

Update on Japan's Contribution to the ISWI 1/21

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STPP Sub-Committee⁴⁾

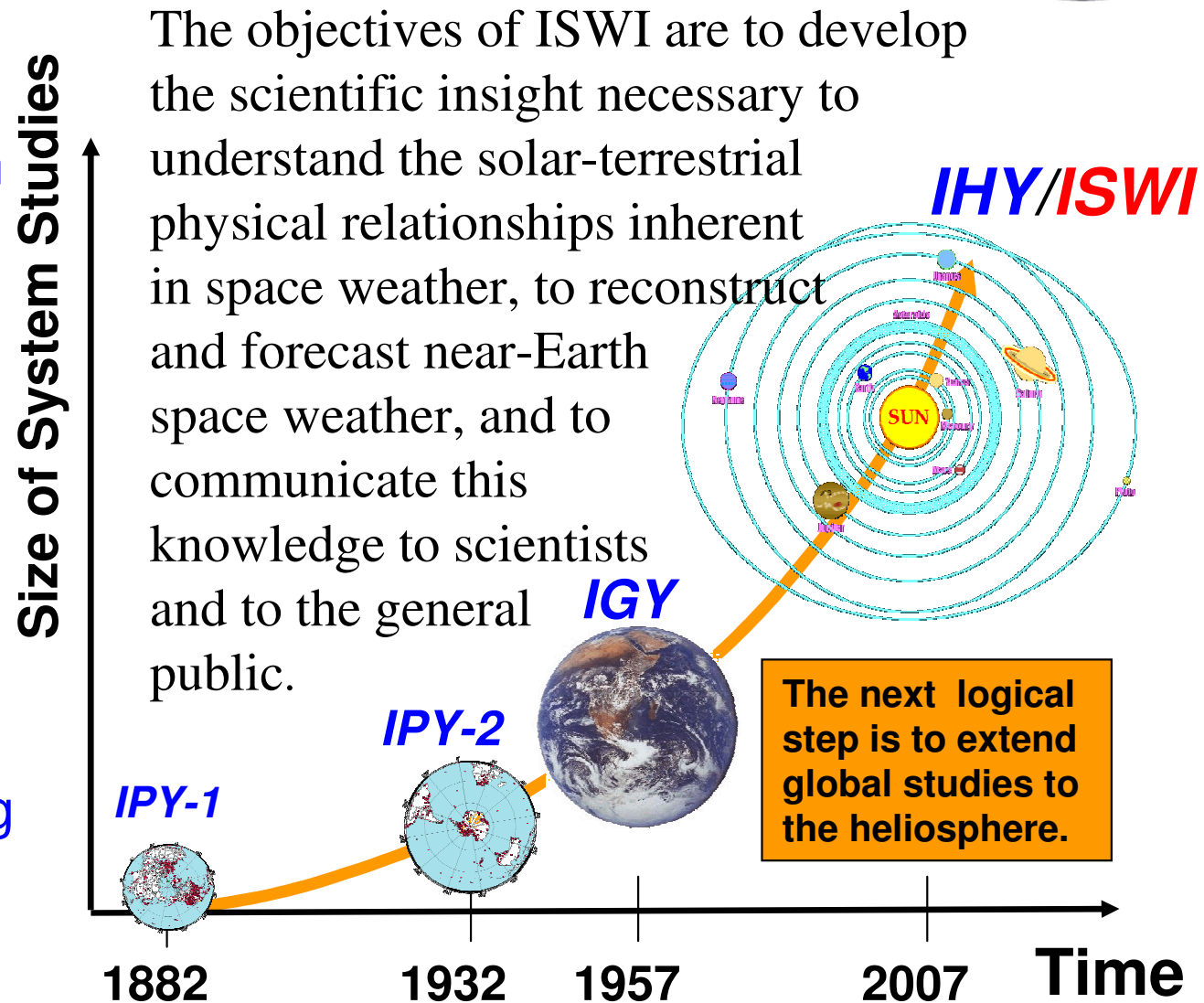
1) SERC, Kyushu Univ., 2) JAXA, 3) NiCT, 4) SCJ

International Space Weather Initiative (ISWI; 2010-2012)



Goals of ISWI

1. Instrument Array Program
 - 1.1 CHAIN Network
 - 1.2 GMDN Network
 - 1.3 MAGDAS Network
 - 1.4 OMTIs Network
 - 1.5 SEALION Network
2. Data Coordination and Analysis
3. Training, Education (i.e. Capacity Building) and Public Outreach (including ISWI Newsletter)



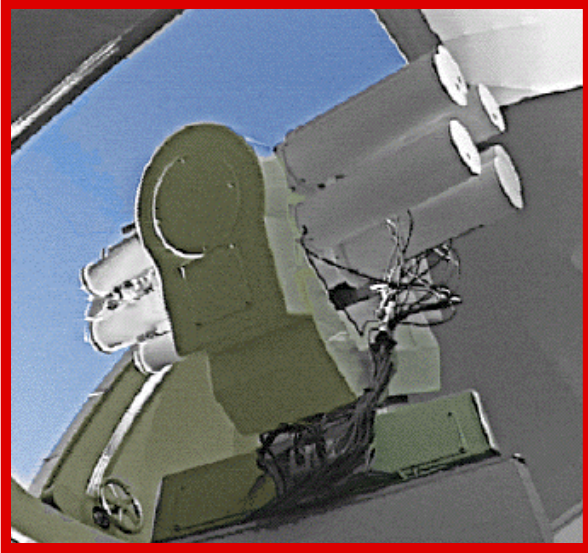
1. Instrument Array Program of Japan

	INSTRUMENT	Lead Scientist	Objective
1	Continuous H-alpha Imaging Network (CHAIN)	Dr. Satoru Ueno, Prof. Kazunari Shibata (Kyoto U)	Time variation and 3D velocity field of solar activity, flares, filament eruptions and shock waves (Morton waves) by using multi-wavelength H-alpha images of the full-disk Sun.
2	Global Muon Detector Network (GMDN)	Prof. Kazuoki Munakata (Shinshu U)	To identify the precursory decrease of cosmic ray intensity that takes place more than one day prior to the Earth-arrival of the shock driven by an interplanetary coronal mass ejection
3	Magnetic Data Acquisition System (MAGDAS)	Prof. Kiyohumi Yumoto (Kyushu U)	Study of dynamics of geospace plasma changes during magnetic storms and auroral substorms, the electromagnetic response of iono-magnetosphere to various solar wind changes, and the penetration and propagation mechanisms of DP2-ULF range disturbances
4	Optical Mesosphere Thermosphere Imagers (OMTIs)	Prof. Kazuo Shiokawa (Nagoya U)	Dynamics of the upper atmosphere through nocturnal airglow emissions
5	South-East Asia Low - Latitude Ionosonde Network (SEALION)	Dr. Tsutomu Nagatsuma (NICT)	Monitoring and study of ionospheric disturbances occurring in the equatorial region by ionospheric and geomagnetic field observations.

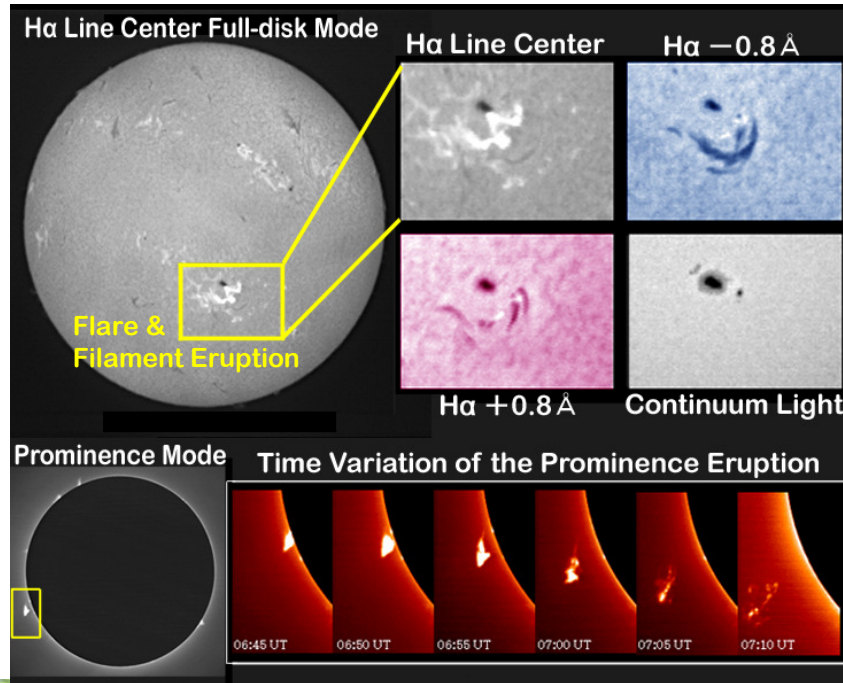
1.1 Continuous H-alpha Imaging Network (CHAIN)

Kwasan & Hida Observatories, Kyoto Univ., JAPAN

*Flare Monitoring Telescope (FMT)



Map of CHAIN



PI: Dr. S. Ueno and Prof. K. Shibata

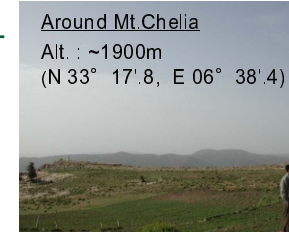
To monitor all solar explosive phenomena continuously, because they are important sources of perturbations in solar-terrestrial environment. 3D velocity field on the solar surface can be measured by the FMT.



- ; Three main observatories of CHAIN: Japan, Peru and Algeria.
- ; Observatories or institutes that participated in the CHAIN project.



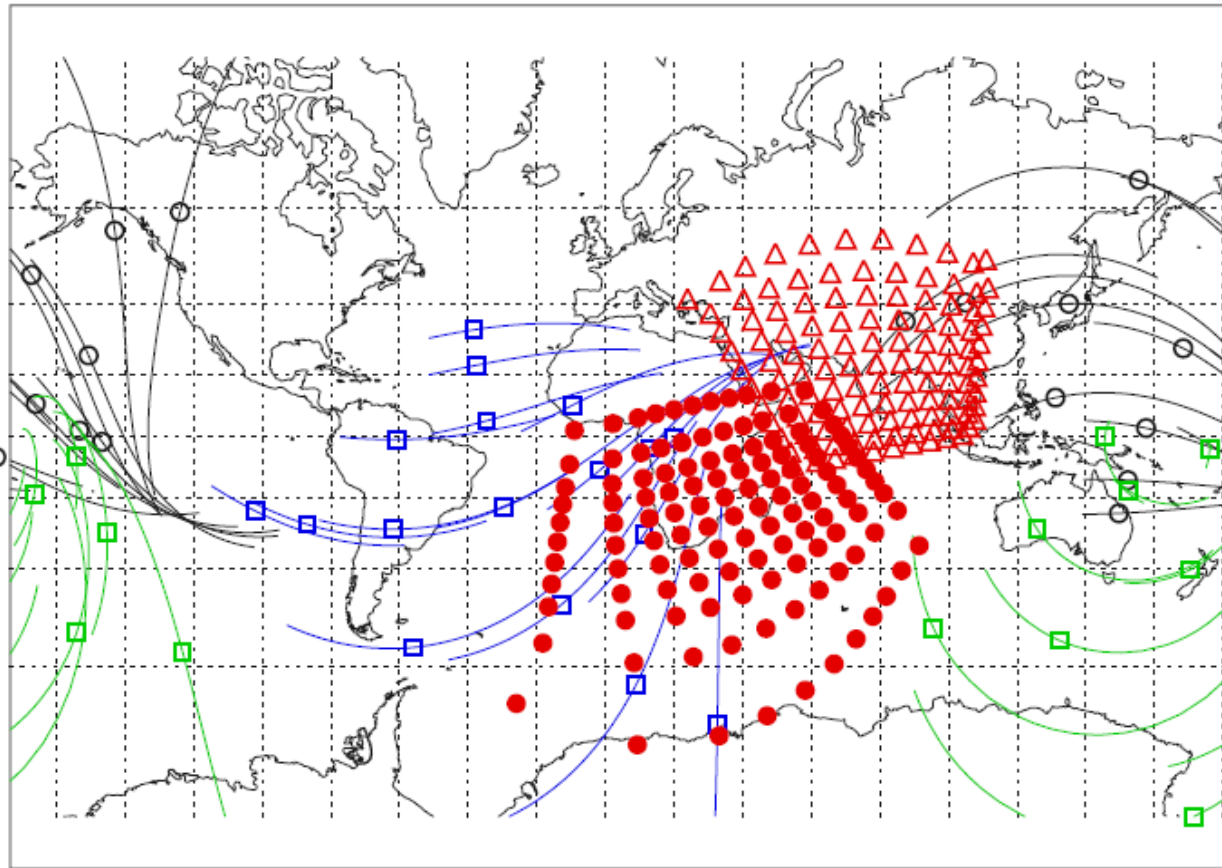
The 1st overseas FMT was installed at "Solar Station" of Ica Univ.. Peru in Mar. 2010



Around Mt. Chelia
Alt.: ~1900m
(N 33° 17' 8, E 06° 38' 4)

Final tests of candidate sites for New Observatory are performed in Aures area, Algeria.

1.2 Global Muon Detector Network (GMDN)



○ Nagoya ■ São Martinho ■ Hobart ▲ Kuwait University ● Hermanus

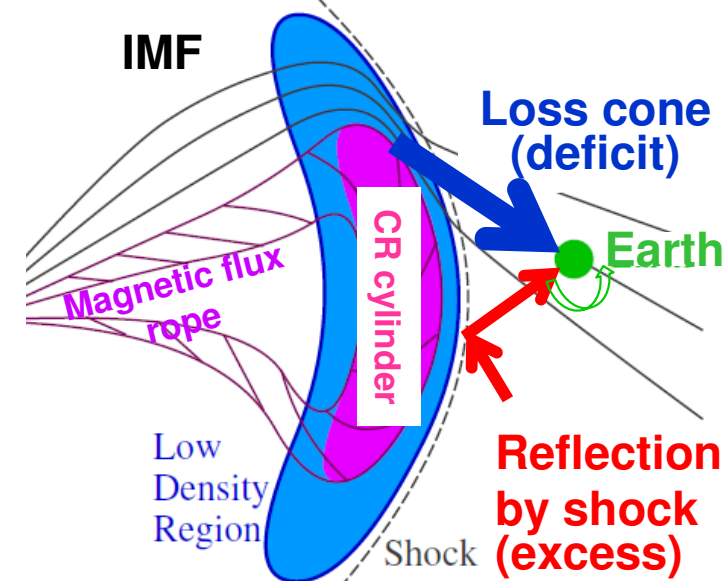
9 institutes
from 7
countries:
Japan, USA,
Australia,
Brazil, Kuwait,
Armenia,
Germany

They are planning the following for improving sky-coverage with the GMDN:

- Expansions of the detection area: Partly completed by the end of 2010 fiscal year.
 - Sao Martinho (Brazil), from current $4 \times 7 \text{ m}^2$ to $4 \times 9 \text{ m}^2$
 - Muon detectors in Kuwait Univ. and Hobart, from current $3 \times 3 \text{ m}^2$ to $5 \times 5 \text{ m}^2$
- Deployments of new detectors
 - A new type of detector on the high-altitude mountain, Sierra-Negra (Mexico)
 - A new muon hodoscope at the Hermanus Magnetic Observatory, (South Africa)

PI; Prof. K. Munakata
Shinshu Univ.

Cosmic Ray Precursors of CME
Arrival at Earth

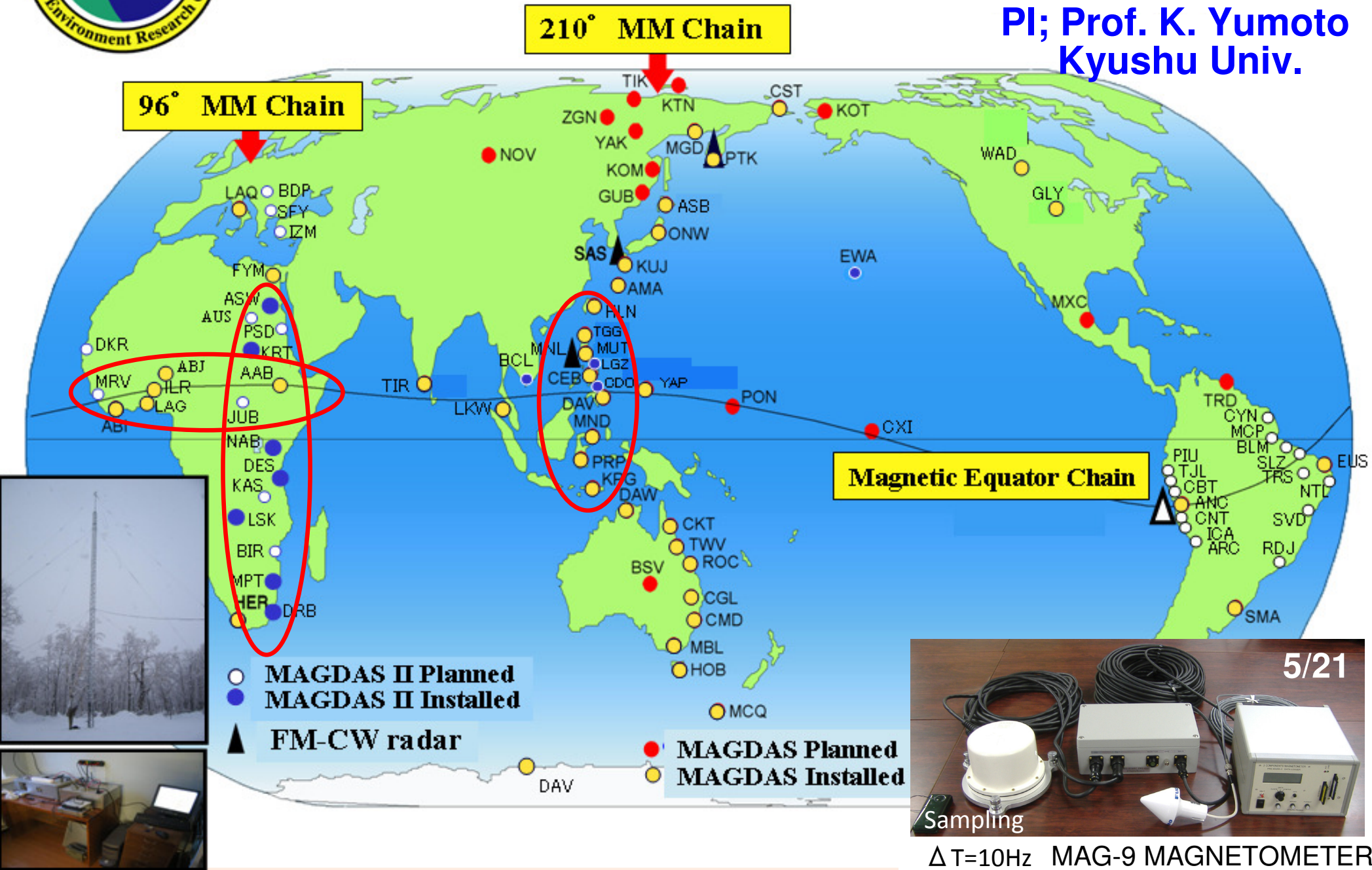


Fushishita et al., *Astrophys. J.*, 715,
1239, 2010.



1.3. Update on MAGDAS Activities (Magnetic Data Acquisition System)

PI; Prof. K. Yumoto
Kyushu Univ.



Sampling $\Delta T=10\text{Hz}$ MAG-9 MAGNETOMETER

1.3-1 MAGDAS Regional Center in the Philippines



SERC Sub-center at Manila Observatory
by Q. M. Sugon Jr. and D. J. McNamara



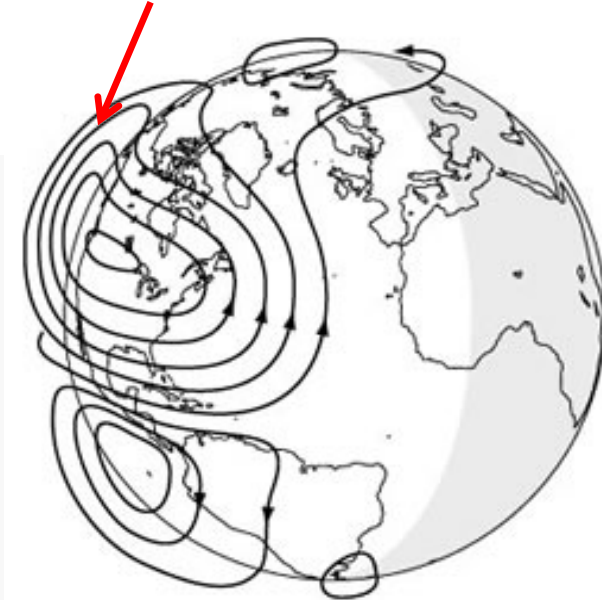
● : MAGDAS Installed in 1990'

● : MAGDAS installed in 2010

http://www.filipinolanguemelbourne.org.au/philippines_map.html

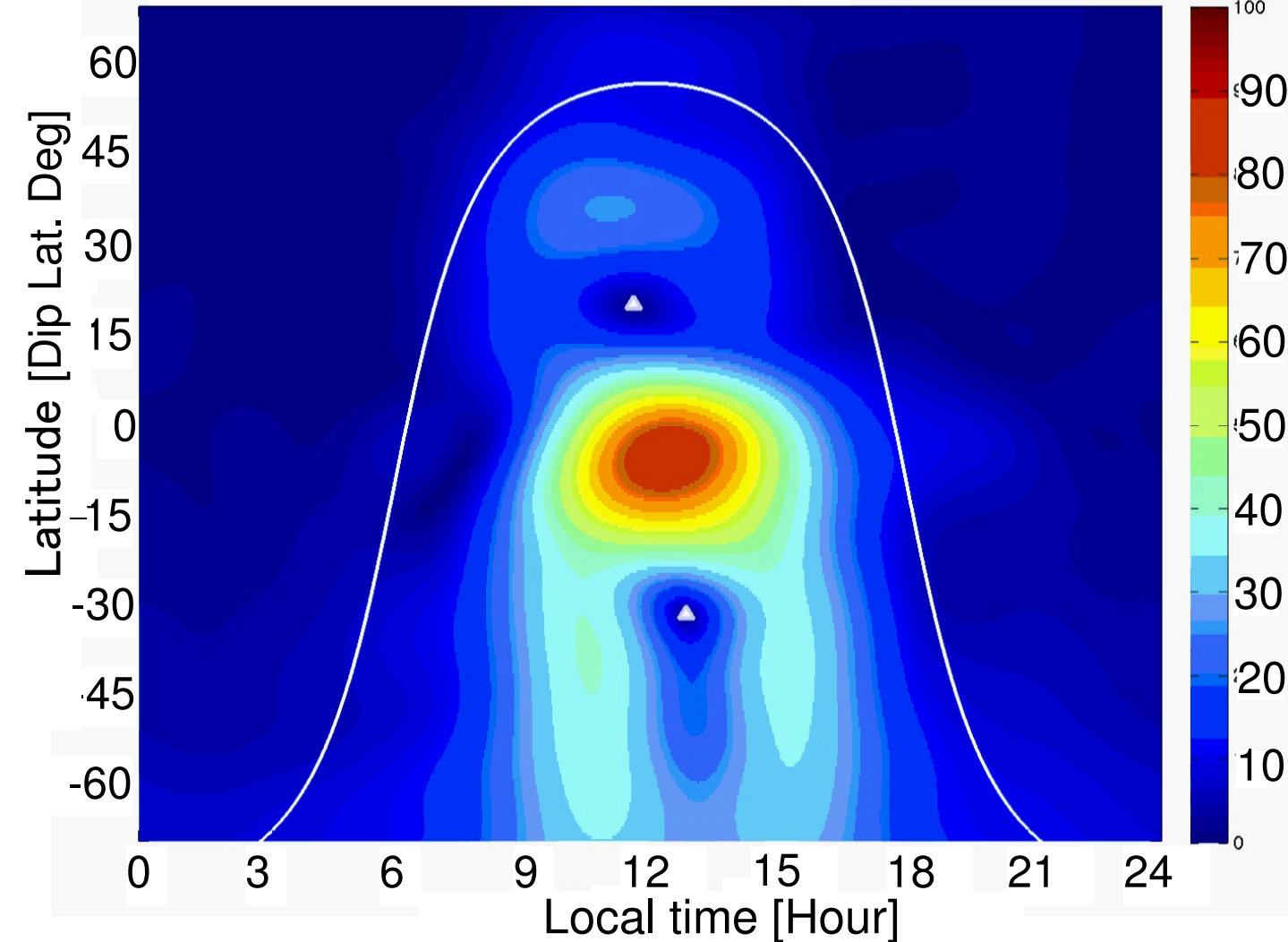
1.3-2 Space Weather Map; Sq Ionospheric Current

Sq Ionospheric Current

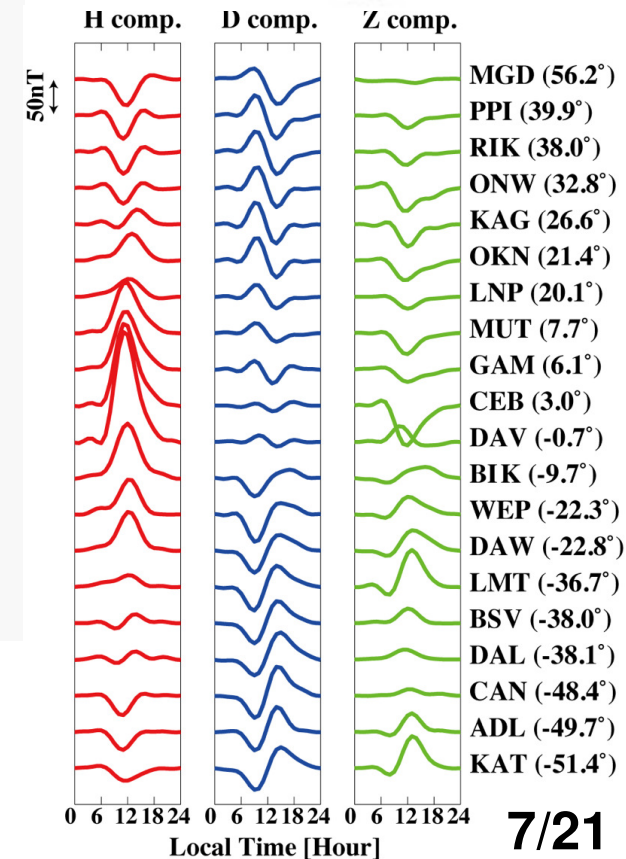


External Sq Current Intensity 2001/01/01

[A/km]



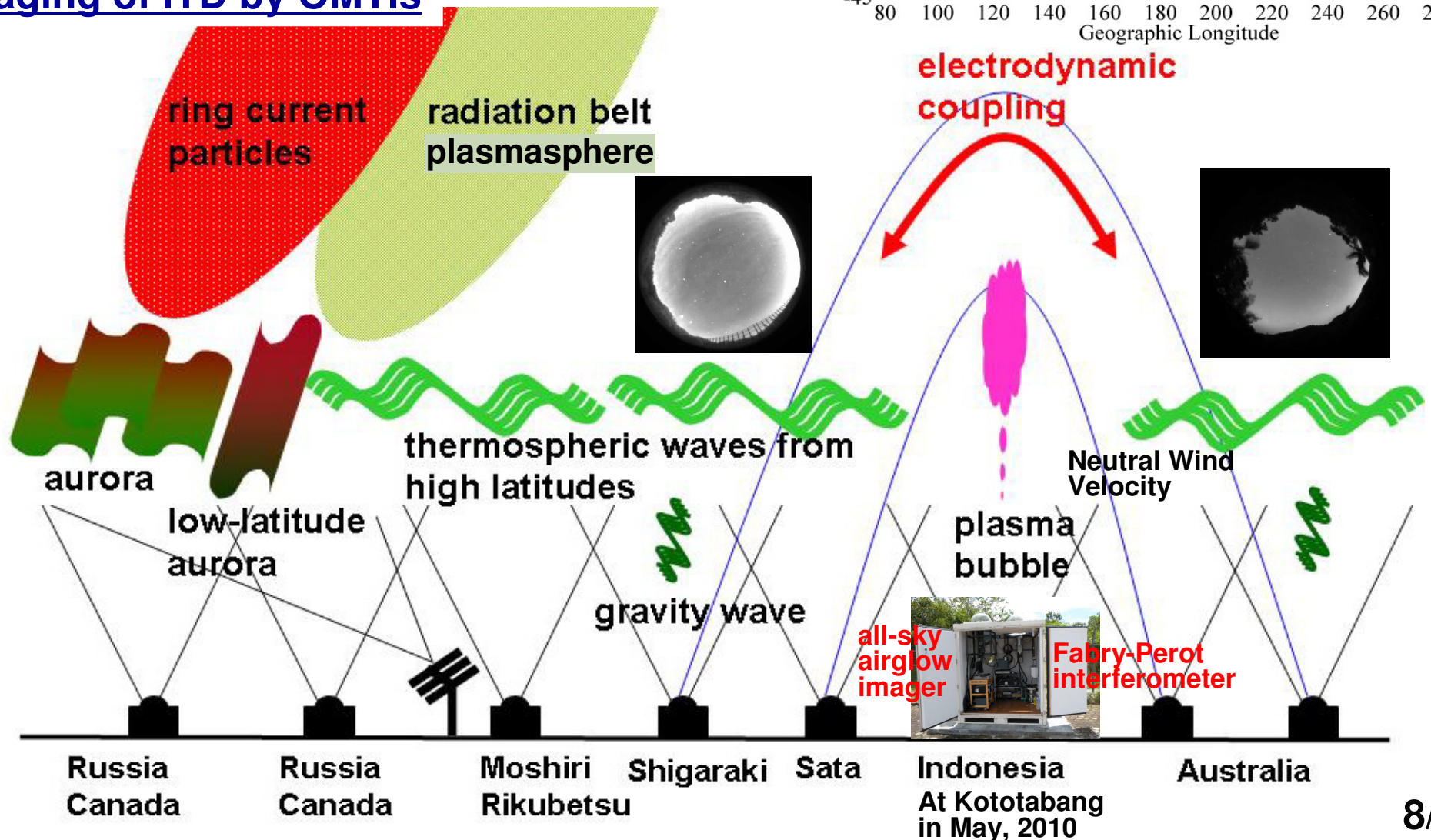
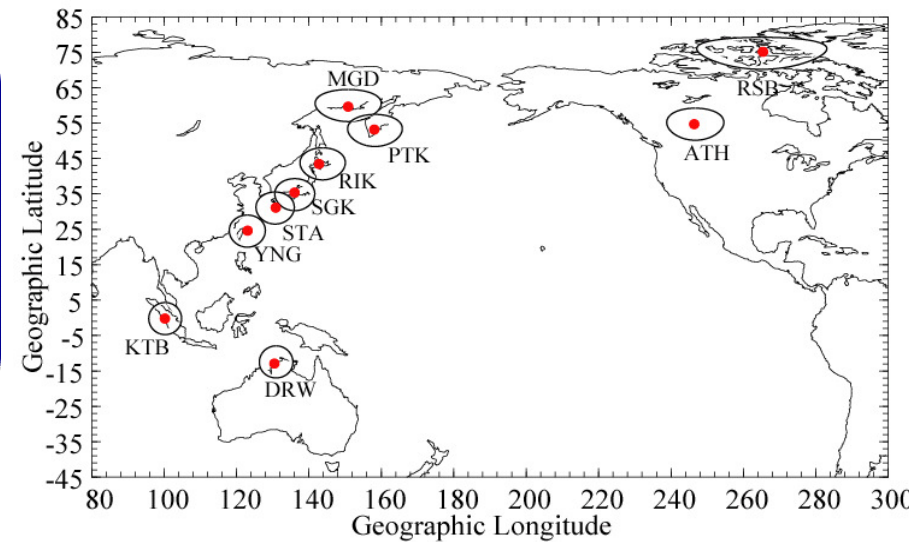
-Seasonal and day-to-day variations of global Sq ionospheric current produced by Solar Radiation.



1.4 Optical Mesosphere Thermosphere Imagers (OMTIs)

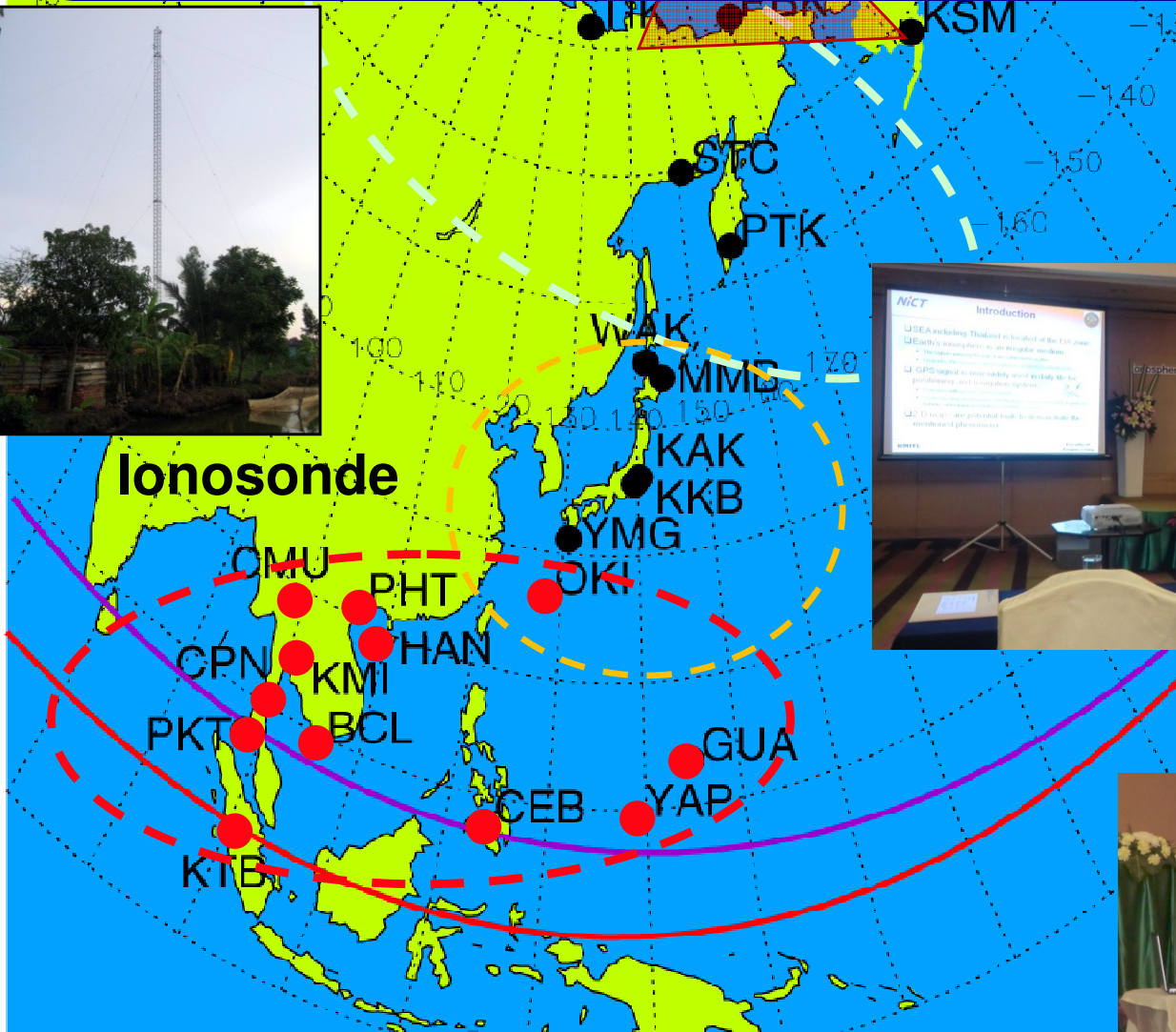
PI: Prof. K. Shiokawa
STEL, Nagoya Univ.

Imaging of ITD by OMTIs



1.5 South-East Asia low latitude Ionosonde Network (SEALION) PI: Dr. T. Nagatsuma

SEALION Symp. on Jan. 27-28, 2011 in Thailand



Tutorial Lecture by Distinguished Researchers



Audience from South-East Asia Countries



NiCT invited one trainee from KMITL, Thailand. (period: 2010/11-2011/02)

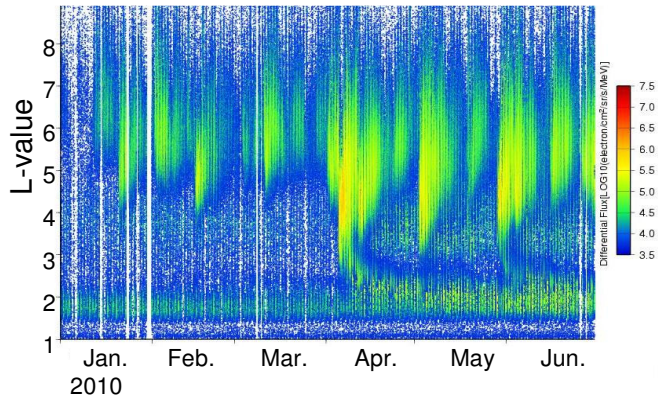
2. Data Coordination in Japan

Database Item	Agency/University	CoP (Contact Person)
Solar Wind Data	Solar Terrestrial Environment Laboratory, Nagoya University (STEL)	Prof. Munetoshi Tokumaru
Space Environment Data (Satellite Measurements)	Japan Aerospace Exploration Agency (JAXA)	Dr. Takahiro Obara
Geomagnetic Field Data	WDC for Geomagnetism, Kyoto University	Prof. Toshihiko Iyemori
Space Weather Data	National Institute of Information and Communications Technology (NiCT)	Dr. Shinichi Watari
CHAIN, GMDN, MAGDAS, OMTIs, SEALION Data	Kyoto U., Shinshu U., SERC, STEL, NiCT	S. Ueno, K. Munakata, K. Yumoto, K. Shiokawa, T. Nagatsuma

To create awareness of ISWI in Japan, the STPP sub-committee organized a “ISWI-Japan Kick-Off Meeting” at Kyushu University in March of 2010, and the “ISWI-Japan International Symposium” at Makuhari in May of 2010 with the help of the Japan Geophysical Union (JpGU). This symposium will be held every year in Japan during ISWI (2010 through 2012).

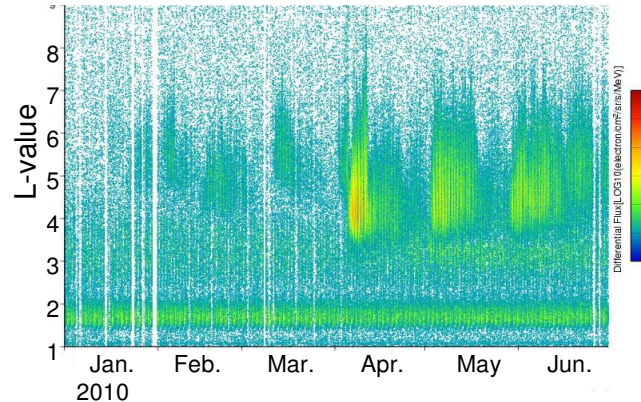
2.1 Example of Satellite Data provided by JAXA

GOSAT 0.3MeV Elect. Flux



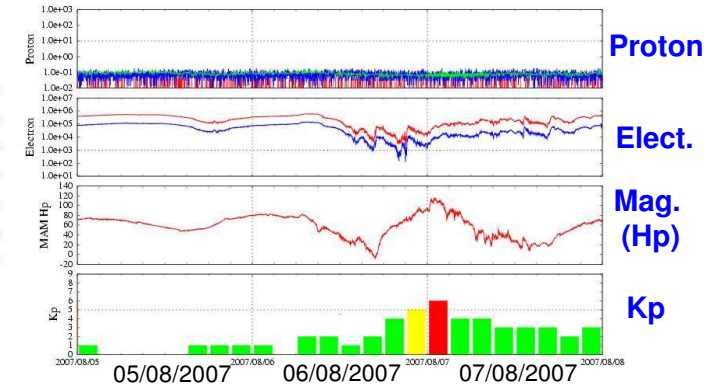
L-t diagram for Energetic Electron (0.271-0.33MeV) by Ibuki satellite

GOSAT 1.0MeV Elect. Flux



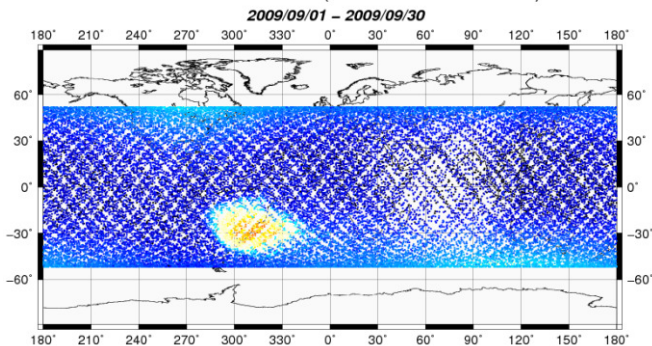
L-t diagram for Energetic Electron (0.91-1.06MeV) by Ibuki satellite

GEO Satellite



Energetic particle and magnetic field observations over Japan at GEO altitude

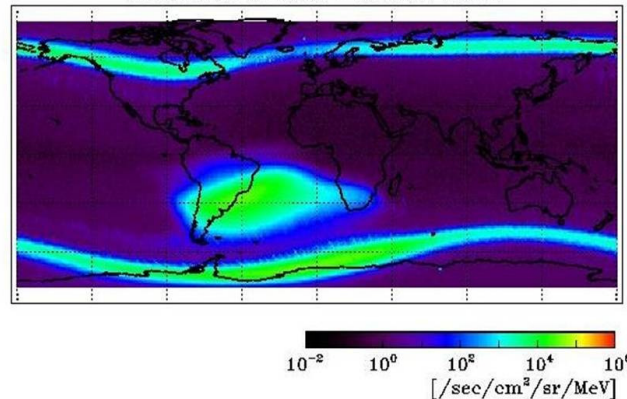
SEDA-AP/SDOM Flux (Electron: 0.93-1.85 MeV)



At 400km altitude

Map of Energetic Electron (0.93-1.85MeV) by ISS/JEM (kibo) SEDA-AP. South Atlantic anomaly region can be clearly observed.

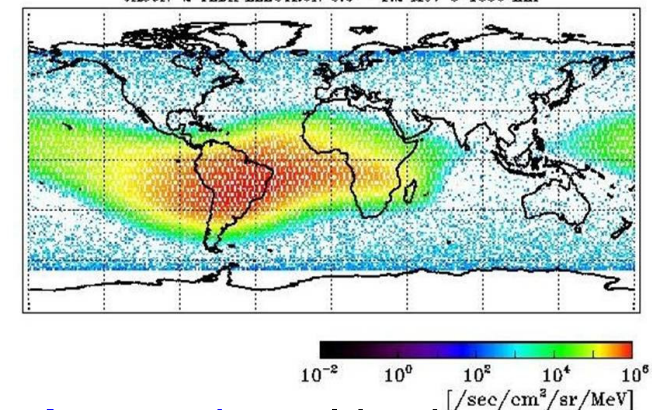
ALOS TEDA ELECTRON 0.6 - 1.2 MeV @ 700 km



At 700km altitude

Map of Energetic Electron (0.6-1.2MeV) by Daichi satellite.

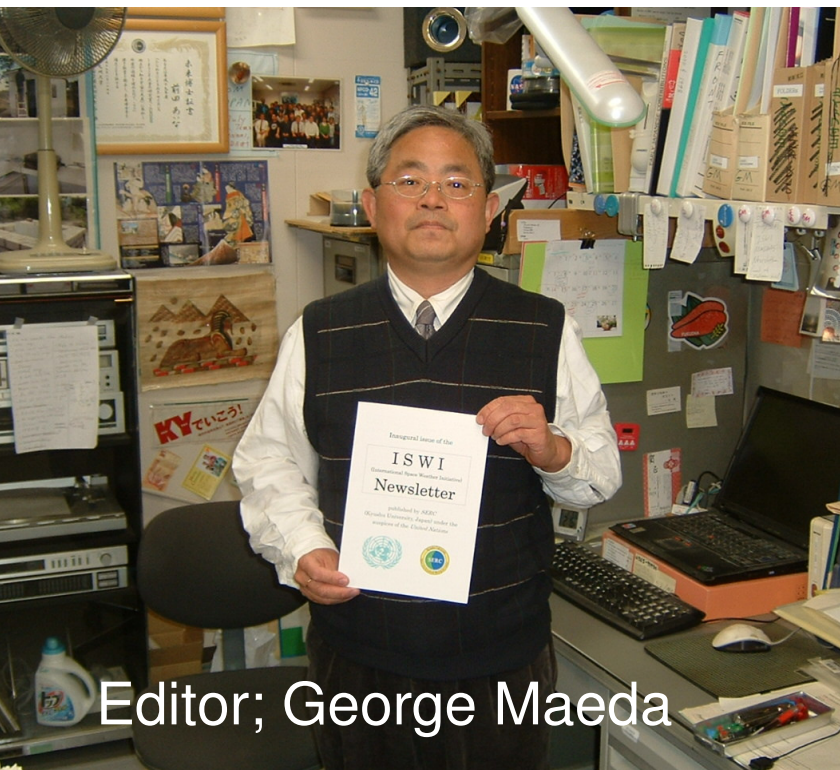
JASON-2 TEDA ELECTRON 0.6 - 1.2 MeV @ 1336 km



At 1336km altitude

Map of Energetic Electron (0.6-1.2MeV) by Jason-2 satellite.

3.1 ISWI Newsletter



Editor; George Maeda

Newsletter Archive Last modified 01/31/2011 20:40:30



About ISWI Newsletter:

It is scheduled to be published throughout the ISWI period, 2010 through 2012, by SERC (Space Environment Research Center) of Kyushu University, Japan. The publisher is Professor K. Yumoto (also Director of SERC) and the editor is George Maeda, who is a member of his SERC staff. This newsletter was requested by Prof. Hans Haubold (United Nations Program on Space Applications) -- (click [here](#)). His letter is a beautifully concise statement about the mission of ISWI - where it came from and where it is to go.

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ISWI
(International Space Weather Initiative)
Newsletter

published by *SERC*
(Kyushu University, Japan) under the
auspices of the *United Nations*



Four issues of the Newsletter were published in 2009. [See the list](#)

One hundred and nine issues of the Newsletter were published in 2010 [See the list](#)

2011	Subject	files	PDF
Vol. 3 No.1	"Geographical distribution of CALLISTO"	Yes(1)	

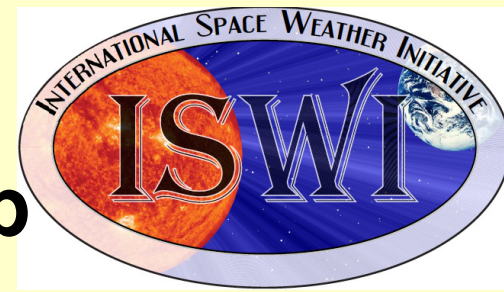
At the request of UNOOSA, the Space Environment Research Center (SERC) at Kyushu Univ. (Japan) became the publisher for the ISWI Newsletter. The main mission of the newsletter is to deliver timely news and information to all participants of ISWI. Already, 129 issues of the newsletter have been distributed via email. All issues are archived at the ISWI website (www.iswi-secretariat.org) so that a formal record is kept of this publication.



3.2 MAGDAS Session

ISWI UN/NASA/JAXA Workshop

Helwan Univ., Egypt, Nov.8-9, 2010



1. Instrument related; 16 talks (SERC, Nigeria, Zambia, Mozambique, Tanzania, Ethiopia, Kenya, Sudan, India, Peru, Australia, Philippines, Brazil),
2. Data related; 3 talks (SERC, Indonesia, Malaysia, Australia),
3. Science related; 11 talks (SERC, Nigeria, Ethiopia, Italy, Australia, Philippines, Nigeria, Cote d'Ivoire, Brazil, Egypt), EEJ, Sq, DP2, Pc 3-4, Pi 2, EQ-related, Space Weather, etc.



3.2.1 Objectives of MAGDAS Session

In order to realize “Equal Partnership” between “instrument provider” and “instrument hosts,” which is the guiding principle of IHY/ISWI, and to make MAGDAS Project collaborations long-term and self-sustaining,

MAGDAS members should exchange information and opinions frankly between members, and initiate discussions about how to accelerate *Capacity Building*.

3.2.2 Proposed Capacity Building

1) Instrument Capacity

- Noise testing, Calibration, Installation, and Maintenance of MAGDAS system

2) Data Analysis Capacity

- Data correction, Making databases, and Learning research tools

3) Science Capacity

- Data analysis, Presentation in Meetings, and Publications

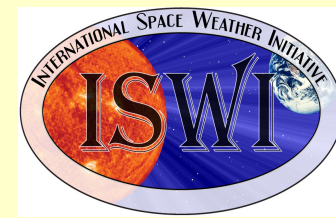
RM-1: MAGDAS/ISWI School and Workshop

RM-2: Short-term and long-term exchanges of students and young staff

RM-3: Supervising and co-supervising students



RM-1: MAGDAS/ISWI School



on

Litho-Space Weather with MAGDAS Data

Venue: Redeemer's University, Mowe, Lagos, Nigeria.

Date: Summer (August), 2011

The Space Environment Research Centre (SERC) of Kyushu University is holding a training workshop titled “MAGDAS/ISWI School on Litho-Space Weather with MAGDAS Data” in Nigeria, Africa during summer of 2011. The Workshop is aimed at training personnel how to handle MAGDAS data and systems. It is envisioned to be a one-week intensive training school. Participants shall be drawn from Japan, Indonesia, Philippines, several African and other countries. Participants shall be mainly persons hosting or working with MAGDAS facilities/data.

Features

Personnel training and development

MAGDAS operation and maintenance

Data coordination

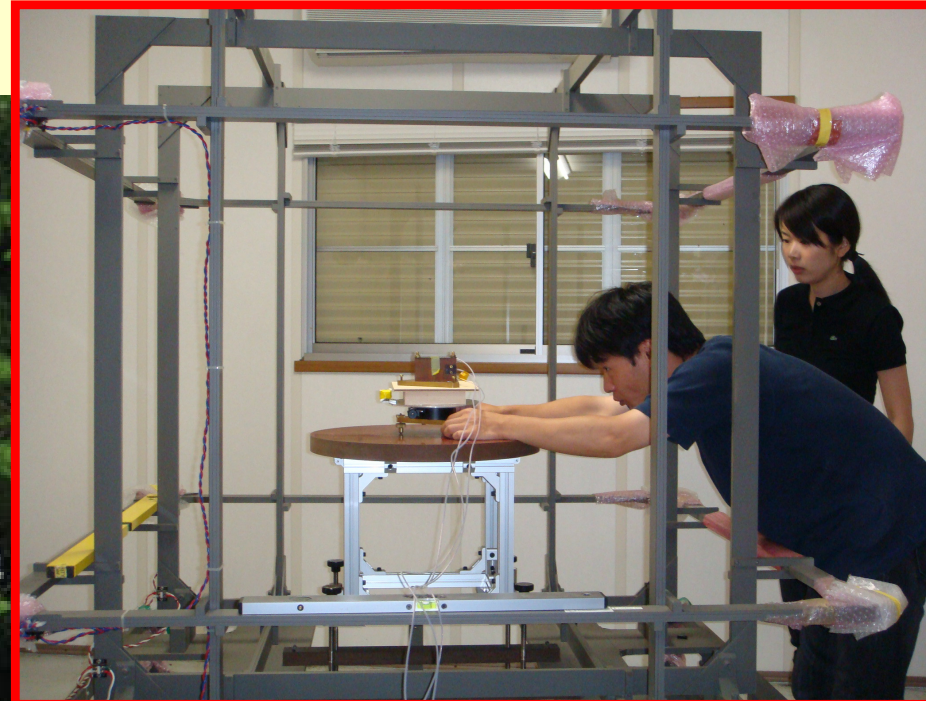
Special topics: Principles of geomagnetism, Space weather, Equatorial ionosphere, lithospheric dynamics

Sponsorships

A travel grant is expected from SERC, Kyushu Univ., and NASA/UN.

Nigeria shall endeavor to take care of local support, including room and board.

RM-2: Noise Testing & Calibration of Magnetometer

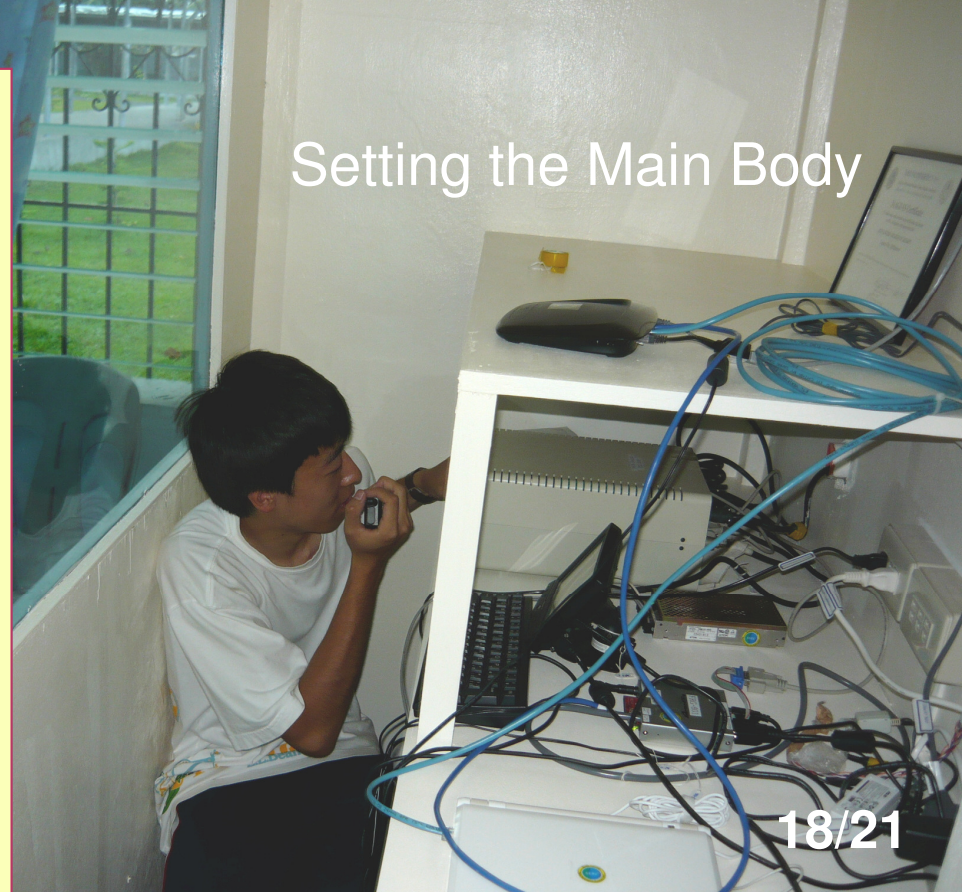


Calibration of
Magnetometer

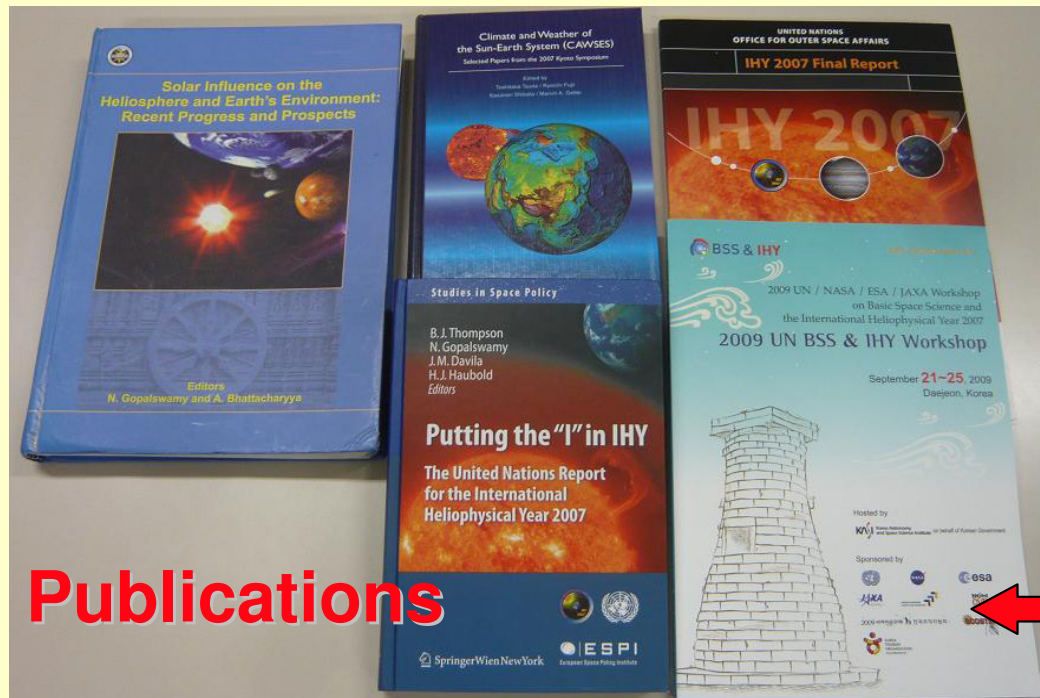
RM-2: Installation in the Philippines



RM-2: Learning Research Tools



RM-3: Supervising Students to Carry out Data Analysis, Presentation & Publication



3.2.3 Conclusion of MAGDAS Session

The final goal of the MAGDAS project is to make our collaborations long-term and self-sustaining on a truly global scale.

To achieve this, we must follow this roadmap:

- (1) Exchange information and opinions frankly about how we can accelerate Capacity Building.**
- (2) Organize MAGDAS/ISWI Schools to train young people on how to maintain instruments and how to use the data generated,**
- (3) Encourage short-term and long-term exchanges of students and young staff,**
- (4) Supervise or co-supervise Ms and PhD students of MAGDAS hosts.**

4. Summary of Japan's ISWI in 2010

1. *Instrument Array Program*

1.1 CHAIN Network

1.2 GMDN Network

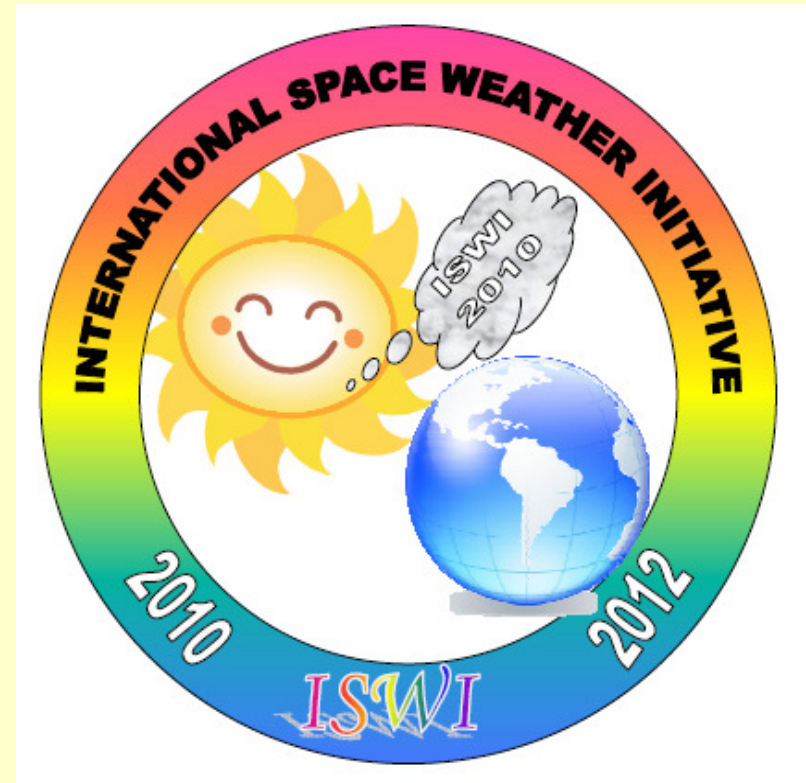
1.3 MAGDAS Network

1.4 OMTIs Network

1.5 SEALION Network

2. *Data Coordination* and Analysis

3. Training, Education (i.e. *Capacity Building*) and Public Outreach (including *ISWI Newsletter*)



Thank you for your attention !!

<http://www.iswi-secretariat.org/>

http://www.stil.bas.bg/ISWI/index_letter.html