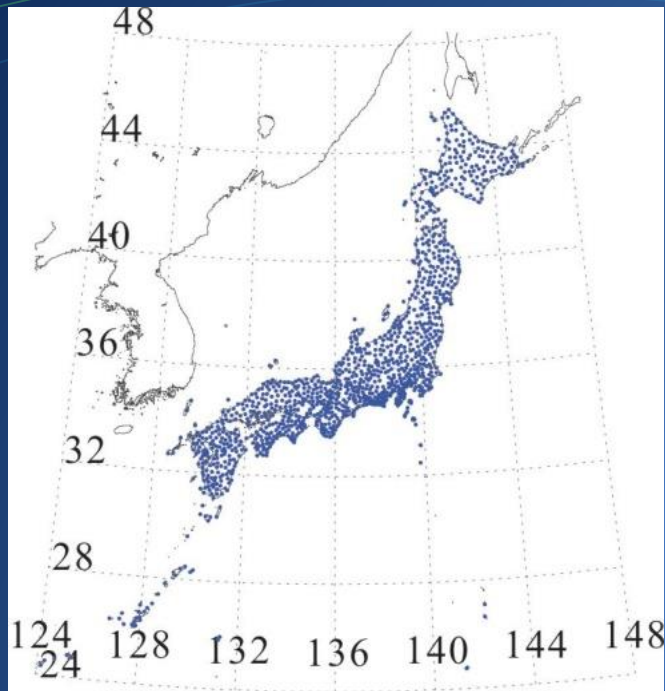


Higher resolution ($2.8^\circ \rightarrow 1^\circ$)

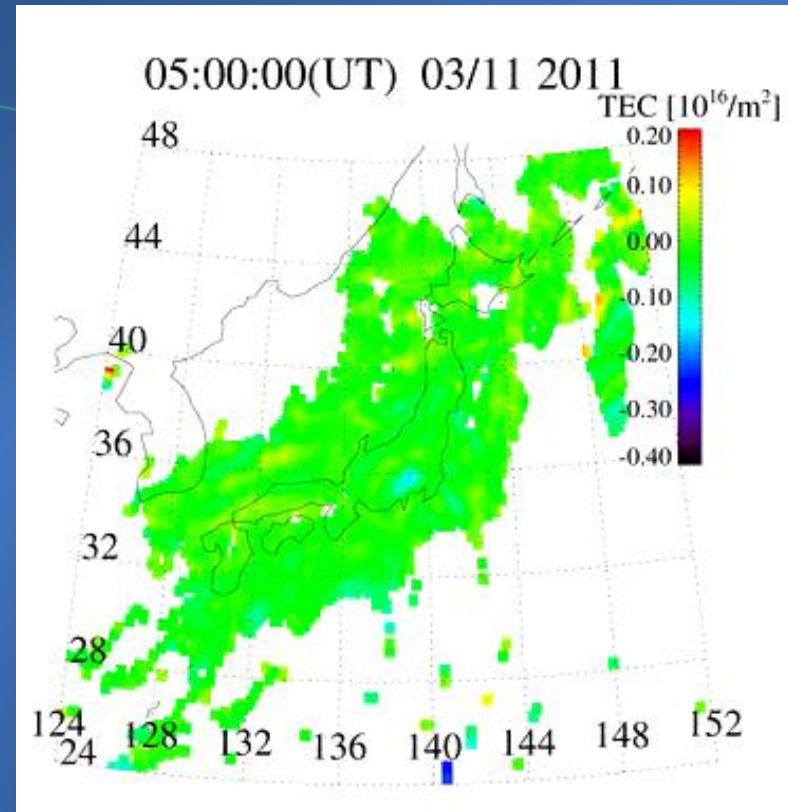


Higher resolution ($1\text{km} \rightarrow 400\text{m}$)

2D TEC Obs. With High Res. In Japan



Distribution of GPS receivers on GEONET (1,240 points)



TEC variation map at Tohoku earthquake [Tsugawa et al., EPS, 2011]. The red star represents the epicenter.

We developed an operational TEC observation system with high temporal and spatial resolution (30sec, 0.15 by 0.15 deg) using 1,240 points of GPS network "GEONET"

AOSWA

- The Asia-Oceania Space Weather Alliance (AOSWA) established on 2010 for information exchange among SWx organizations in Asia and Oceania.
- Members: 27 organizations from 13 countries
- AOSWA workshop is held every one and half years. The last one is hosted by RRA at Jeju, Korea on October, 2016.
- Electric newspaper “AOSWA link” is circulated



Group Photo of the 3rd AOSWA Workshop @ Fukuoka, Japan

AOSWA
Asia-Oceania Space Weather Alliance

The 3rd AOSWA Workshop
"International collaboration on space weather forecast"

2-5 March 2015
LUIGANS Spa & Resort
Fukuoka, Japan

Deadline of Registration: 31 December 2014
Registration Fee: 20,000 yen (Student 10,000 yen)
This workshop will be jointly hosted by UNITED NATIONS/JAPAN Workshop
See more detail from the workshop website
http://aoswa.nict.go.jp/workshop_3/

Issue 5, March 2015

AOSWA Link

In this Issue...

- **KAS's contribution to Space Weather**
Myungjae Cho
Seungwon Park
Korea Aerospace Administration
- **An Introduction to AOSWA, UNM**
Hiroshi Nakagawa
National Institute of Information and Communications Technology, Japan
- **Workshop Program at NICT**
Takashi Inoue
National Institute of Information and Communications Technology, Japan
- **United Nations / Japan Workshop on Space Weather**
Yoshinori Kishimoto
National Institute of Information and Communications Technology, Japan
- **Domestic Collaborative Symposium supported by the Solar-Terrestrial Environment Laboratory**
Nagoya University, Japan

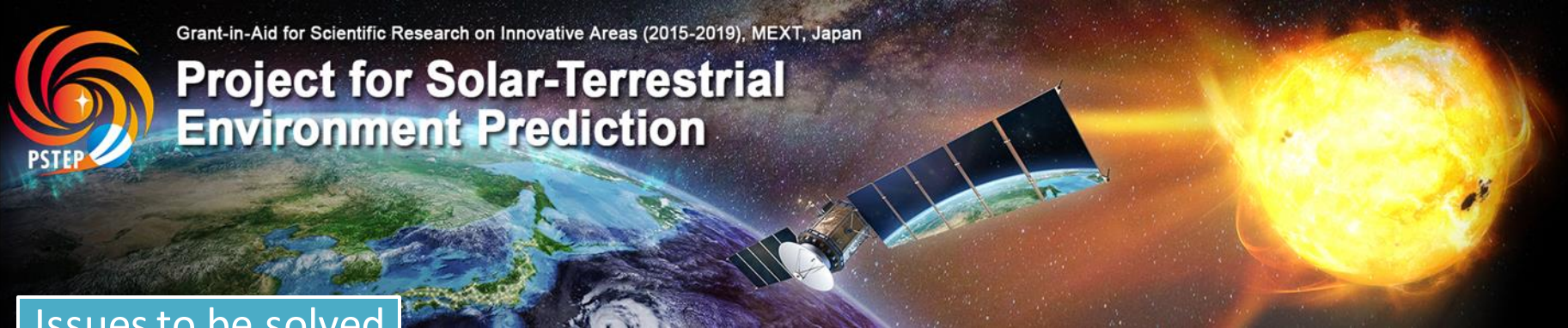
Your contribution is always welcome!

If you would wish to submit an article, you are greatly appreciated. The articles should be approximately 300 words and contain either figures or tables. Also if it is available to use as a source of secondary information, such as upcoming conference and so on. Your feedback is always welcome.
Contact: sw-project-office@nict.go.jp

contact:
The 3rd AOSWA W/S LOC
Mail : sw-project-office@nict.go.jp



Project for Solar-Terrestrial Environment Prediction

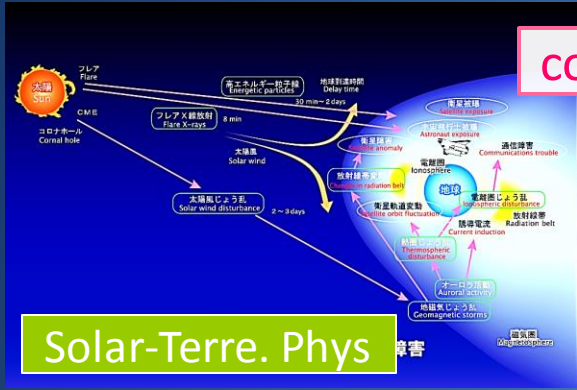


Issues to be solved

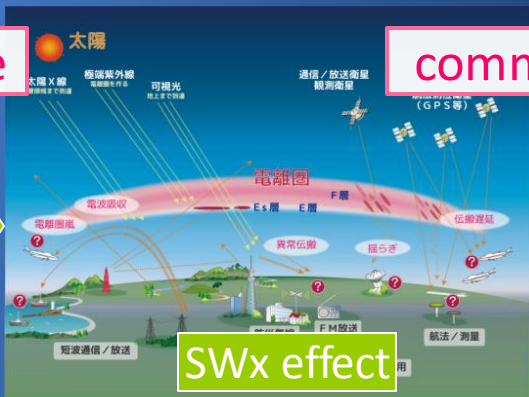
- The effect of SWx to high concentrated ICT society is unknown
- It is necessary to establish an integrated space weather system in the society against extreme SWx event in the next solar cycle.
- Most of potential users do not know the importance of SWx.: necessary to communicate to them

actions

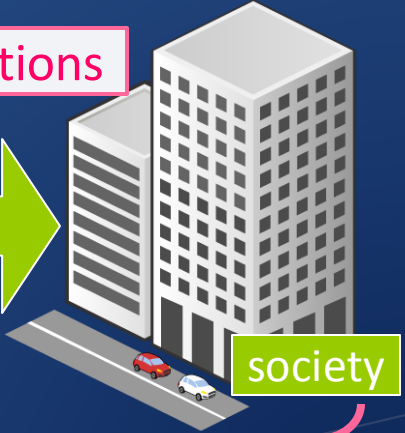
- Build a system to provide a useful information for users
- Identified simulation model among sun/solar wind/magnetosphere/ionosphere
- **Establish Japanese original hazardous map for preparedness against SWx extreme events.**



coordinate



communications

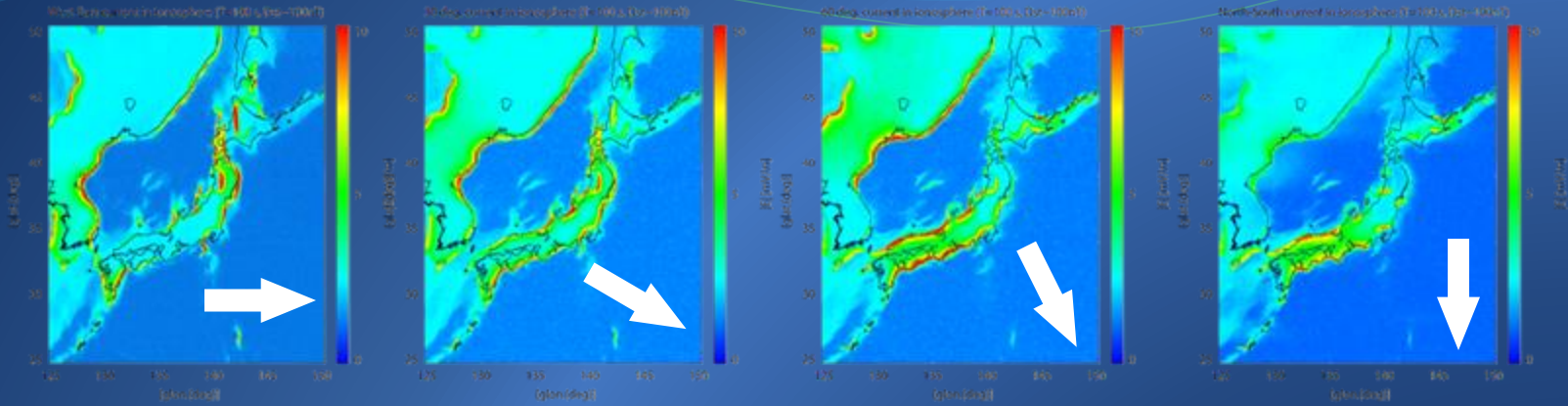


Total coordinate : hazardous map

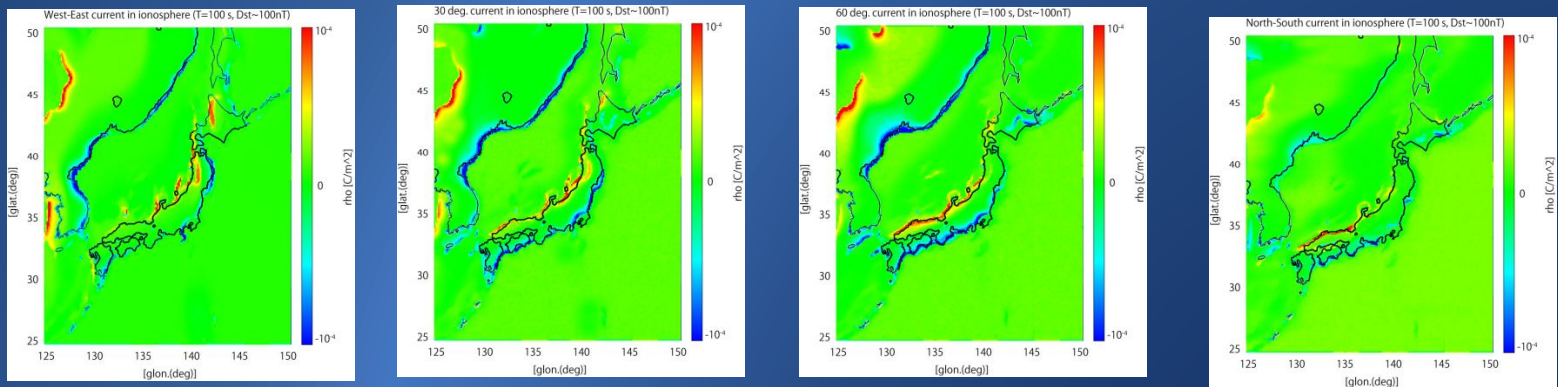
Results of different direction source currents

Courtesy of Dr. Satoko Nakamura (Kyoto Univ.)

E
[mV/m]



Charge
density
[C/m²]

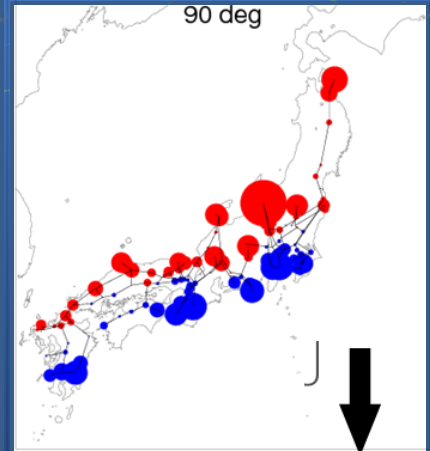
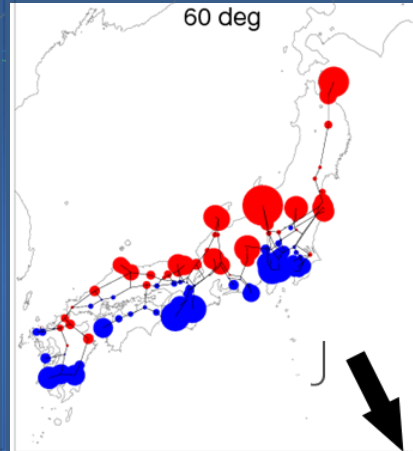
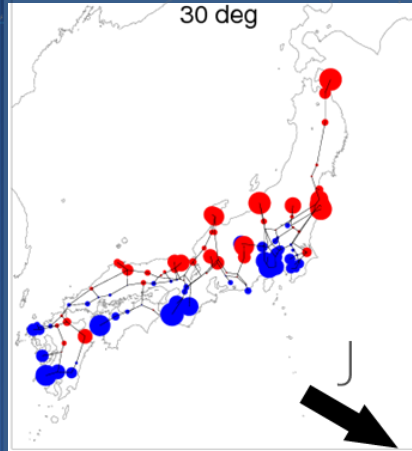
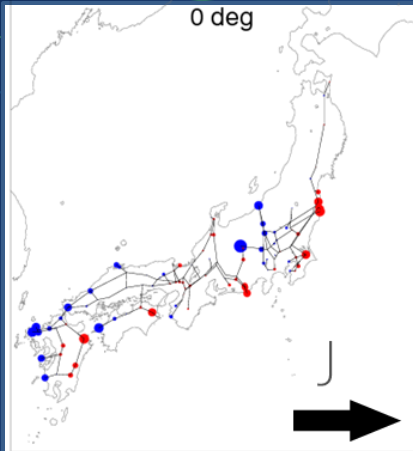


The Japanese land can be regarded as a capacitor because of strong coastal effects with the land shape extending north and south.

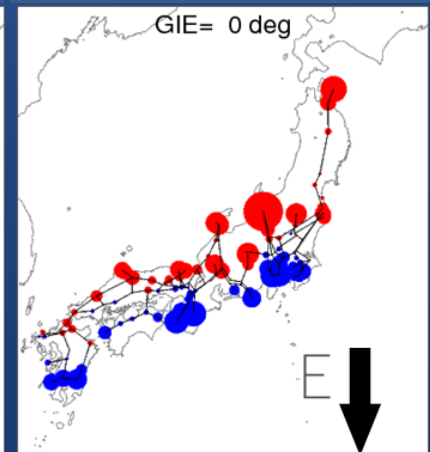
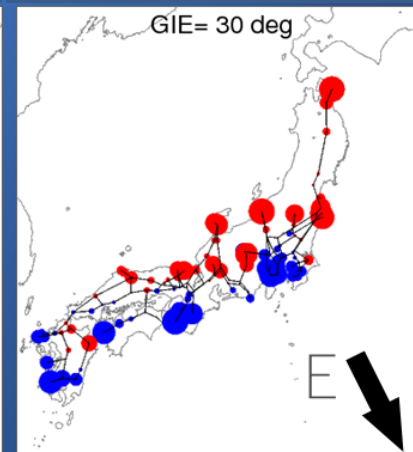
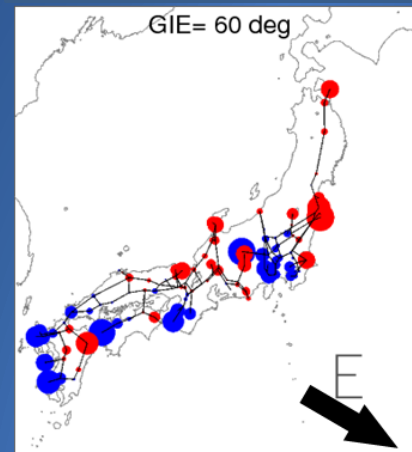
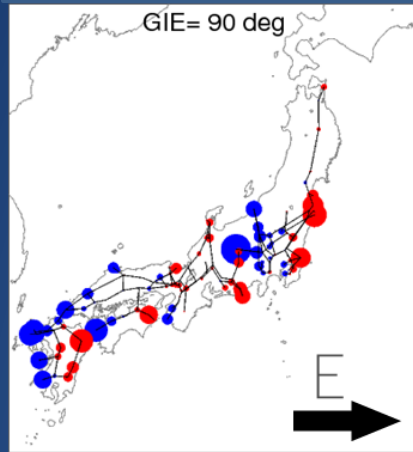
Comparisons with uniform the GIC model

Courtesy of Dr. Satoko Nakamura (Kyoto Univ.)

FDTD



Uniform



NICT

(National Institute of Information and Communications Technology)

- The “ONLY National Institute” of Information and Communications technology in Japan
- Staff: permanent scientists: 300, temporal scientists: 400, administrative: 200 (approximately).
- Yearly budget: about 30 billion yen
- Headquarter: Koganei, Tokyo
- Main Branches: Keihanna, Kobe, Kashima, Okinawa
- Observatories: Wakkanai, Hiraiso, Yamagawa, Okinawa

