

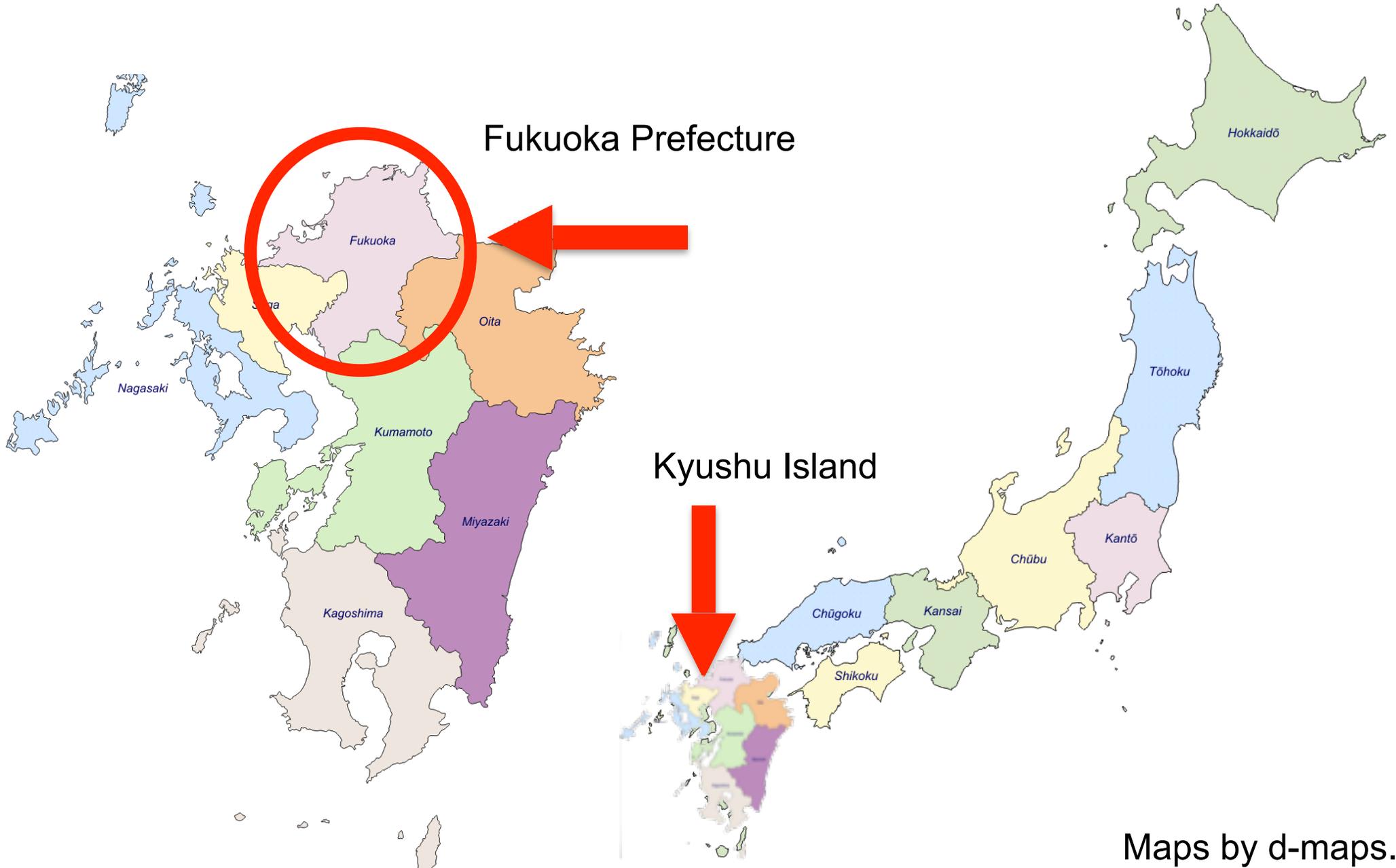
# ICSWSE and the MAGDAS Project

Akimasa Yoshikawa

International Center for Space Weather Science and Education (ICSWSE)



**KYUSHU UNIVERSITY**

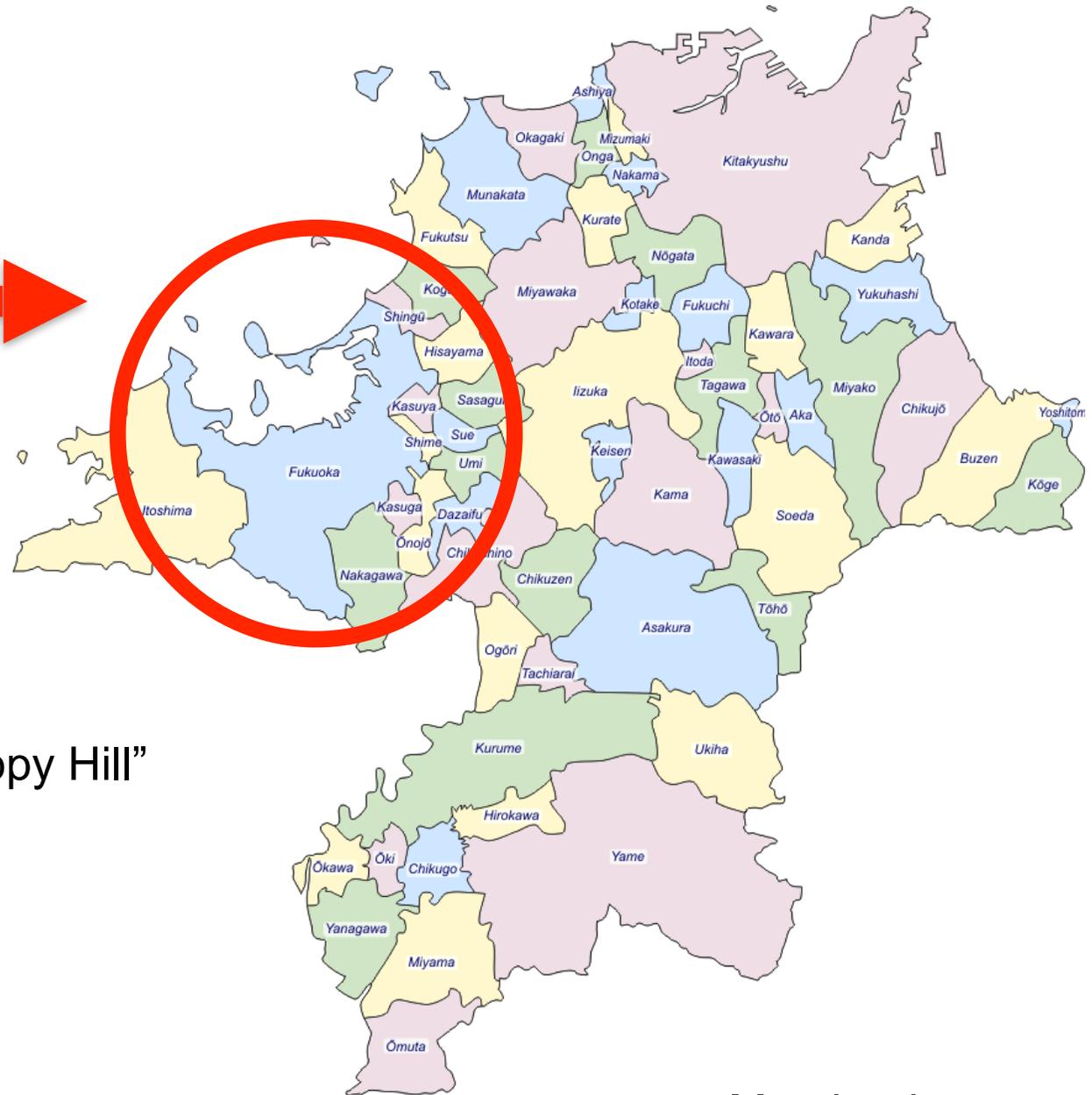




Fukuoka City

→

One of the  
World's Most  
Liveable Cities



Fukuoka literally means "Happy Hill"

Home to 1.4 Million People

Map by d-maps.c

## 2. Fukuoka City At A Glance



Provided by the City of Fukuoka

UN/JAPAN Space Weather Workshop, 2015

## 2. Fukuoka City At A Glance



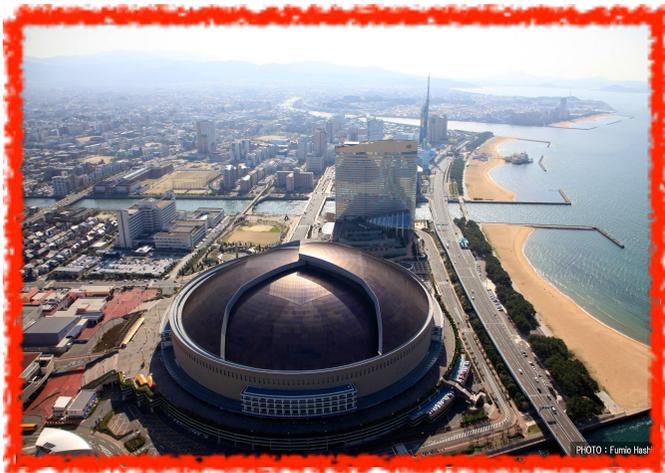
Hakata City Station



Fukuoka tower



Tenjin yatai



Yafuku dome



Marine World

All photos provided by the City of Fukuoka

## 2. Fukuoka City At A Glance



Kushida Shrine



Dontaku Festival



Yamakasa Festival



Hakata dolls

## 2. Fukuoka City At A Glance



Hakata Ramen



Mentaiko



Fresh Seafood



Hakata Amaou



Motsunabe

Home to one of the best food cities in Japan

All photos provided by the City of Fukuoka

## 2. Fukuoka City At A Glance

Home to one of the best universities in Japan



## 3. Kyushu University

### 3-1. Brief history of Kyushu University

May2011

Celebrated the university's first centennial anniversary.

Apr  
2004

Kyushu University was launched as a National University Corporation.

Oct  
1947

Name changed from Kyushu Imperial University to Kyushu University.

Jan  
1911

The Kyushu Imperial University was established.

Apr  
1903

Fukuoka Medical College was established.



### 3. Kyushu University



## 4. What is “ICSWSE” ?

### 4-1. International Center for Space Weather Science and Education (ICSWSE)

- we call it “Iku Sei” (nurture in Japanese)
- Reestablished in 2012, April from SERC
- Purpose : to push the frontiers of international space weather research and education



new building of Faculty of sciences



April 2002 – March 2012



ICSWSE

April 2012 ~



new building of ICSWSE

# 4. What is “ICSWSE” ?

## 4-2. the program

1. Expansion and promotion of Space Weather as a field of science
2. Closer investigation of changes of climate/geospace/disasters
3. Examination of the medical and biological aspects of man working in space
4. Realizing international space weather research and education



Strong commitment to UN activities and  
“International Space Weather Initiative” (ISWI)



UNITED NATIONS  
Office for Outer Space Affairs



# Research divisions of ICSWSE...

Geospace Environment Observation Lab.

Geospace Experimental Simulation Lab.

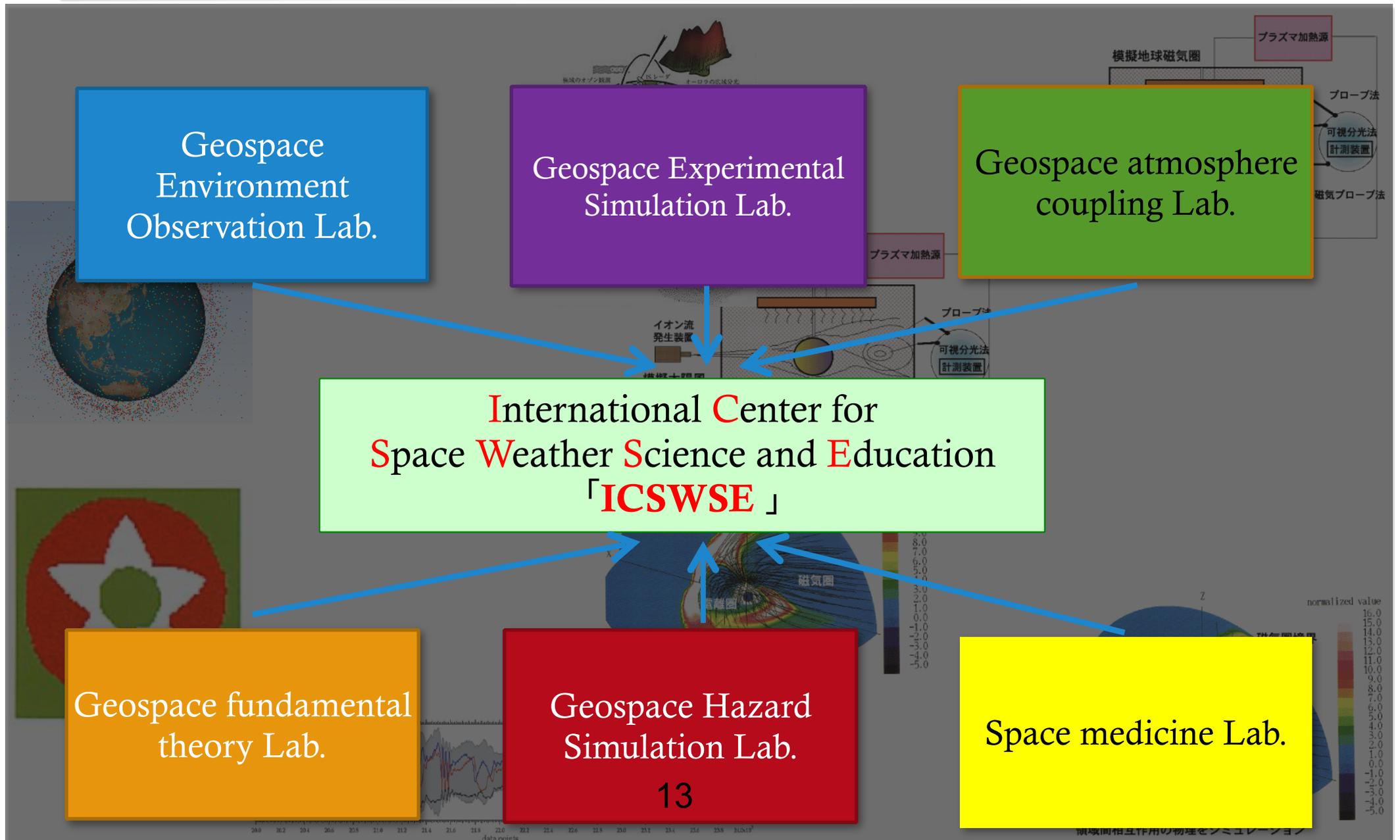
Geospace atmosphere coupling Lab.

International Center for Space Weather Science and Education 「ICSWSE」

Geospace fundamental theory Lab.

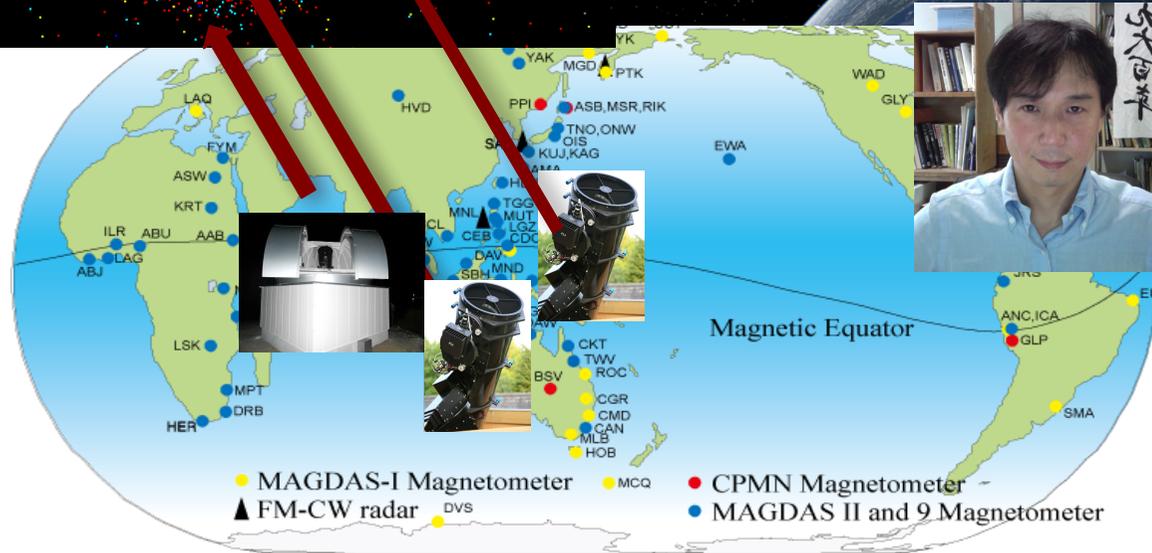
Geospace Hazard Simulation Lab.

Space medicine Lab.





# DEBDAS (DEBris Data Acquisition System)



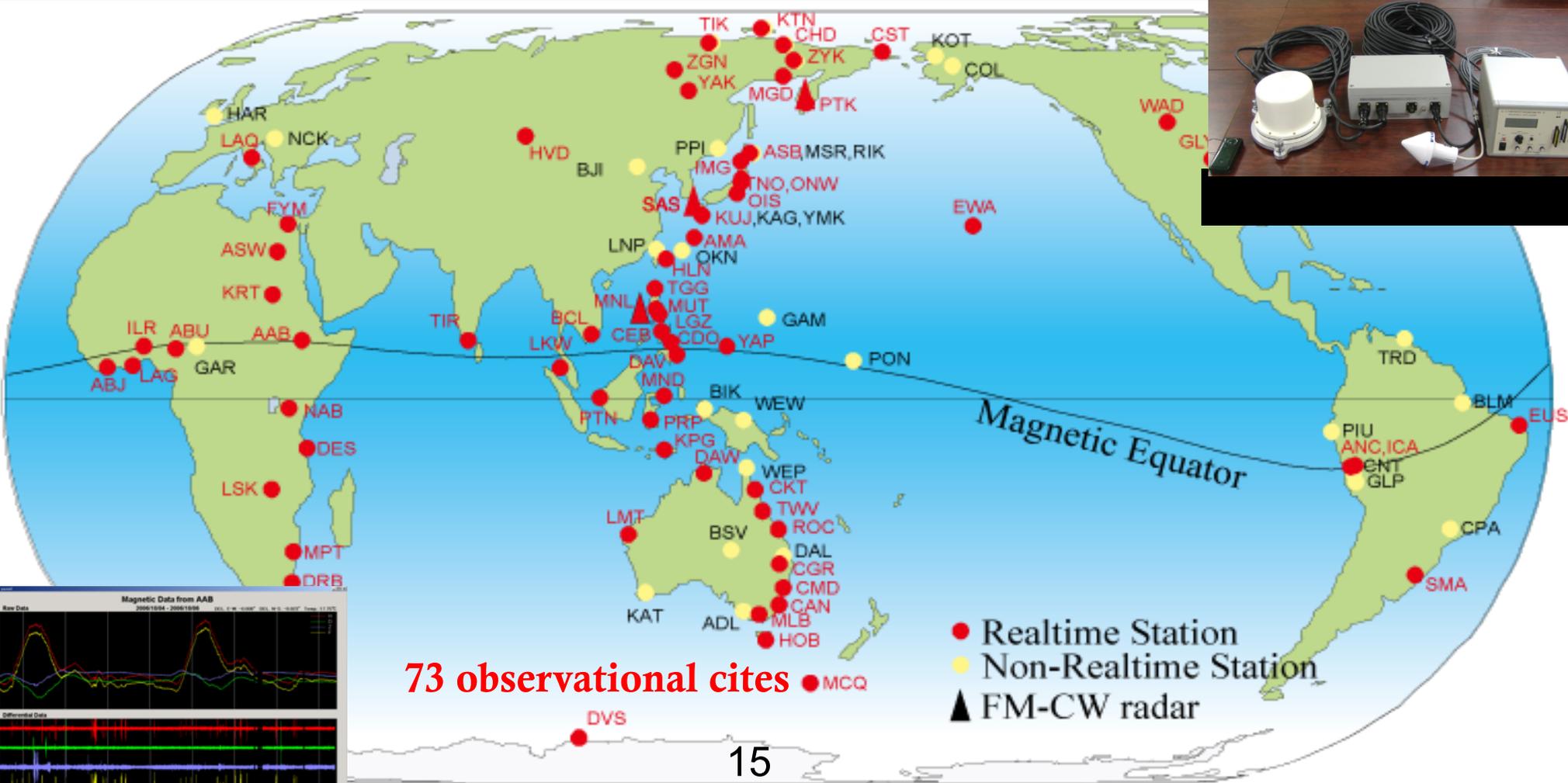
# MAGDAS (Magnetic Data Acquisition System)

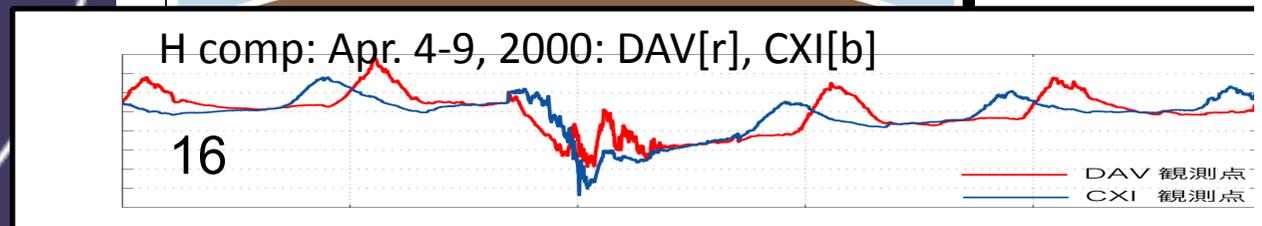
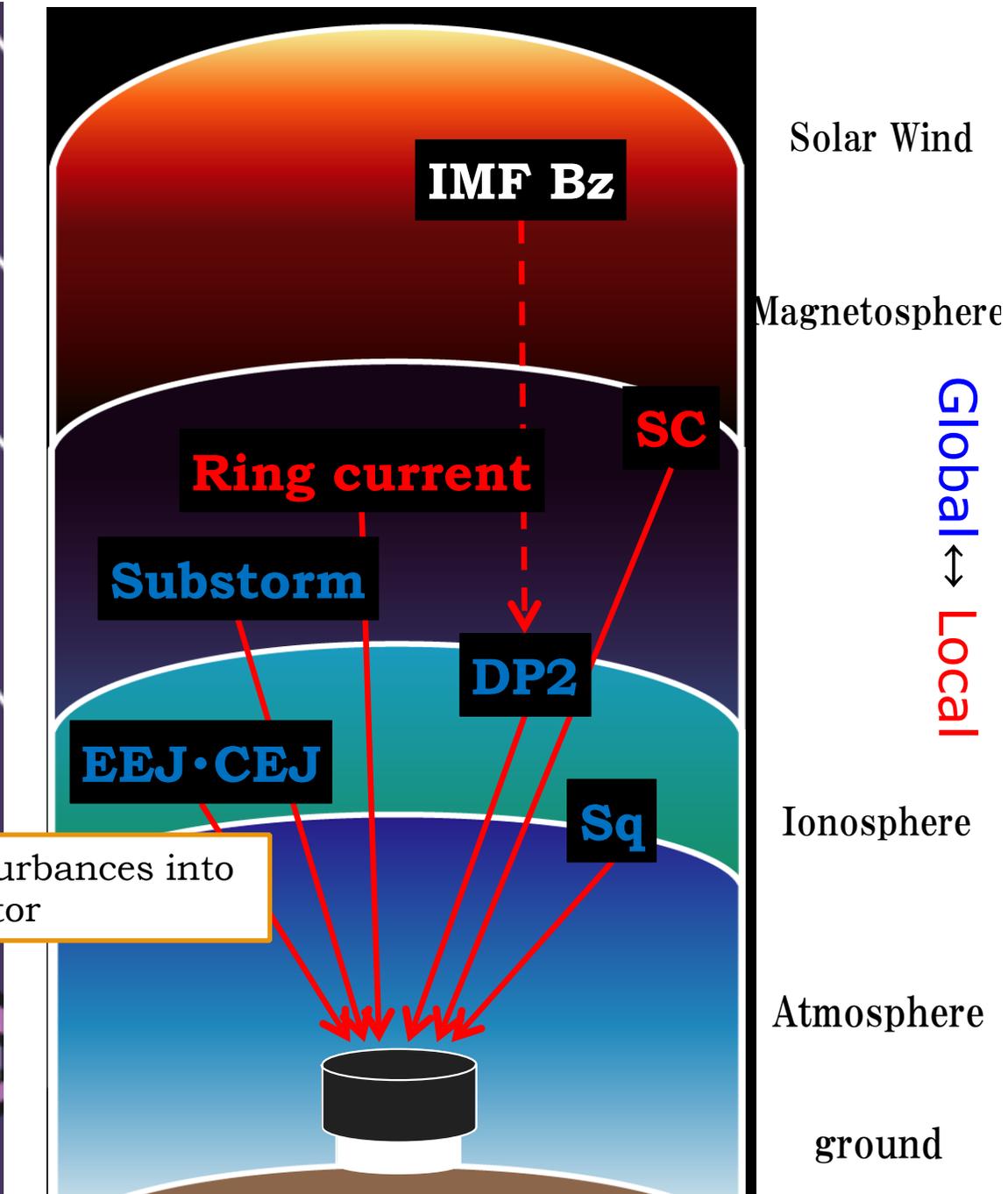
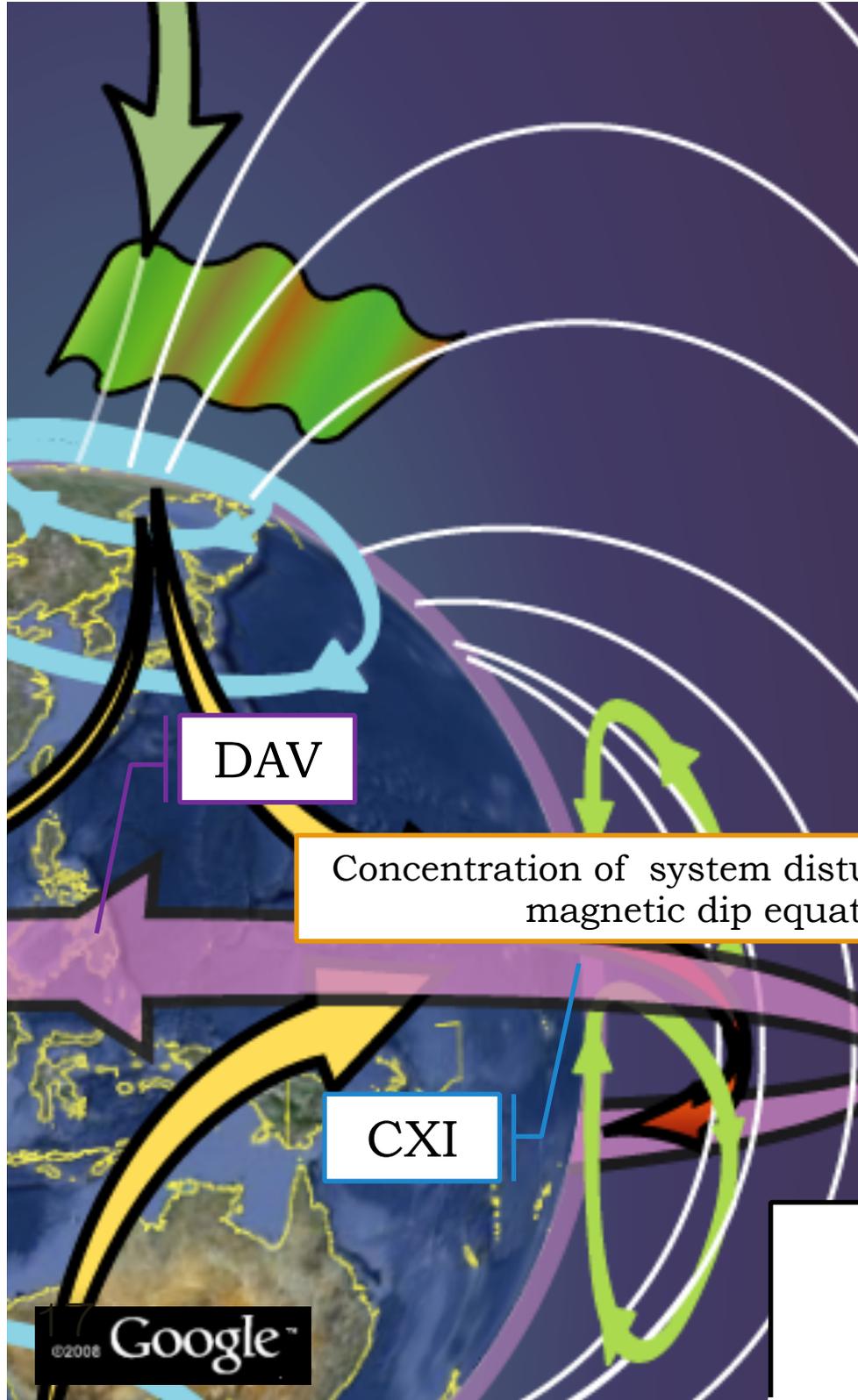


# Space environment monitoring: Geomagnetic field disturbances

MAGDAS/CPMN started in 2003

(MAGnetic Data Acquisition System/Circum pan Pacific Magnetometer Array)



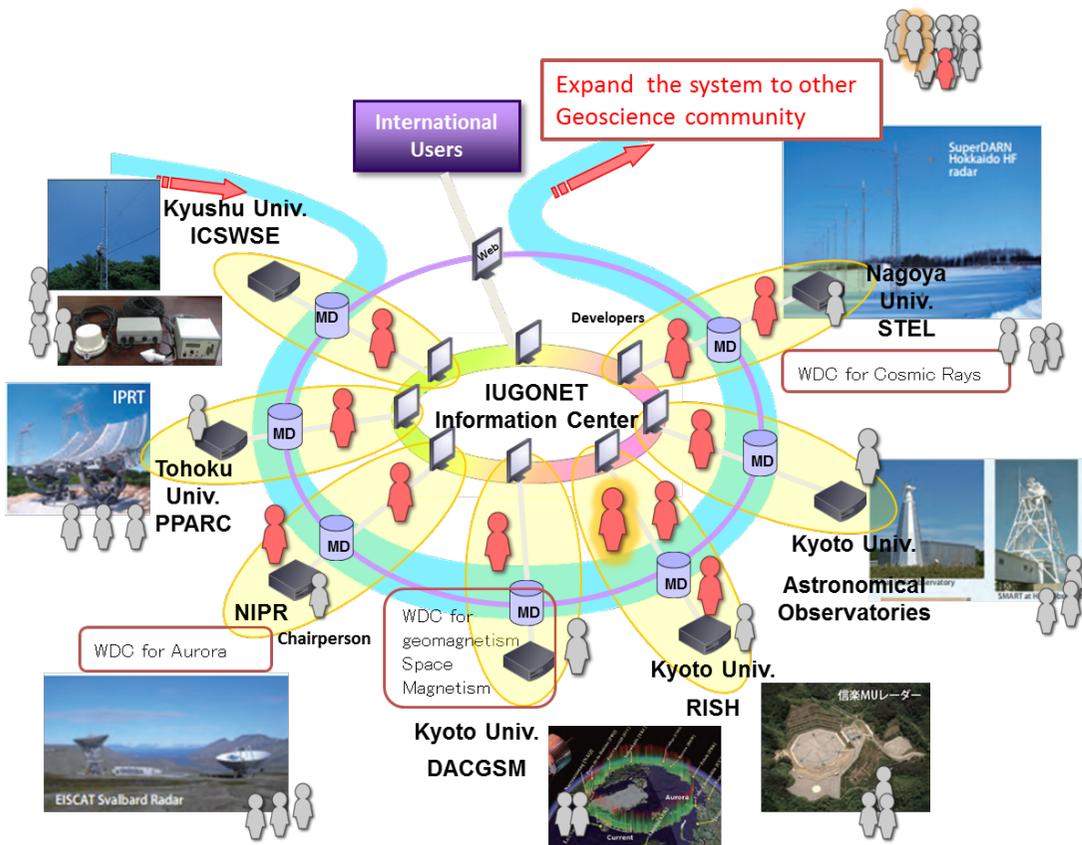


# About IUGONET

<http://www.iugonet.org/en/>

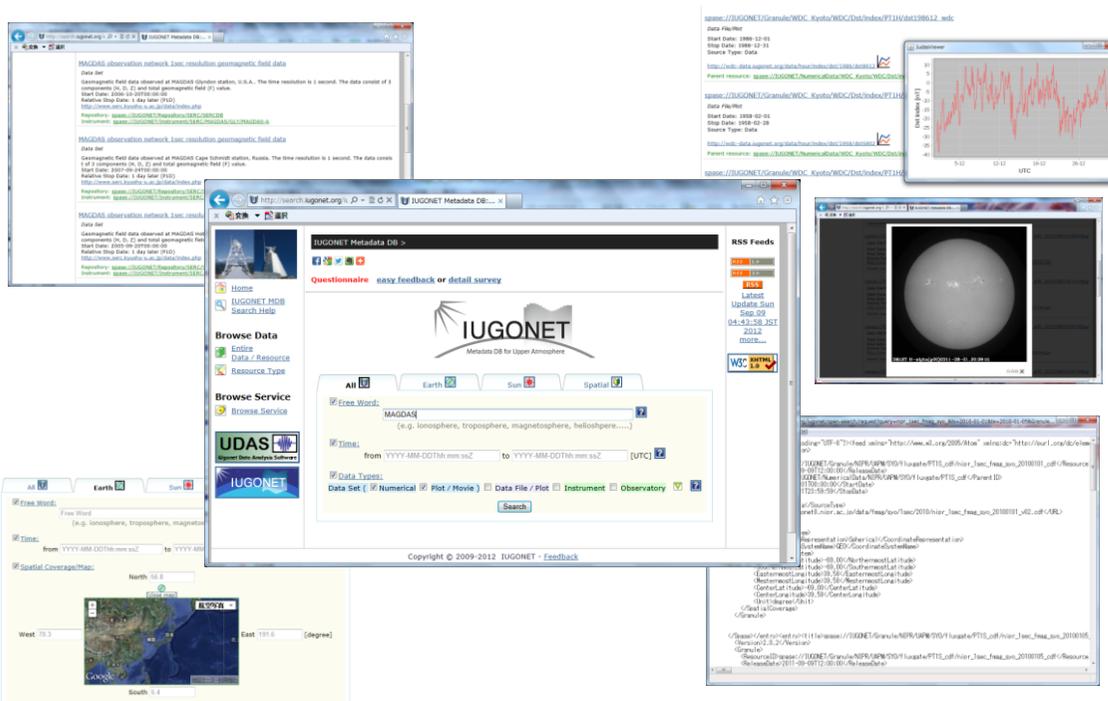


## Inter-university Upper atmosphere Global Observation NETWORK



- Develop a metadata database ground-based upper atmosphere observation data.
- Promote effective use of the observational data spread across the institutes/universities.
- Investigate mechanism of long-term variation in the upper atmosphere.

# Main Products of the IUGONET



**IUGONET Metadata Database**

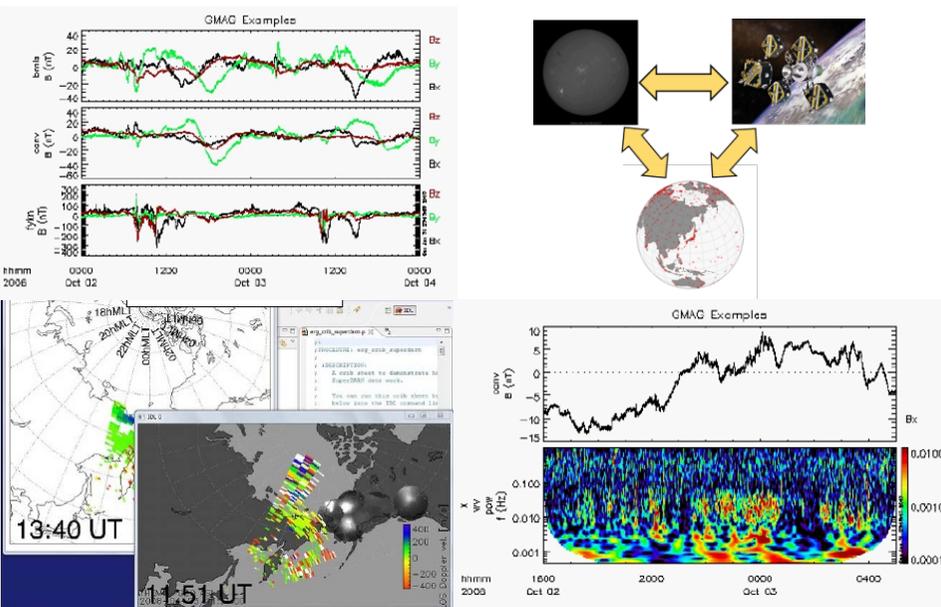
For data retrieval

<http://search.iugonet.org/iugonet/>

**IUGONET Data Analysis Software**

For data analysis

<http://www.iugonet.org/en/software.html>





# **30 years history of geomagnetic observation by Kyushu University**

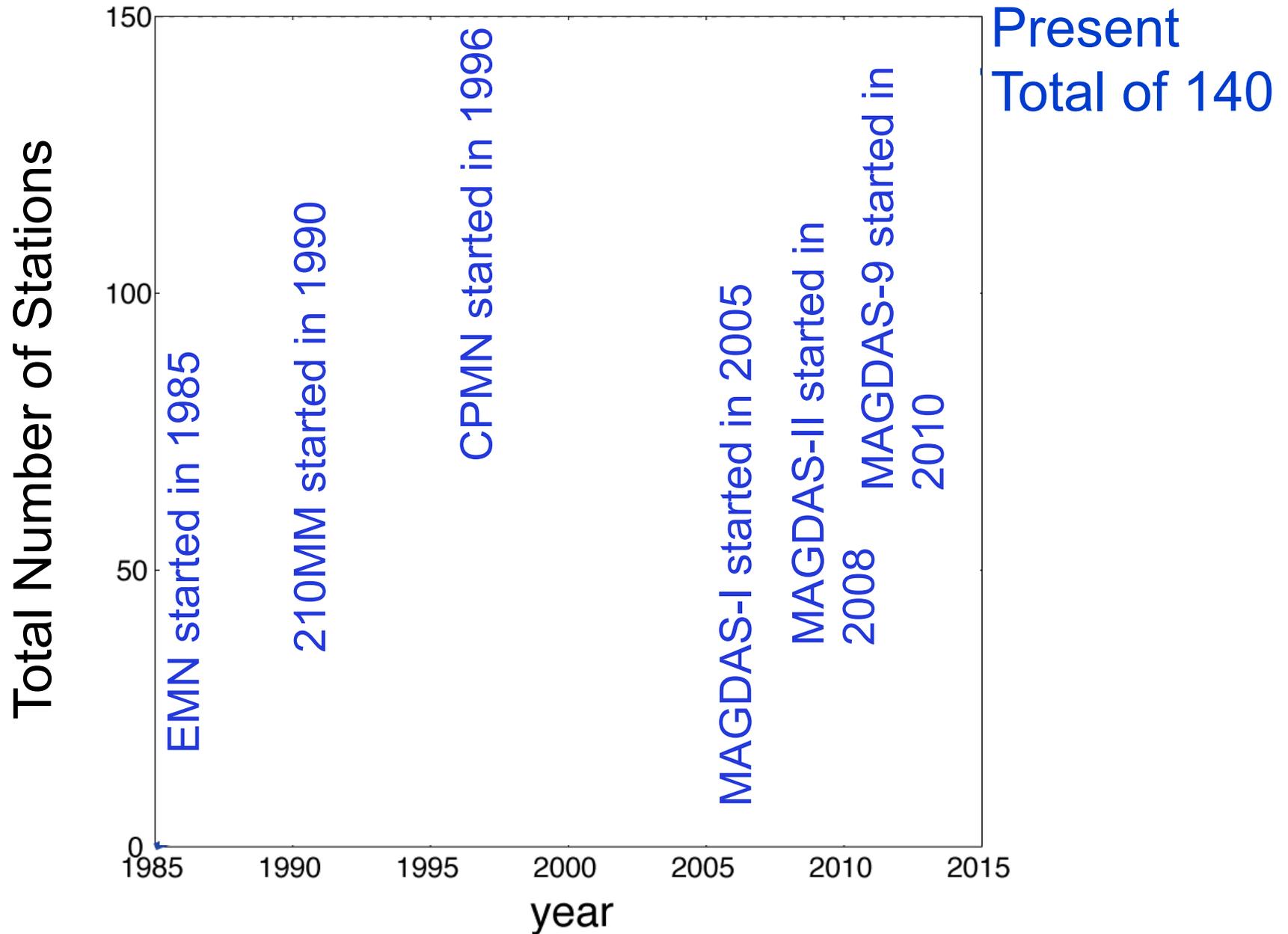
**MAGDAS/CPMN project**

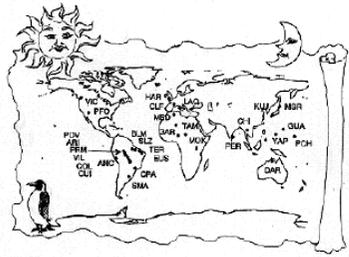
**since 1985**





### Growth of MAGDAS/CPMN

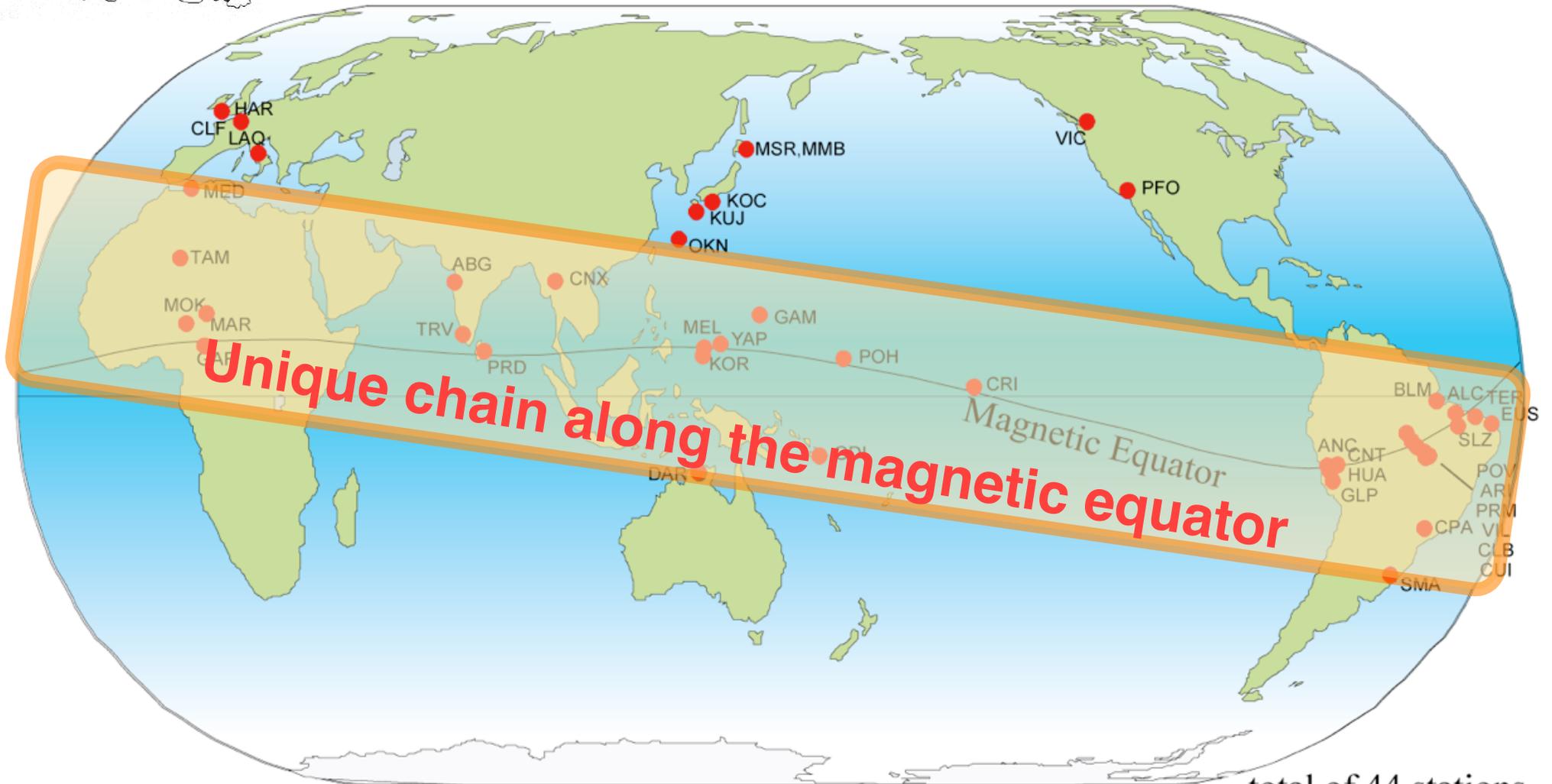




## EMN

## 1985-1995

(The Equatorial Magnetometer Network: PI Prof. Kitamura)

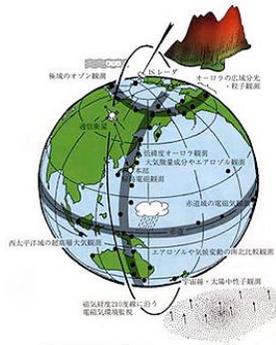


total of 44 stations

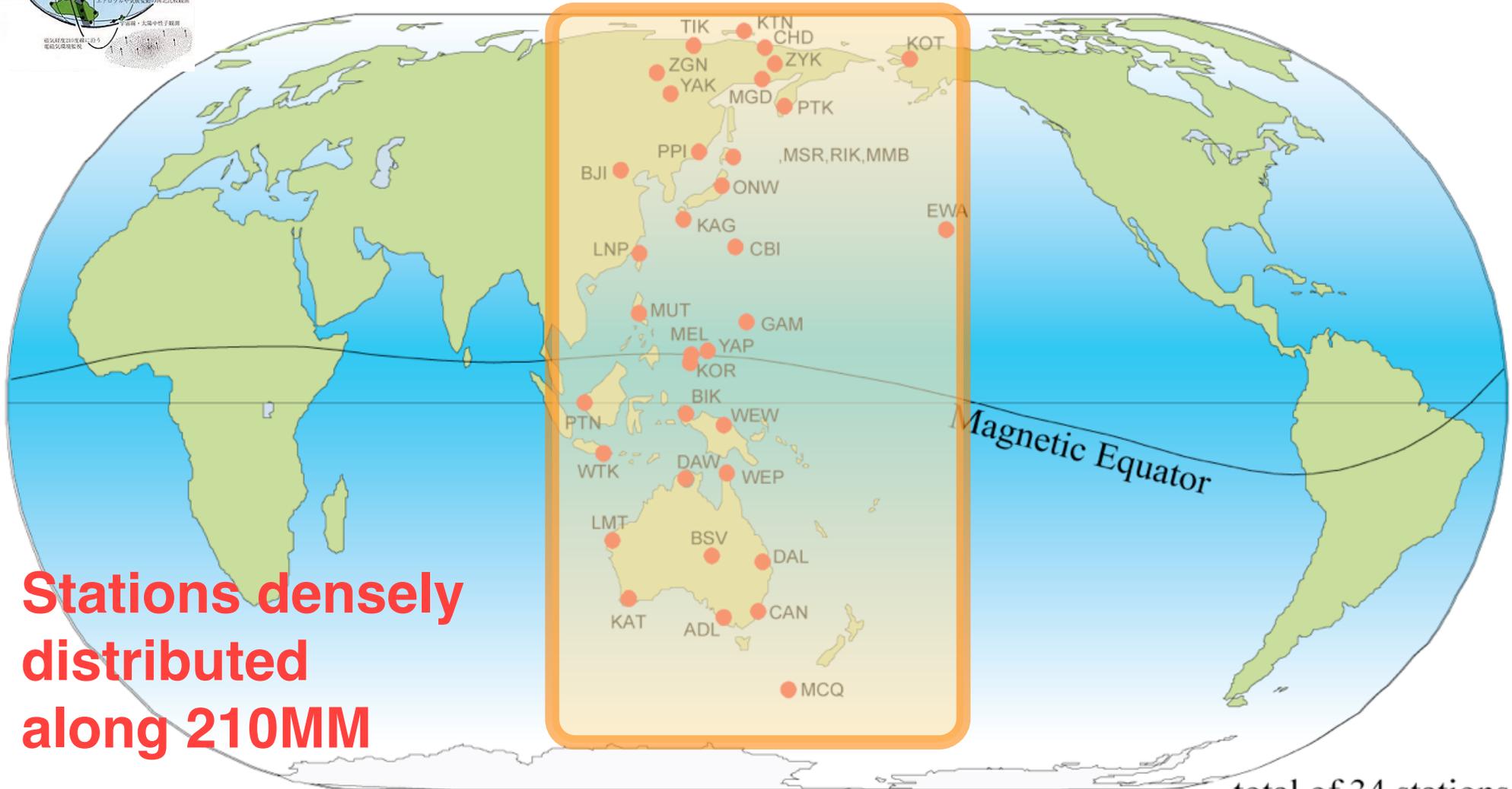


picture showing how the sensor is deployed in the fields (Kapargald station, Darwin). We recommend this style.



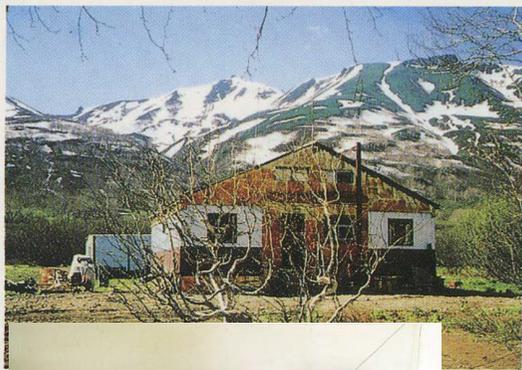


## 210MM 1990-1995 (The 210MM Magnetic Observation Network: PI Prof. Yumoto)



**Stations densely distributed along 210MM**

total of 34 stations

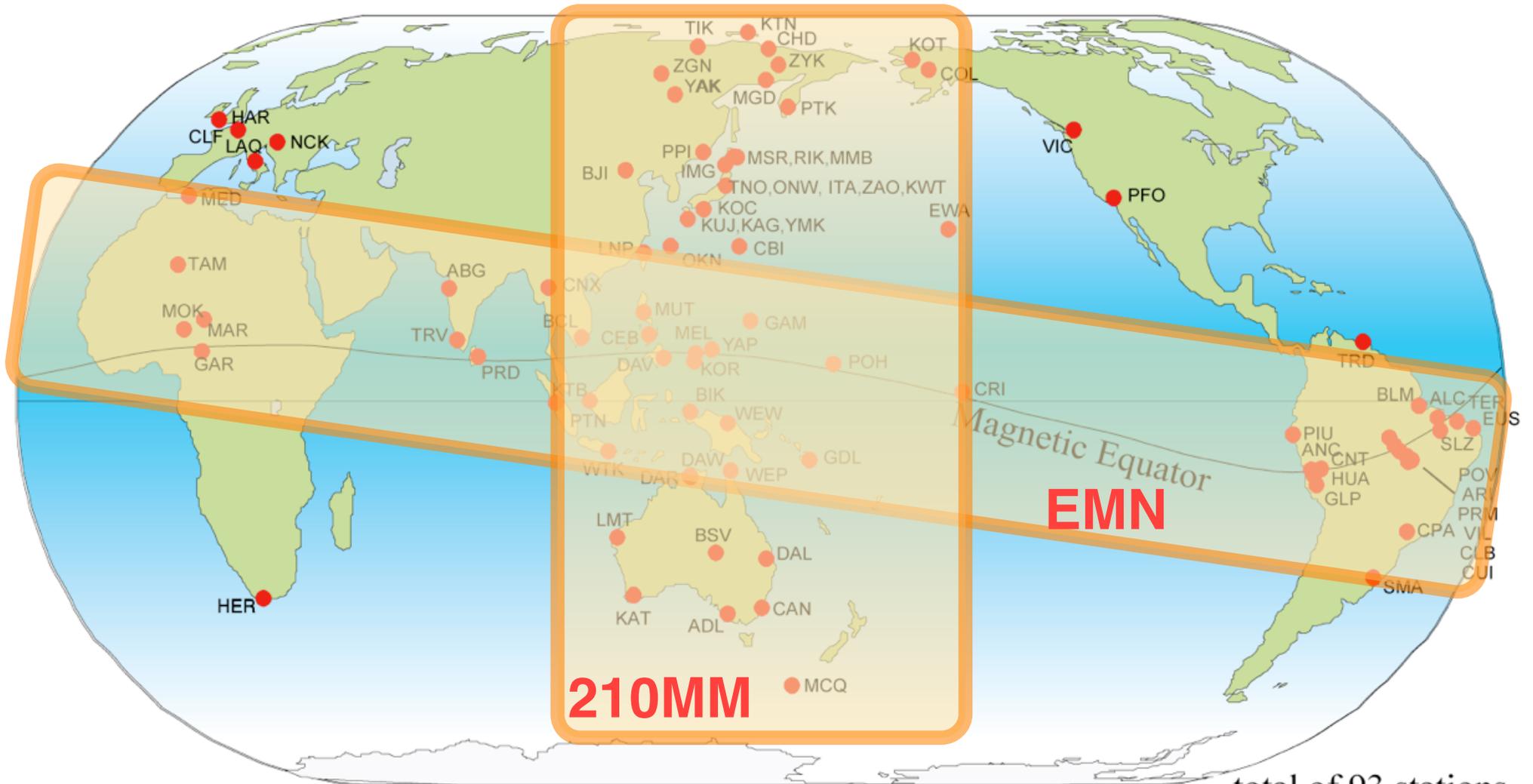


## CPMNP = EMN + 210MM + others

### CPMNP

### 1996-Present

(The Circum-pan Pacific Magnetometer Network: PI Prof. Yumoto)



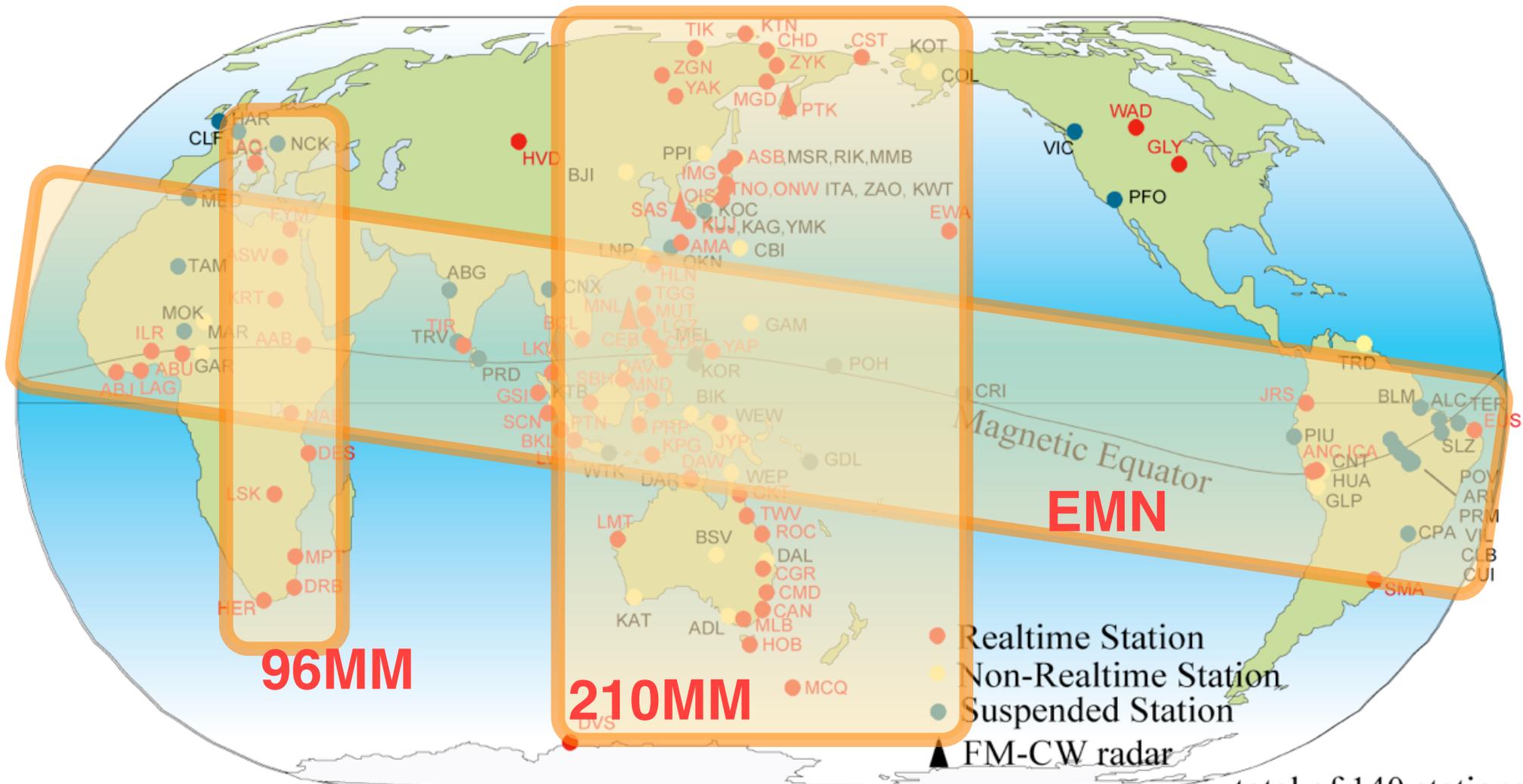
total of 93 stations



## MAGDAS/CPMN

2005-Present

(MAGnetic Data Acquisition System/Circum-pan Pacific Magnetometer Network)



total of 140 stations



MAGDAS Test Station  
Sasaguri, Japan



MAGDAS Station  
Manado, Indonesia



MAGDAS Station  
Yap, Micronesia



MAGDAS Station  
Parepare, Indonesia



Kuju Observatory  
Oita, Japan



FM-CW Radar  
Kamchatka, Russia



MAGDAS Station  
Manado, Indonesia



MAGDAS Installation  
Melbourne, Australia



MAGDAS Installation  
Melbourne, Australia





# Space weather science education

## Space weather summary report

Since October 2002, daily reports on space weather have been issued by students.

## Outreach activities on space weather

Over 50 public lectures have been conducted on Space Weather science for children and general citizens in Japan.

## Foreign students from Asian/African nations

Several students from Egypt, Sudan, Indonesia, Philippines, Malaysia, have completed Phds at ICSWSE, Kyushu University.





# Capacity Building at ICSWSE

Philippines, Malaysia, Indonesia, Vietnam and Peru

1<sup>st</sup> Batch -2012/11



3<sup>rd</sup> Batch -2013/08



2<sup>nd</sup> Batch-2013/01



4<sup>th</sup> Batch- 2014/01  
Ivory Coast,  
Mozambique, Nigeria  
and Egypt

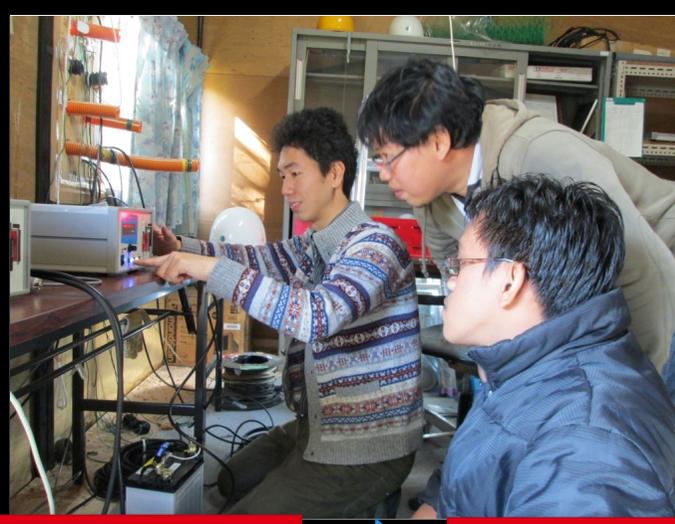




# Capacity Building at ICSWSE



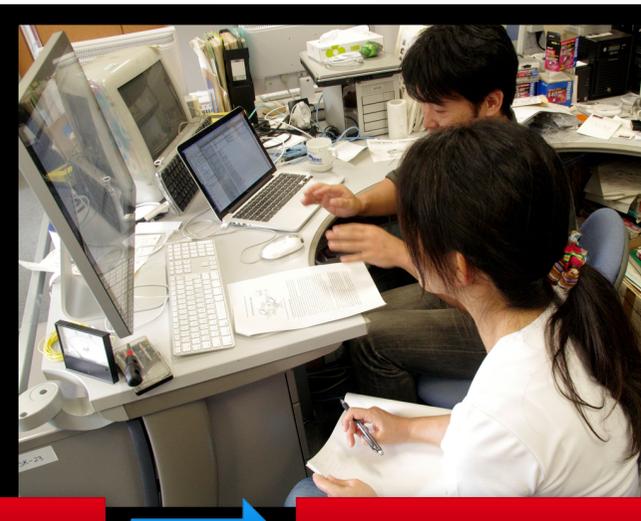
Pre-installation of magnetometer



Installation of magnetometer



Monitor magnetometer data



Use magnetic data to do research

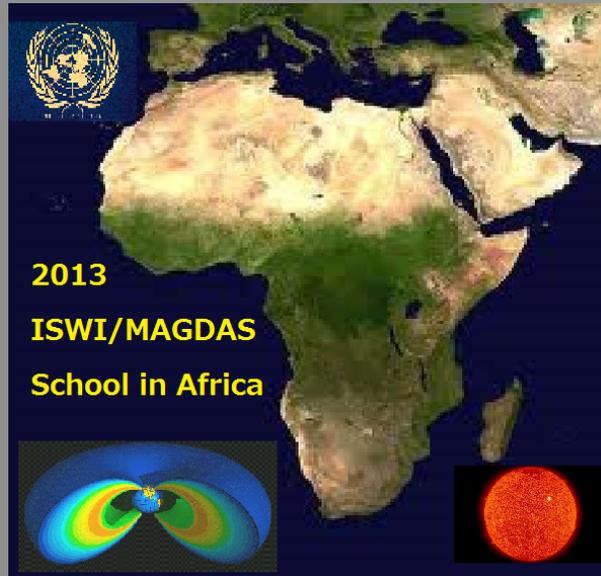


# Capacity Building at ICSWSE



For more information, access the Research Note, Space Research Today, Volume 188, December 2013, Pages 18-20, ISSN 1752-9298, <http://dx.doi.org/10.1016/j.srt.2013.11.007>.  
(<http://www.sciencedirect.com/science/article/pii/S1752929813000601>)

# 2013 ISWI/MAGDAS School in Africa



The MAGDAS School for this year was conducted at Abidjan in Cote d'Ivoire in western Africa.

At the right is the schedule  
for MAGDAS schools

2011	Nigeria
2012	Indonesia
<b>2013</b>	<b>Côte d'Ivoire</b>

**2014**

BMKG Geomagnetic Workshop in Medan, Indonesia

Workshop on Space and Earth's Electromagnetism in LKW, Malaysia

# Technical Presentation for ICSWSE/MAGDAS Activity at UN/COPUOS Meeting: 2012-2014

New Director of ICSWSE: Prof. Hada



New PI of MAGDAS/CPMN Project Prof. Yoshikawa





# United Nations/Austria Symposium on Data Analysis and Image Processing for Space Applications and Sustainable Development: Space Weather



Hands-on training of MAGDAS data analysis using IUGONET Data Analysis Software

# Summary

**The new ICSWSE will conduct *ISWI activity* for young scientists in Japan and in the world through a wide-variety of approaches:**

- (1) growing into a network of centres, focusing on space weather around the world, dedicated to the advancement of space weather research and education
- (2) conducting overseas ISWI/MAGDAS Schools
- (3) implementing student exchanges
- (4) installing ground magnetometers (e.g. MAGDAS) in "missing areas"
- (5) bringing students who want to study space weather science to Japanese universities.



**ICSWSE : "iku-sei" : 育成**

- research initiatives (e.g., collaboration with foreign researchers)
- data-collection initiatives (e.g. the IUGONET Project)
- education initiatives (e.g. ISWI/MAGDAS Schools)

**The new center will contribute to Space Weather Capacity Building with cooperation of COPUOS and other space weather related institutes in the world.**