

Establishing the IHY/ISWI Asia-Pacific Program 1/21

Akimasa and Yoshikawa¹⁾ and STPP Sub-Committee²⁾

1) ICSWSE, Kyushu Univ., 2) Science Council of Japan

International Space Weather Initiative (ISWI; 2010-2012)

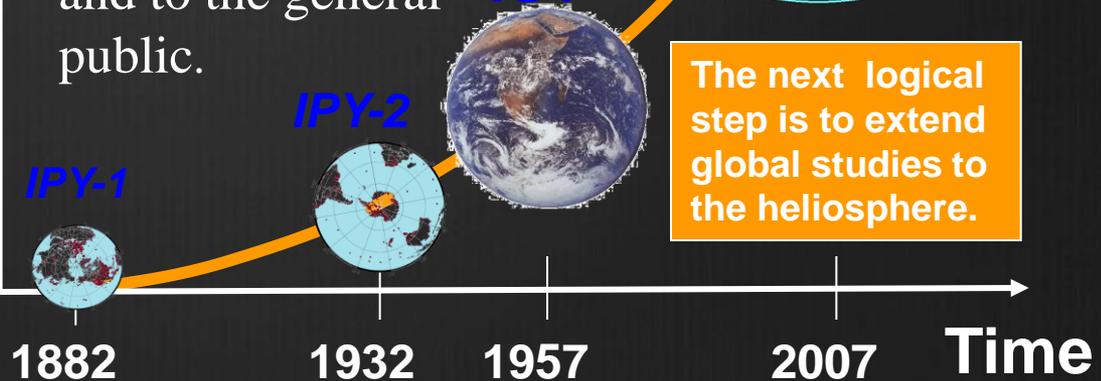


Goals of ISWI

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)

Size of System Studies

The objectives of ISWI are to develop the scientific insight necessary to understand the solar-terrestrial physical relationships inherent in space weather, to reconstruct and forecast near-Earth space weather, and to communicate this knowledge to scientists and to the general public.



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 , Prof. Yoshikawa (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

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

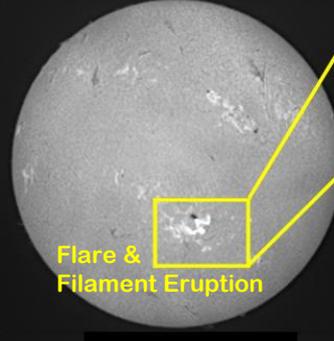
To monitor all solar explosive phenomena continuously, because they are important sources of perturbations in solar-terrestrial environment. 3D velocity field on the solar surface can be measured by the FMT.

*Flare Monitoring Telescope (FMT)



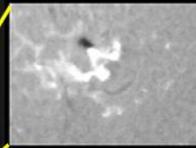
Map of CHAIN

H α Line Center Full-disk Mode



Flare & Filament Eruption

H α Line Center



H α -0.8 Å

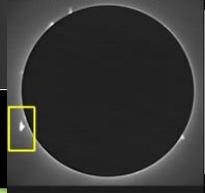


H α +0.8 Å

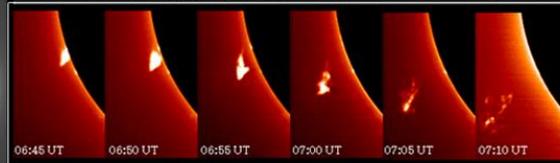


Continuum Light

Prominence Mode



Time Variation of the Prominence Eruption



The 1st overseas FMT is installed at Ica Univ. in PERU

National Ica University

Latitude : -15°
 Altitude : 400 m
 Rain : 0 mm/year
 Temperature : 10 - 27 °C
 Avrg. Humidity: 20 %

Ica, Peru

LIMA

ICA



Chechar Algeria
 Alt. : ~2000m



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



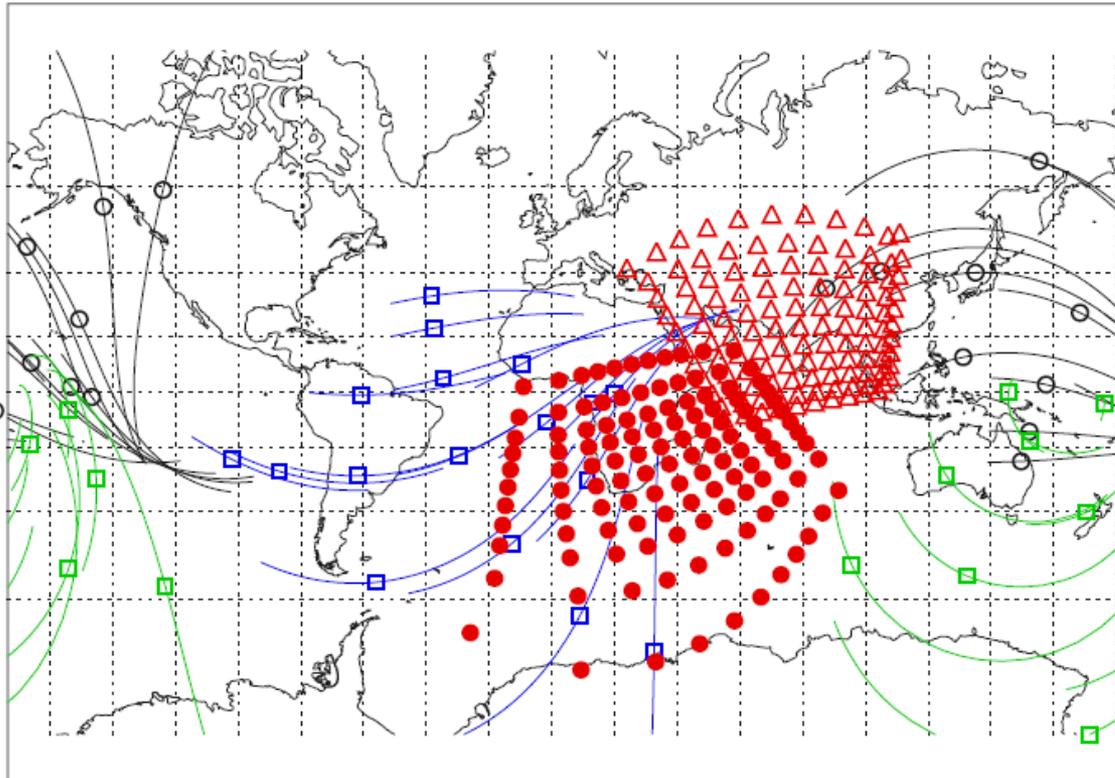
Final tests of candidate sites for New Observatory are performed in Aures area, Algeria.



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

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

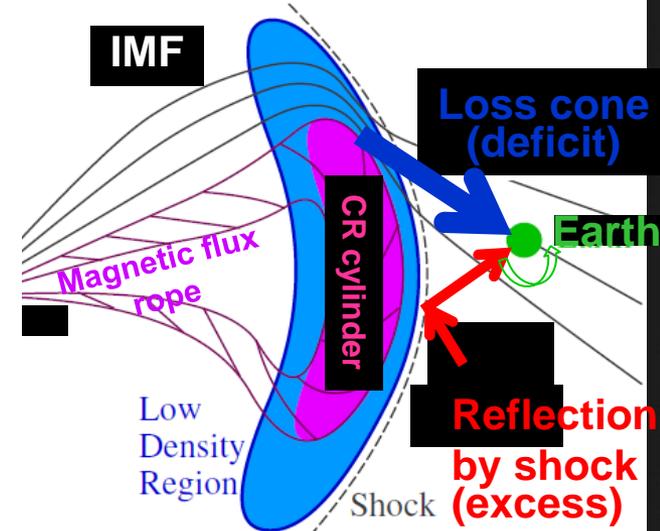
1.2 Global Muon Detector Network (GMDN)



○ Nagoya □ São Martinho □ Hobart △ Kuwait University ● Hermanus

PI; Prof. K. Munakata
Shinshu Univ.

Cosmic Ray Precursors of CME
Arrival at Earth



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

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

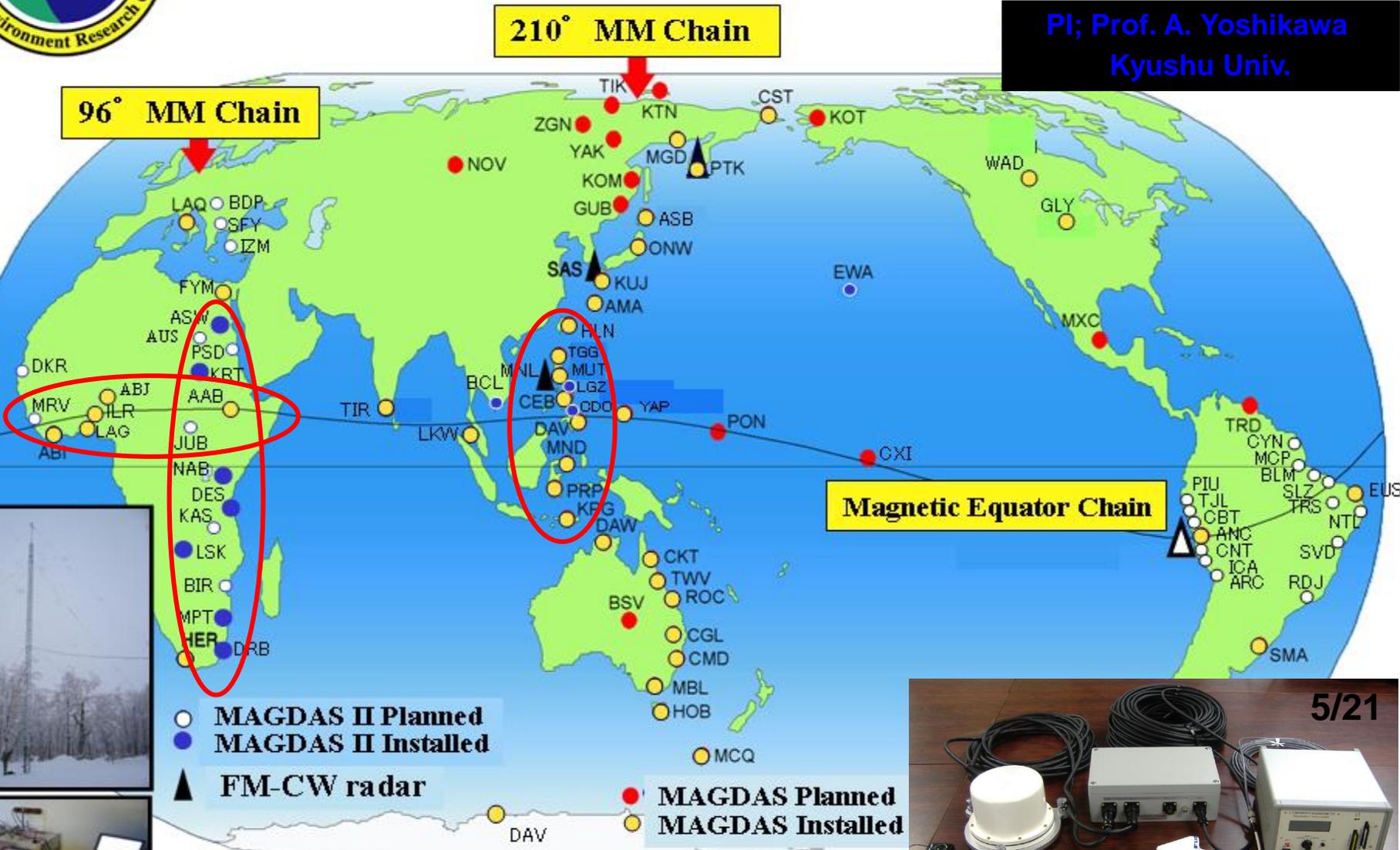
They are planning the following for improving sky-coverage with the GMDN:

- 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)



1.3. MAGDAS (Magnetic Data Acquisition System)

PI; Prof. A. Yoshikawa
Kyushu Univ.



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

5/21

1.3-1 MAGDAS Regional Center in the Philippines



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



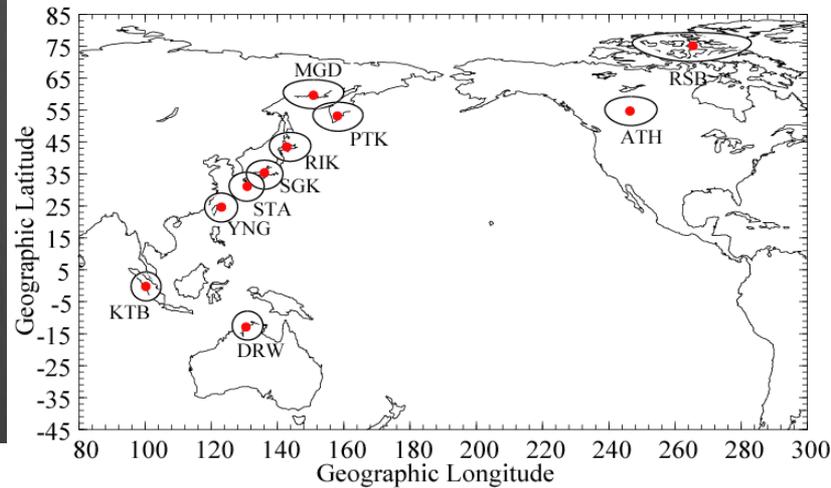
● : MAGDAS Installed in 1990'

● : MAGDAS installed in 2010

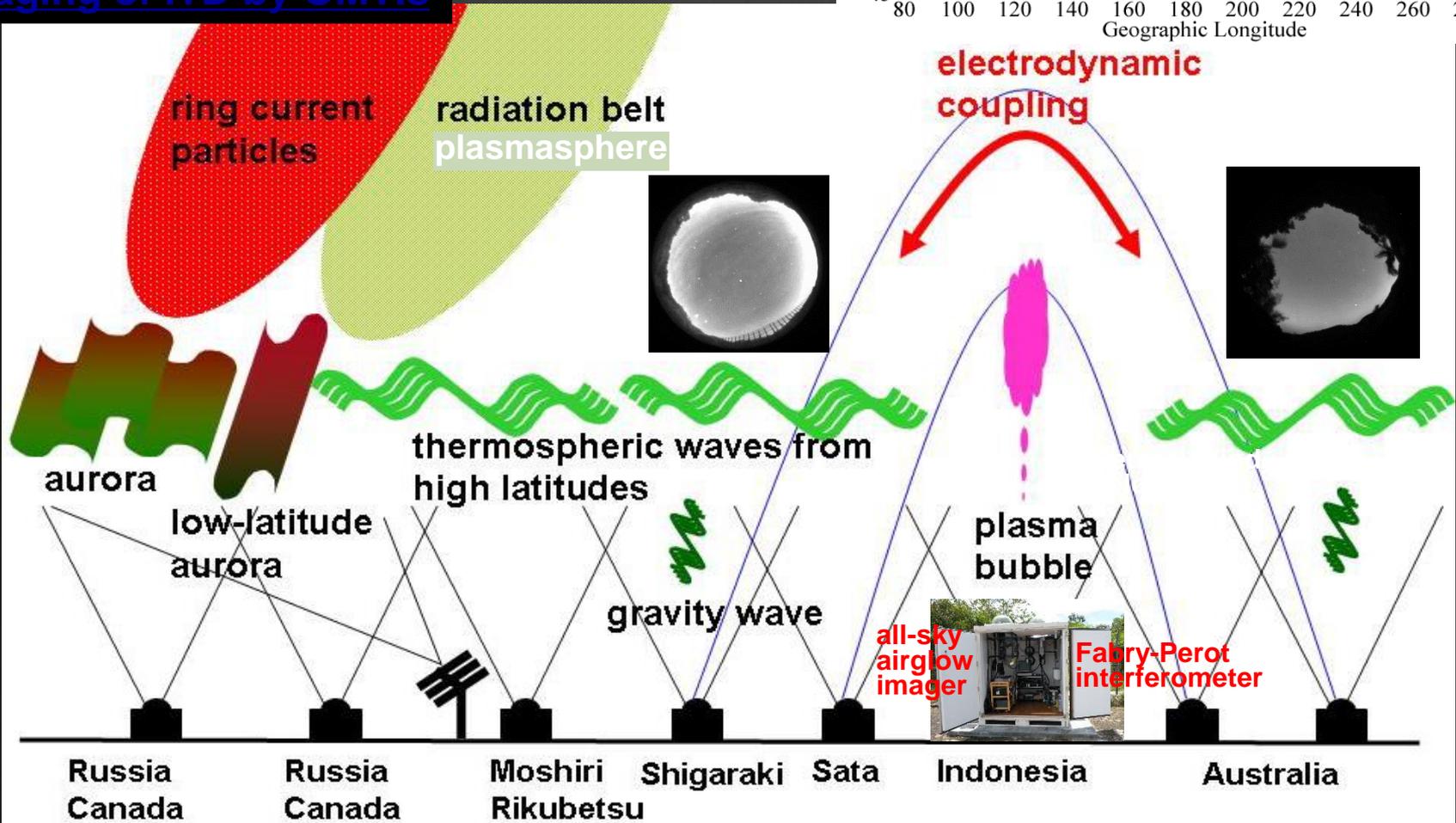
http://www.filipinolanguemelbourne.org.au/philippines_map.html

1.4 Optical Mesosphere Thermosphere Imagers (OMTIs)

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

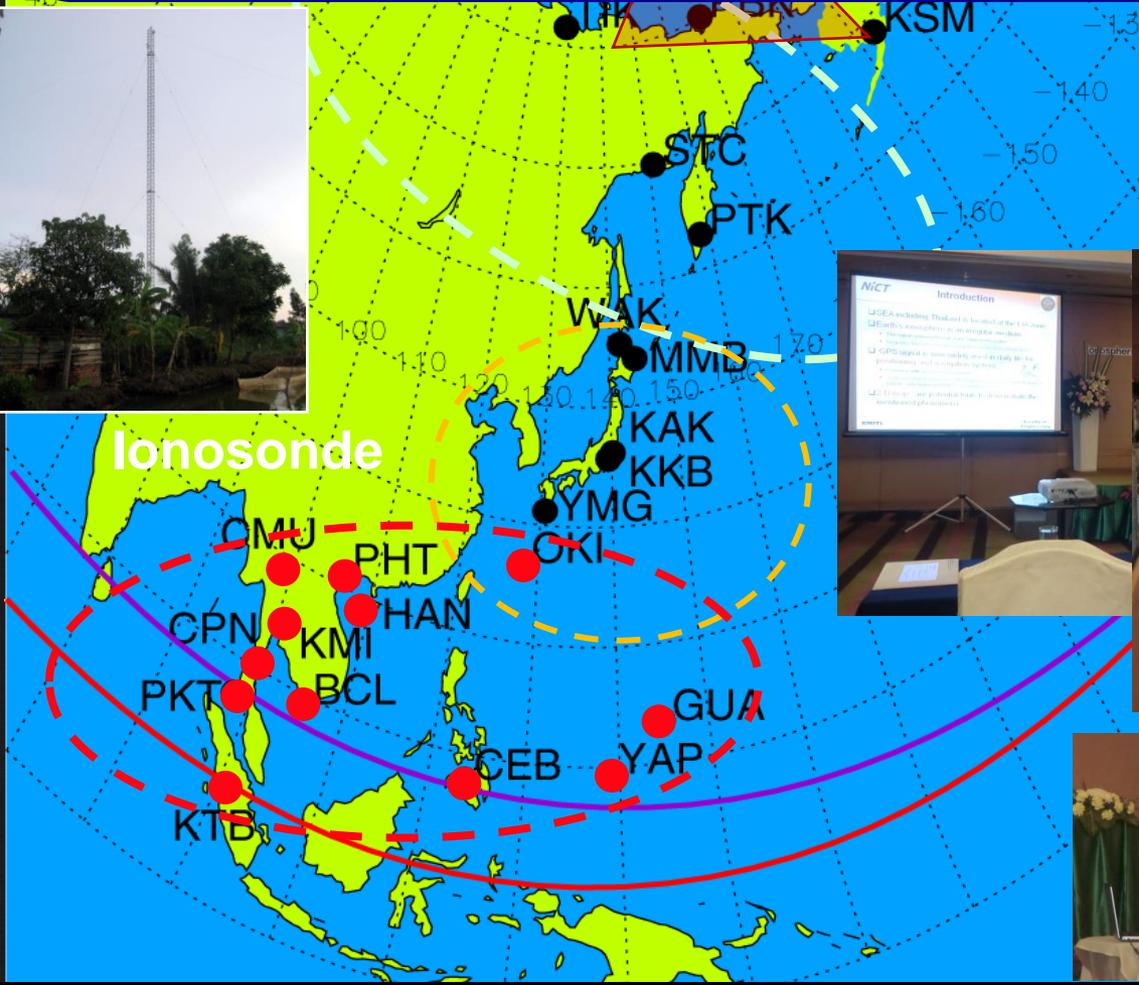


Imaging of ITD by OMTIs



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

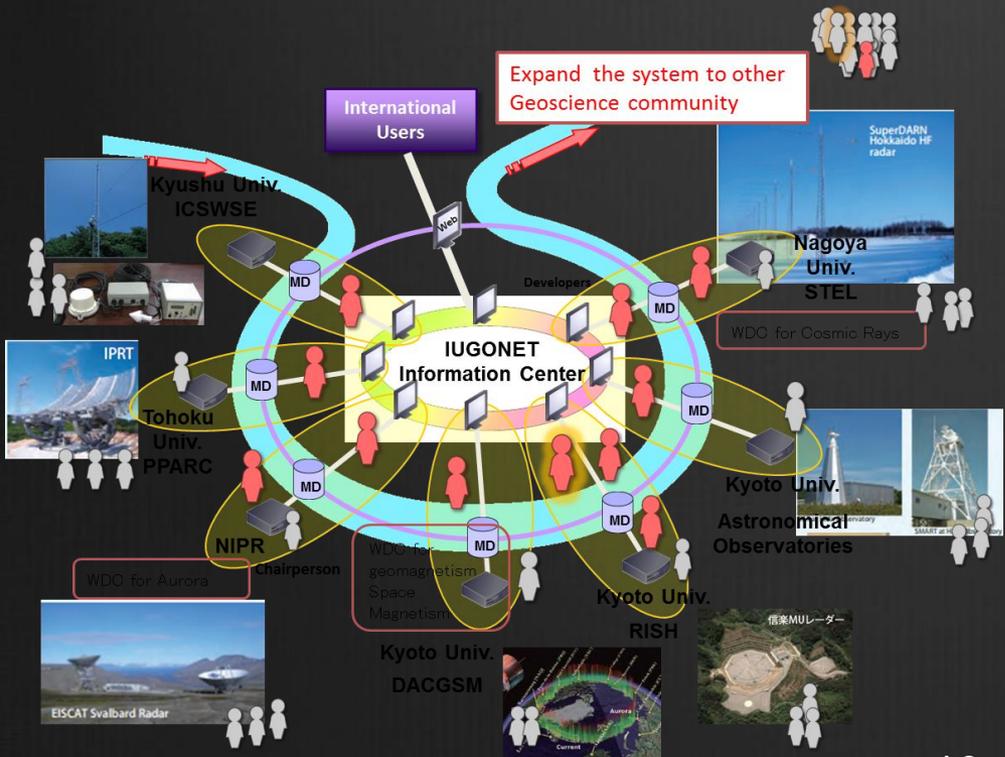
Database Item	Agency/University	CoP (Contact Person)
Solar Wind Data	Solar Terrestrial Environment Laboratory, Nagoya University (STEL)	Prof. Munetoshi Tokumaru
Space Environment Data (Satellite Measurements)	Japan Aerospace Exploration Agency (JAXA)	Dr. Takahiro Obara
Geomagnetic Field Data	WDC for 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 were held every year in Japan during ISWI (2010 through 2012).

About IUGONET

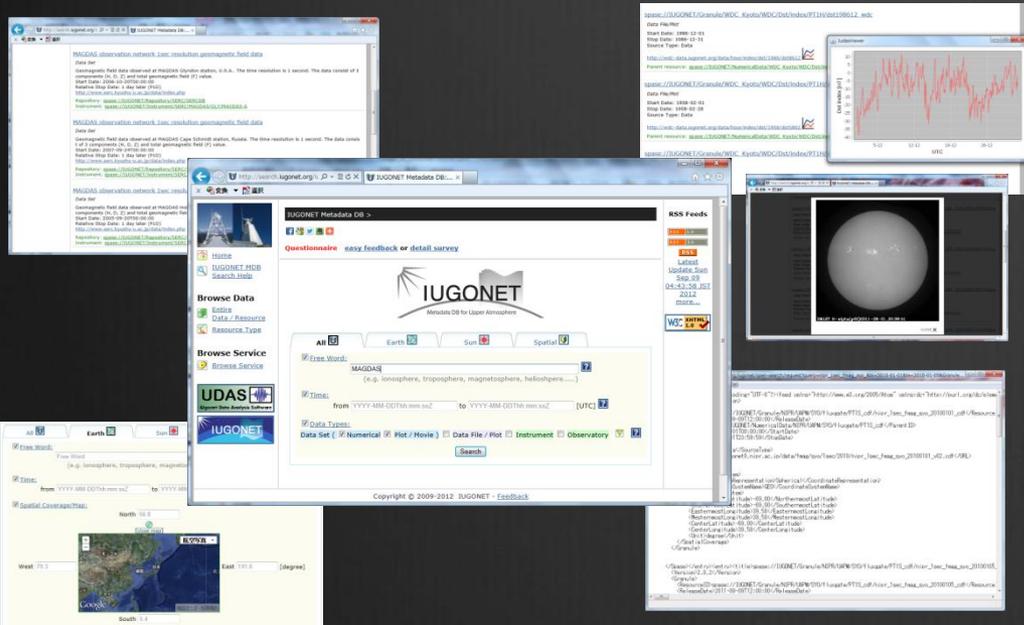
<http://www.iugonet.org/en/>

Inter-university
Upper atmosphere
Global **O**bservation
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**

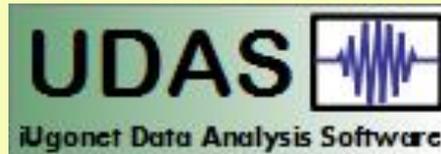
For data retrieval



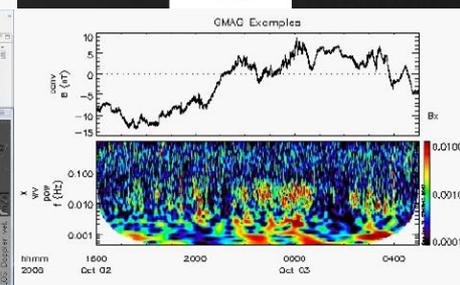
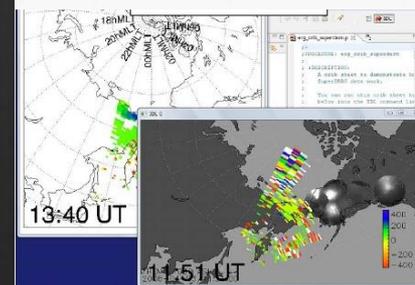
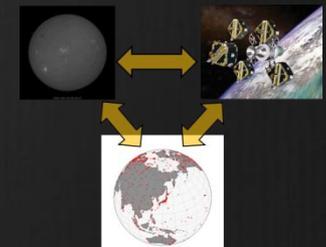
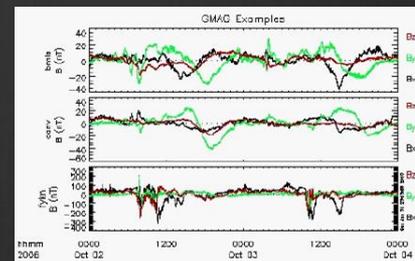
<http://search.iugonet.org/iugonet/>

**IUGONET
Data Analysis
Software**

For data analysis



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



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*

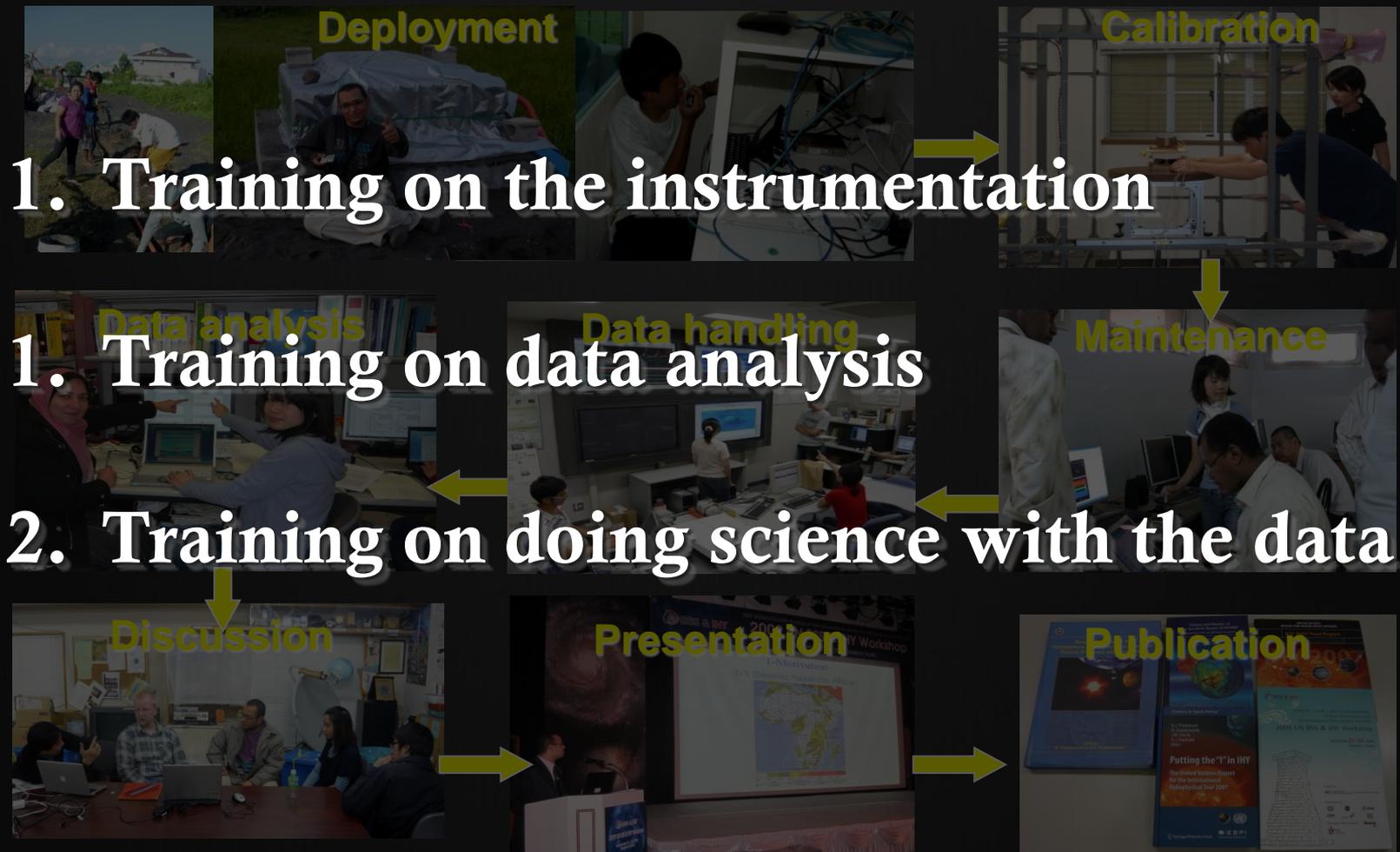
Four issues of the Newsletter were published in 2009. [See the list](#)

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

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

At the request of UNOOSA, the International Center for Space Weather Science and Education (ICSWSE) 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, 400 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.

Capacity building





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 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.

ISWI/MAGDAS School



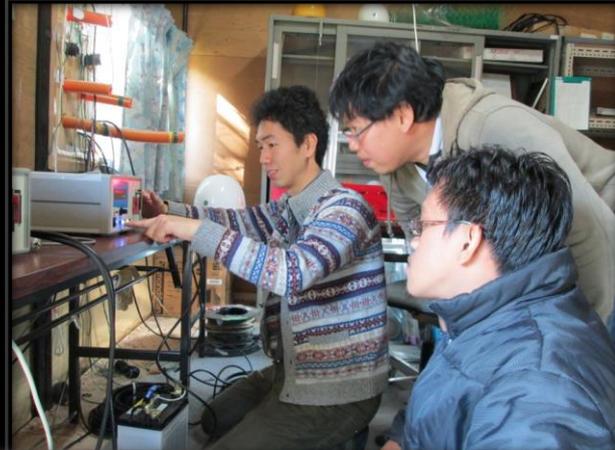
2011	Nigeria
2012.	Indonesia
2013	Côte d'Ivoire
2014	Indonésie, Malaysia, (Local MAGDAS WS)
2015	Japan (UN/Japan ISWI WS)
2016	Nigeria (Joint WS)
2017	Malaysia (Local MAGDAS WS)

JSPS Adopted Projects Type: B. Asia-Africa Science Platforms (Apr. 2012 - Mar. 2015)
Program Title: Formation of Preliminary Center for Capacity Building for Space Weather Research

Capacity Building at ICSWSE



Pre-installation of magnetometer



Installation of magnetometer



Monitor magnetometer data



Use magnetic data to do research

Capacity Building at ICSWSE

Philippines, Malaysia, Indonesia, Vietnam and Peru

1st Batch -2012/11



3rd Batch -2013/08



2nd Batch-2013/01



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



Ph.D at ICSWSE (2012–2016)

Dr. Grace Rolusta (Philippine)

Dr. Emad Takla (Egypt)

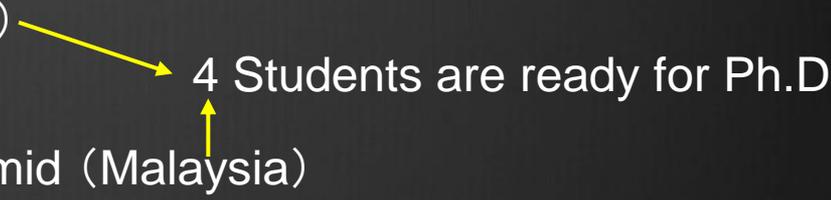
Dr. Mohamad Huzaimy (Malaysia)

Dr. Magdi Yousif (Sudan)

Dr. Nurul Shazana binti Abdul Hamid (Malaysia)

Dr. Shun Imajo (Japan)

4 Students are ready for Ph.D



Foreign Associate of Professor at ICSWSE, Kyushu Univ for MAGDAS project (2016–2018)

Prof. Dr. Moiseev Alexey (Russia)

Prof. Dr. Quirin Jr. Sugon (Philippine)

Prof. Dr. Heikki Vanhamaki (Finland)

4. Summary of Japan's ISWI

1. *Instrument Array Program*

1.1 CHAIN Network

1.2 GMDN Network

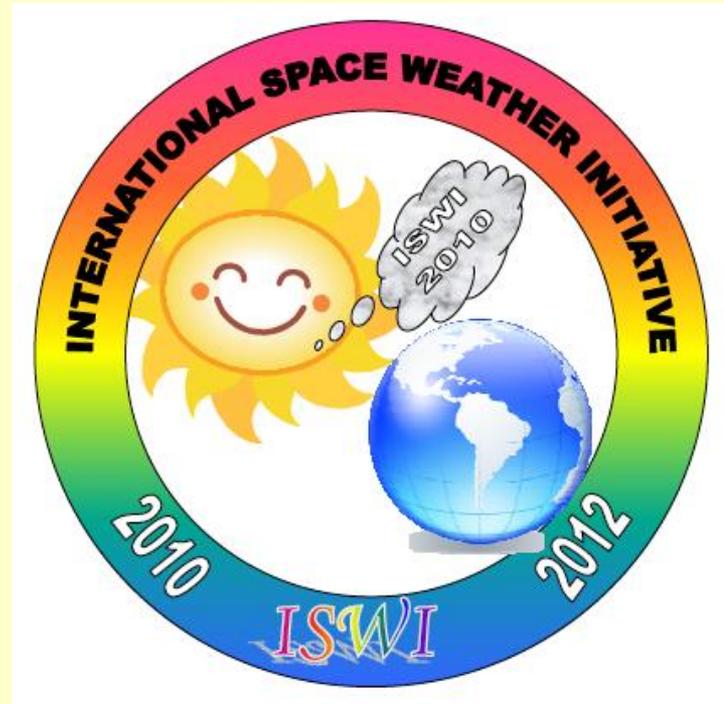
1.3 MAGDAS Network

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*)



Thank you for your attention !!

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

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