

2012 ISWI & MAGDS School on Space Science

17-26, September, 2012, Indonesia



JSPS Core – to – Core Program

B. Asia-Africa Science Platform

「 Formation of Preliminary Center for Capacity Building
for Space Weather Research 」

JSPS研究拠点形成事業 (B. アジア・アフリカ学術基盤形成)
Core-to-Core Program

国際宇宙天気キャパシティ・ビルディング
(能力強化) 拠点の形成



Coordinator K. Yumoto and A. Yoshikawa,
ICSWSE, Kyushu University

ISWI/MAGDAS School

in Côte d'Ivoire
in Japan

to be held at

2013
2014

Opening of "International Center for Space Weather Science and Education (ICSWSE) of Kyushu University "



K. Yumoto and A. Yoshikawa

Kyushu University International Space Weather Science
and Education

2012~: ICSWSE : “iku-sei” : 育成



UNITED NATIONS
Office for Outer Space Affairs

Space Environment Research Center (SERC),
Kyushu University: Established 2002.04

Roles of SERC

Creation of interdisciplinary geospace
environment science

Basic research of space weather forecast
and space debris warning

Space Environment Research Center (SERC), Kyushu University

Laboratories in the Opening

Geospace Environment
Observation Lab.

Integrated Data
Analysis Lab.

Geospace
Experimental
Simulation Lab.

Geospace Hazard
Simulation Lab.

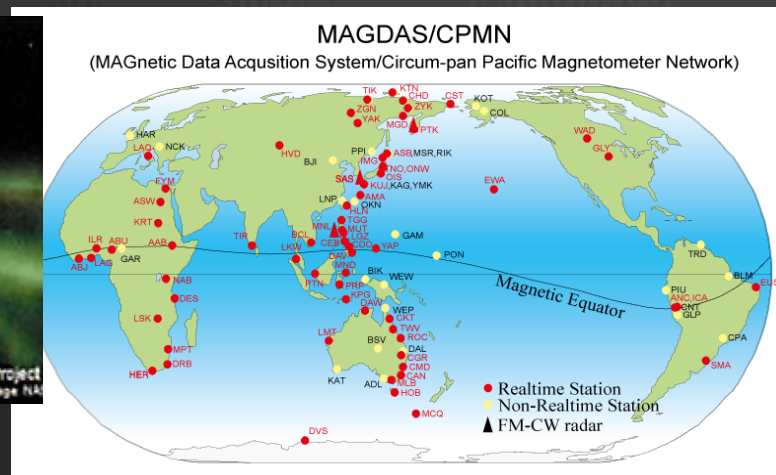


宙空環境観測部門
Geospace Environment
Observation Lab.

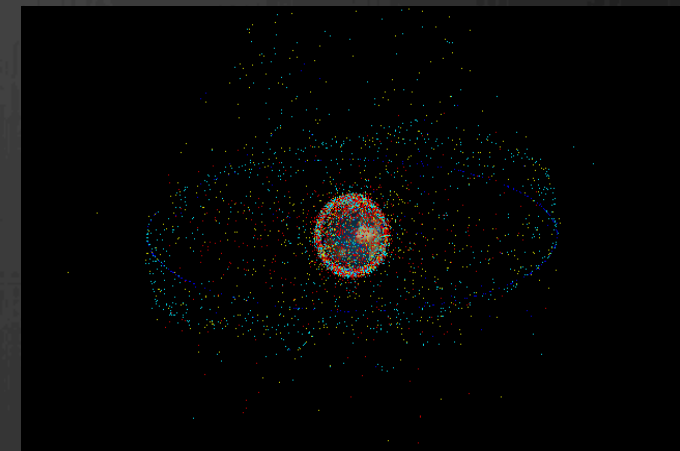
- MAGDAS/CPMNによる宇宙地球電磁気学
- 電離層変動電場の観測的研究
- 宇宙デブリ環境推移モデルの研究
- 磁化プラズマ観測衛星QSAT
- Observation of the EM field of space and the earth via the MAGDAS/CPMN network
- Fluctuating electric field in the ionosphere
- Modeling of space debris environment change
- QSAT, the polar plasma observation satellite



QSAT



MAGDAS/CPMN



Debris

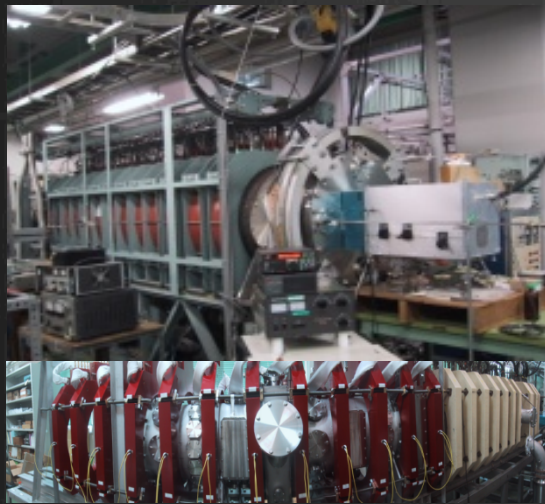
宙空環境模擬実験部門
Geospace Experimental
Simulation Lab.

- ・ 超高密度プラズマ計測法の導入
- ・ 精度保証付計算法の開発と大規模計算
- ・ 多次元数理解析法によるアプローチ
- ・ Super high density plasma measurement
- ・ Rigorous computation/ large scale simulation
- ・ Multi-dimensional mathematical analysis

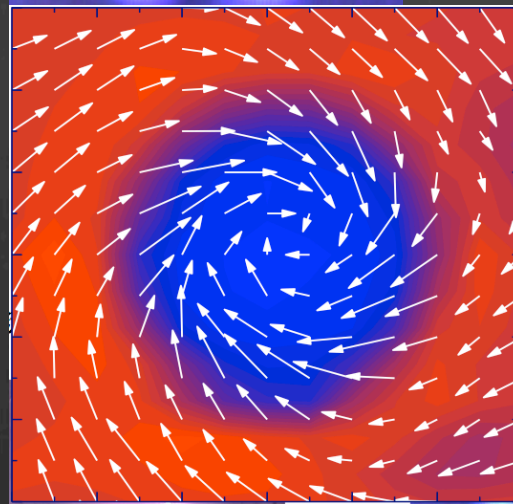
三極渦



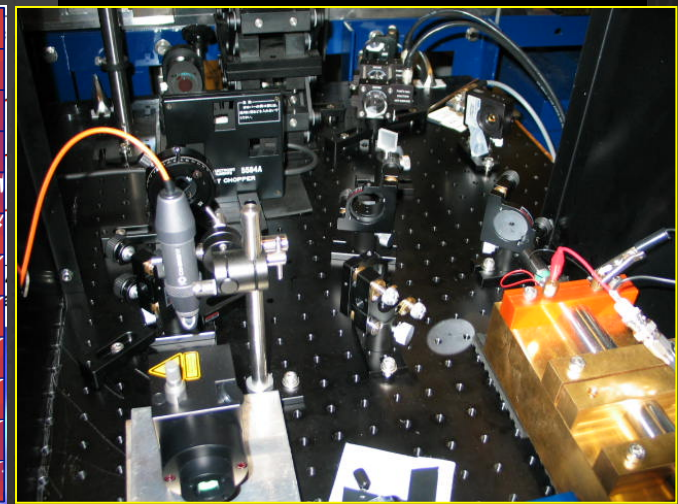
高密度プラズマ発生装置 (HYPER-I)



ヘリコンプラズマ発生装置



流れ場の可視化



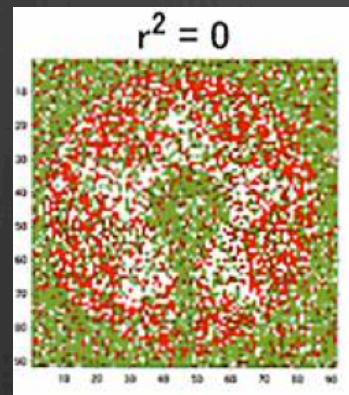
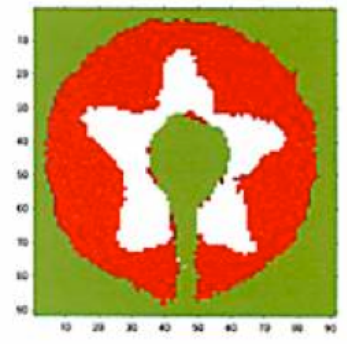
半導体レーザー誘起蛍光分光装置

総合理論解析部門
Integrated Data Analysis Lab.

- ・ 統計的学習理論に基づく太陽面や地表の様々な画像のデータ解析
- ・ 太陽風プラズマ中のMHD乱流の非線形発展
- ・ 突発現象の前兆検出アルゴリズム
- ・ Application of statistical learning theory for analyzing solar and the earth surface images.
- ・ Evolution of MHD turbulence in the solar wind
- ・ Precursor detection of abrupt phenomena

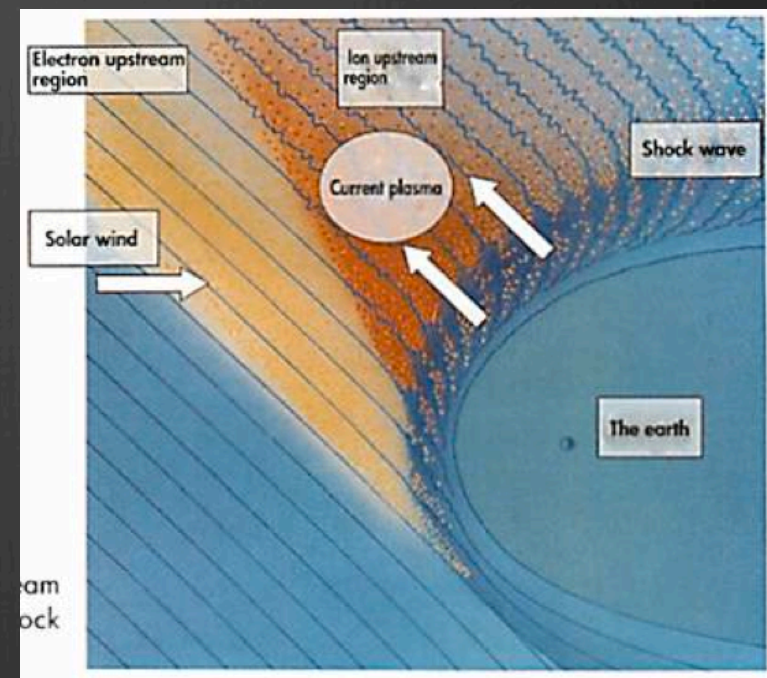


$r^2 = 17$



$r^2 = 0$

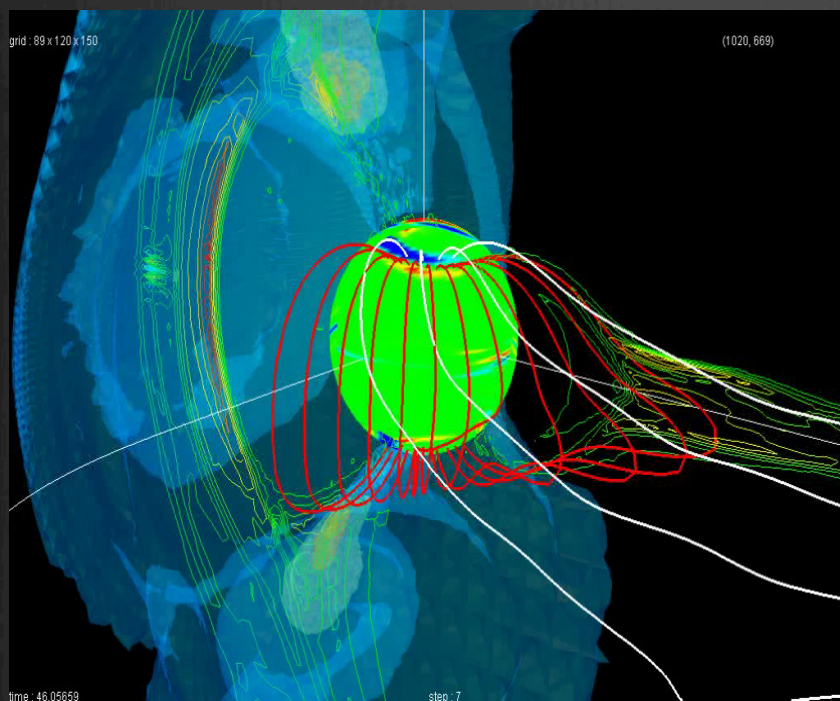
Pixel
discrimination
methodology



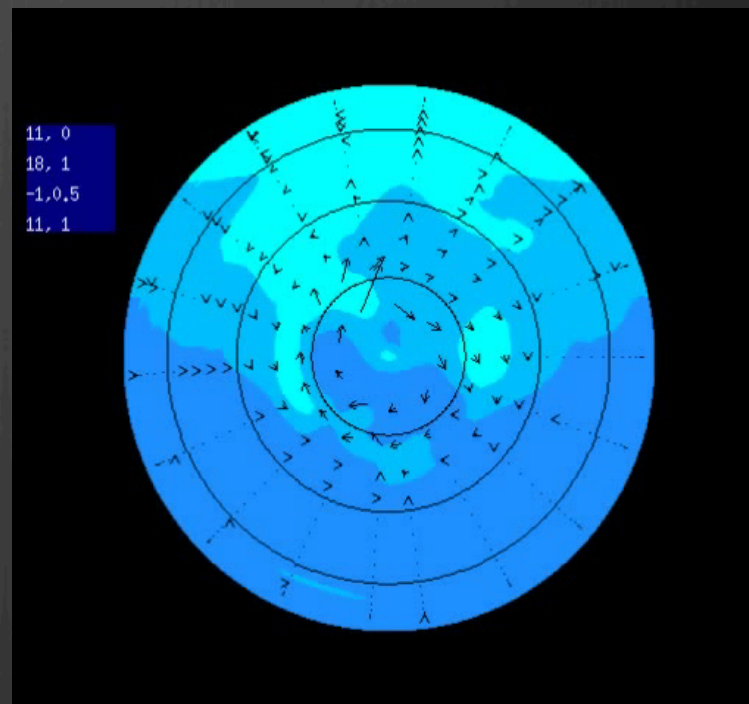
The earth's foreshock region

宇宙災害予測部門
Geospace Hazard Simulation
Lab.

- 太陽地球系シミュレーション
- 惑星大気シミュレーション
- 低緯度領域の宇宙天気予報モデル
- グローバル粒子シミュレーション
- Simulation of the solar-terrestrial system
- Simulation of planetary atmosphere
- Space weather forecast in low-latitude regions
- Global simulation of energetic particles

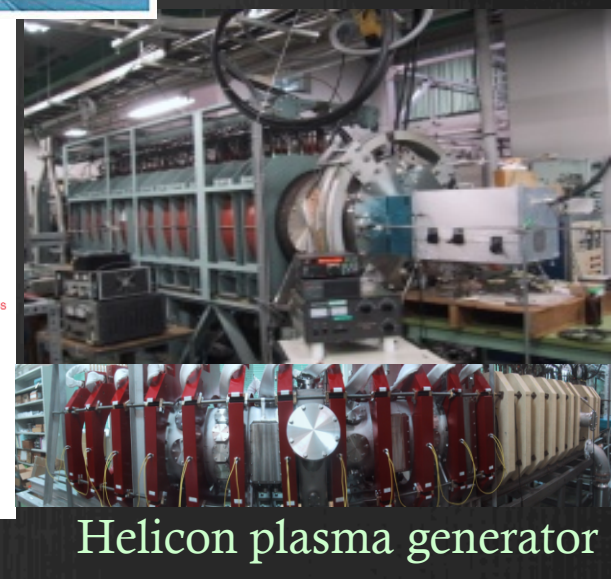
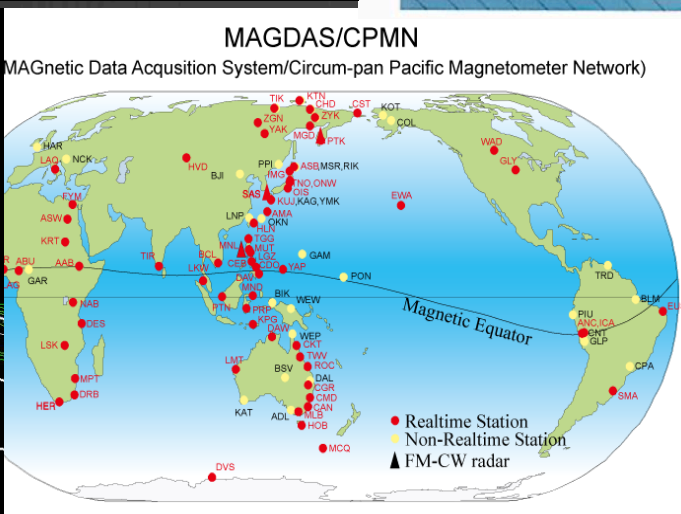
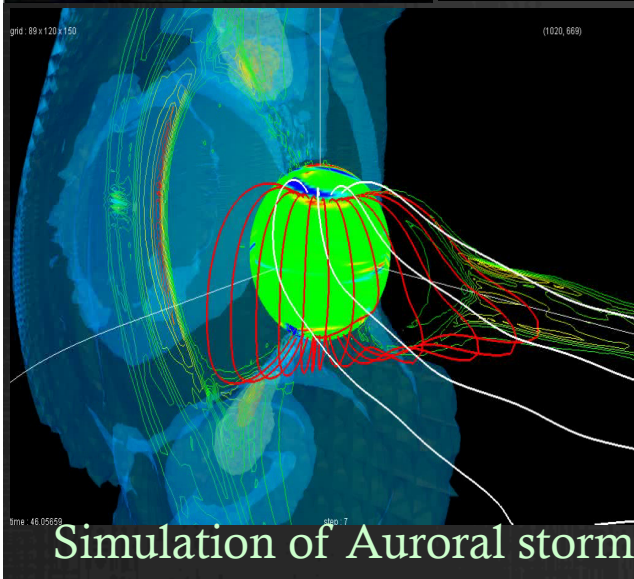
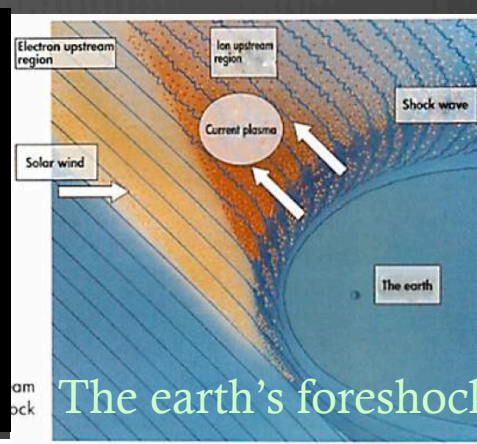
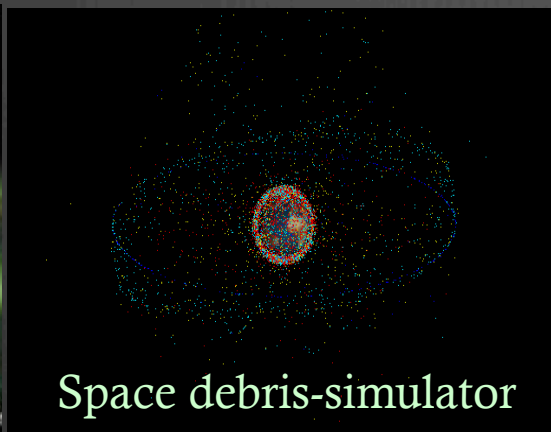
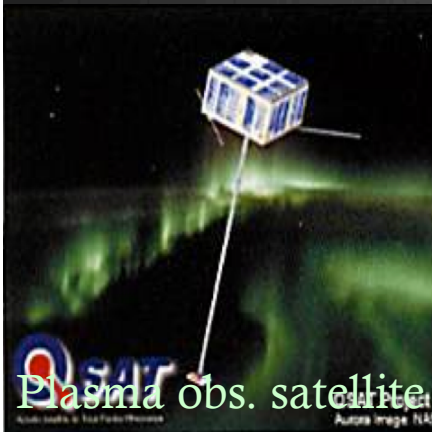


オーロラ嵐のシミュレーション
静止軌道での磁場変動（赤い磁力線）を再現。



湾型磁場変動を作る西向き電流を再現

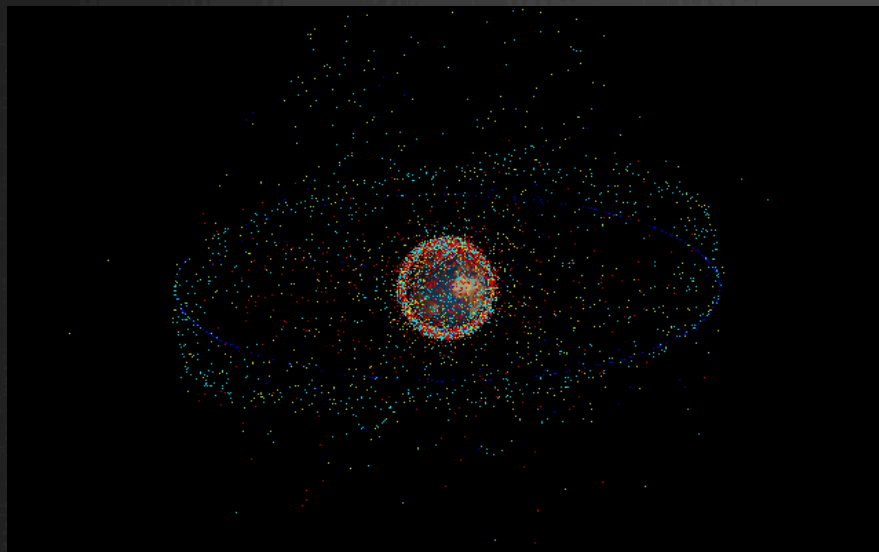
Research activities in SERC



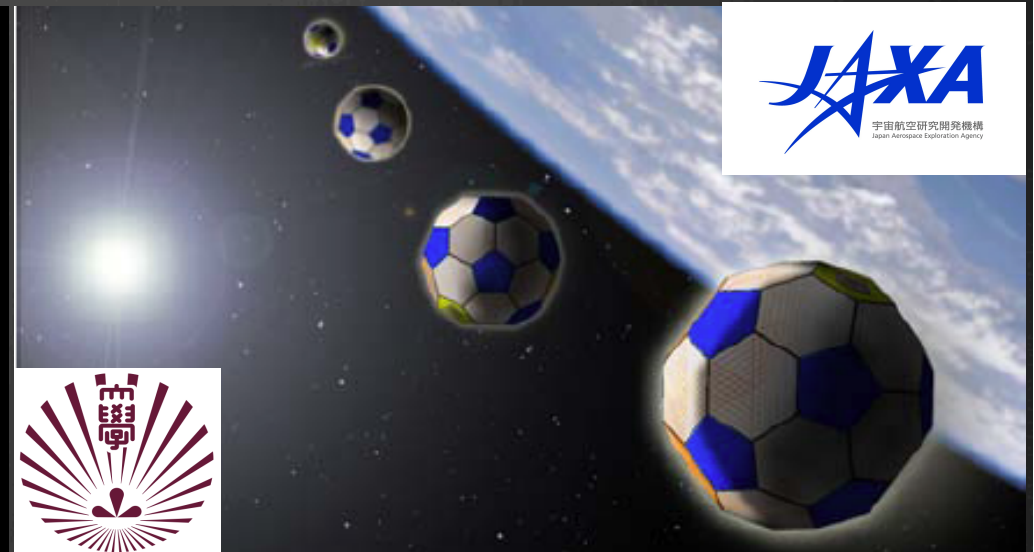
MAGDAS/CPMN

Space environment monitoring: space debris

Debris observation and -simulation



Development of Kyushu-u.-JAXA dust detectors with multi-sub-satellite observation system



<http://ssdl.aero.kyushu-u.ac.jp/?SpaceDebris%2FOrbitalAnalysis> Courtesy of Prof.. Hanada

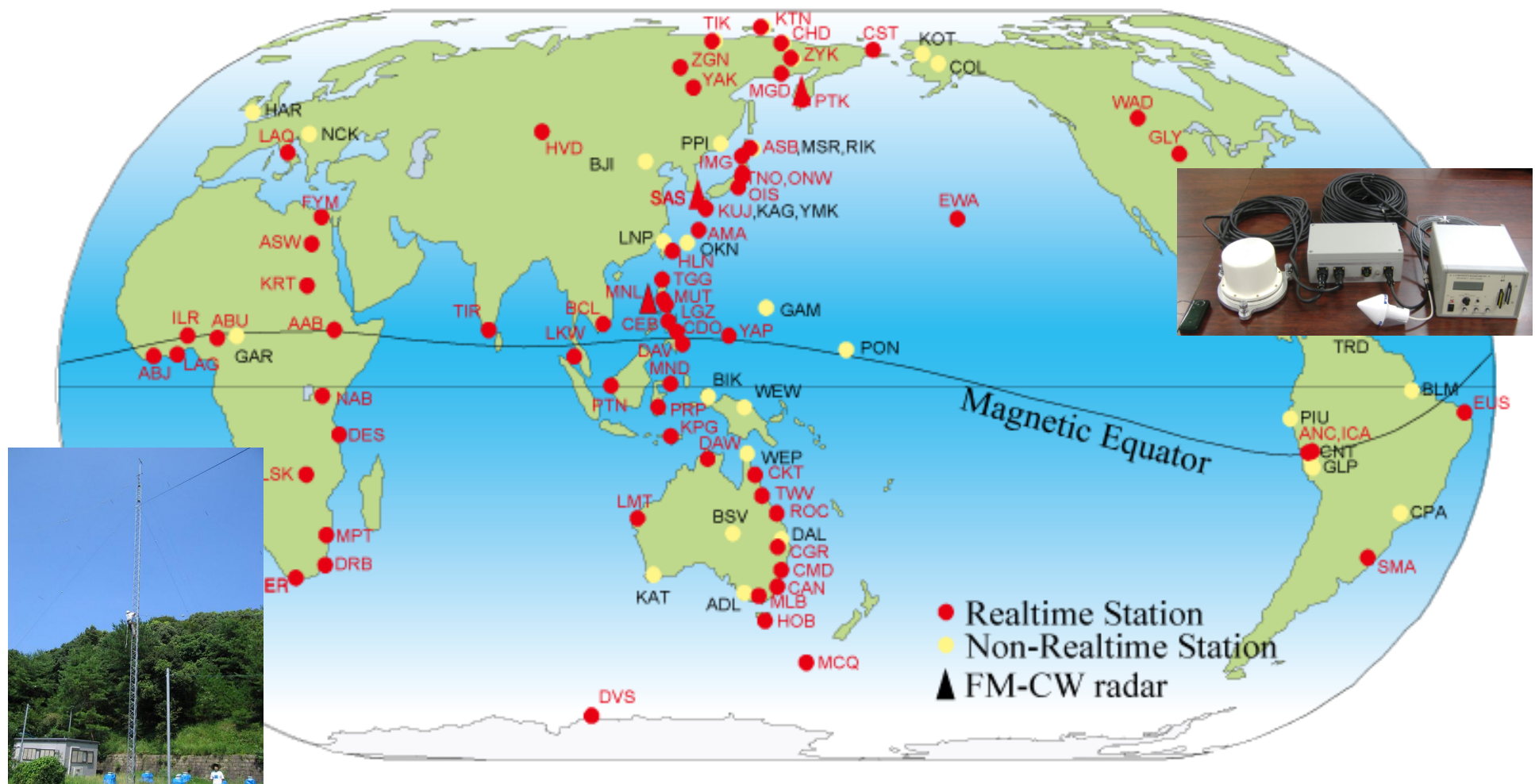
Space environment monitoring: Geomagnetic field disturbances

MAGDAS/CPMN started in 2003

MAGDAS/CPMN

2011

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



Collaborative projects : International

Cooperation wit MAGDAS host countries

installation · maintenance · operation of Network



Autonomous association by MAGDAS hosts countries



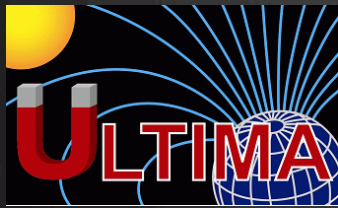
2011.08 Africa MAGDAS Association



2011.03 Manila, Phillipines, SERC sub-center

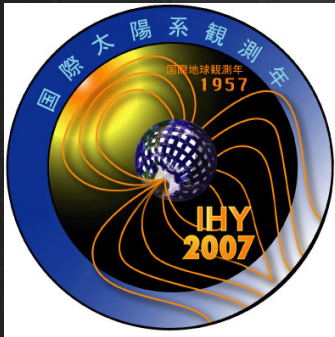
Collaborative projects : International

Contribution to the international Space Weather Science



ULTIMA (since 2006)

Chair of worldwide consortium of magnetic observational arrays



IHY (2007-2009)

Development of MAGADS in the world



ISWI (2010-2012)

Contribution to the enlightenment of space weather science

Space weather science education

Space weather summary report

Since October 2002, daily reports for space weather were produced by students

Outreach activities on space weather

Over 50 public lectures on Space weather science for children and general citizen in Japan



Foreign Student from Asian/African nations

5- Ph D. students from 4-nations (2012)
Egypt, Sudan, Philippines, Malaysia (2)



ISWI/MAGDAS School Redeemer's 1 on Litho-Space Weather 15-20, August 2011, University, neat Lagos, Nigeria

- A 264-page textbook entitled *Selected Papers of MAGDAS* was published prior to the School, containing MAGDAS-related papers that had been published in peer-reviewed journals.
- 60 participants, of whom 8 were instructors mainly from Kyushu University/ remaining participants from MAGAS African host and Nigerian students.

ISWI /MAGDAS School on Litho-Space Weather
Venue: Redeemer's University, Mowe, Near Lagos, Nigeria
Dates: 15 – 21 August, 2011

To view presentation file, photograph, or other documents, click on [pdf](#)
Presentation Files of all Talks Delivered at this school.

	1st Morning Session	2nd Morning Session		1st Afternoon Session	2nd Afternoon Session
Day 1	Arrival			Arrival	
Day 2 Tuesday 16 Aug 2011	<i>Opening Ceremony</i> Capacity Building (KY1) pdf	<i>Intro to MAGDAS</i> MAGDAS (KY2) pdf some history (KY3) pdf		Data analysis (MG1) pdf	EEI (KY4) pdf Pe 5 Index (MG2) pdf
Day 3 Wednesday 17 Aug 2011	Principles of geomagnetism (AY1) pdf	Geomagnetic disturbances (AY2) pdf		MAGDAS data tutorial (MG3) pdf	MAGDAS Deployment in Africa (GM1) pdf
Day 4 Thursday 18 Aug 2011	Equatorial ionosphere (ABR1) pdf	Space Weather (AI1) pdf	LUNCH BREAK	African MAGDAS Station Status Reports click here	<i>Lithospheric Dynamics & Litho-Space Weather (KY5) pdf</i> Peru / Taiwan earthquakes (KY6) pdf Relation between solar and seismic activity (KY7) pdf
Day 5 Friday 19 Aug 2011	Analysis of satellite geomagnetic data (VD1) pdf	Estimation of EEJ using MAGDAS data (ABR2) pdf		Laboratory work on space weather I (AD) pdf Laboratory work on space weather II (SA) pdf	Data Citation Rules (GM2) pdf
Day 6 Saturday 20 Aug 2011	Analysis of satellite geomagnetic data (VD2) pdf	<i>Closing Ceremony</i> Final remarks (KY8) pdf		Excursion Trip (Downtown Lagos: shopping mall and beach --- twas great fun.)	
Day 7	Departure			Departure	

School instructors:
KY= Prof. K. Yumoto; ABR=Dr Rabinu; VD=Prof Vafi D.; AY=Dr A. Yoshikawa; GM=George Maeda; AI=Dr A. Ikeda; SA=Dr S. Abe; MG=Magdi of Sudan.



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Core-to-Core Program

国際宇宙天気キャパシティ・ビルディング
(能力強化) 拠点の形成



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From SERC to ICSWSE...

Geospace
Environment
Observation Lab.

Geospace Experimental
Simulation Lab.

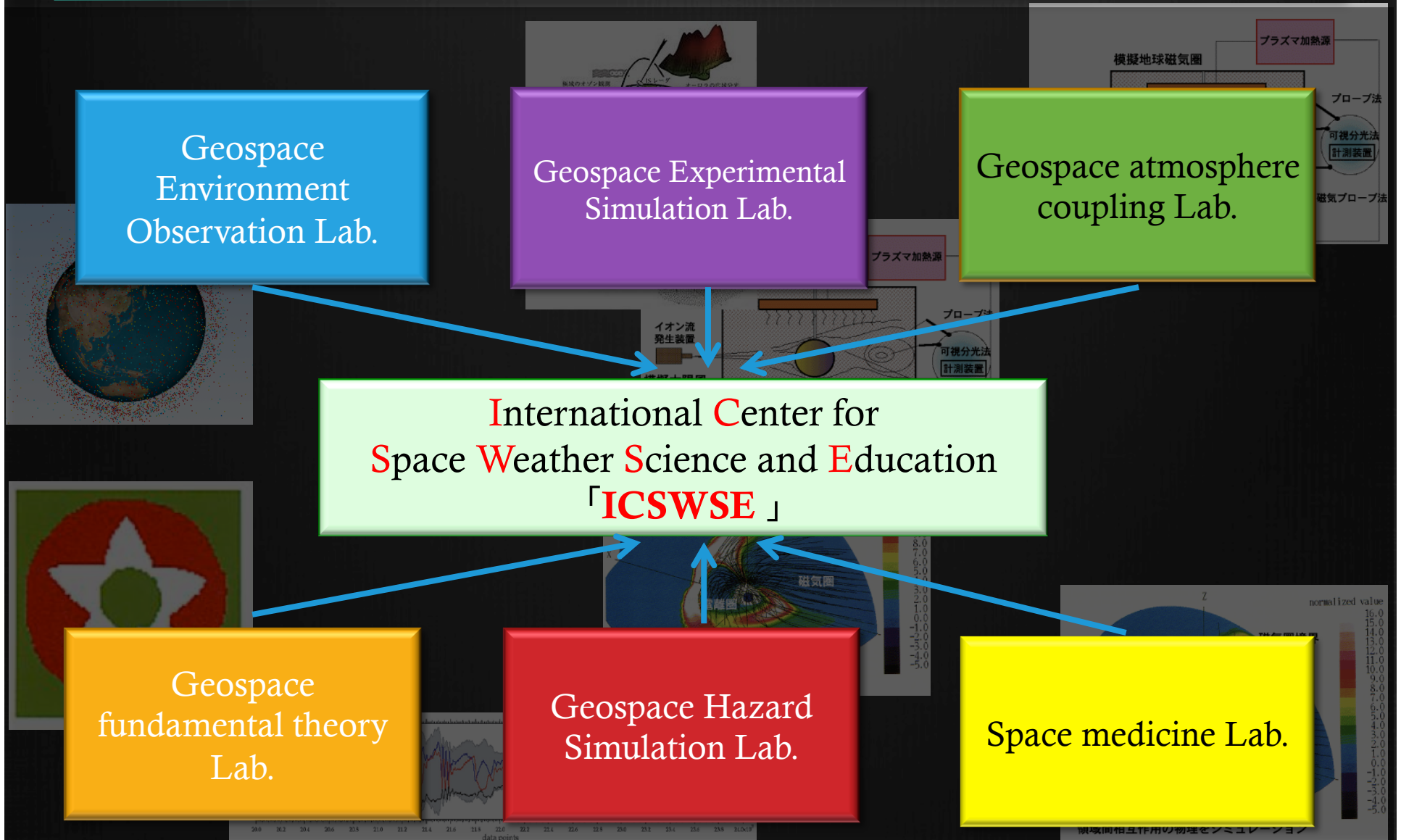
Geospace atmosphere
coupling Lab.

International Center for
Space Weather Science and Education
「**ICSWSE**」

Geospace
fundamental theory
Lab.

Geospace Hazard
Simulation Lab.

Space medicine Lab.



From SERC to ICSWSE: Agenda and Roles

Agenda

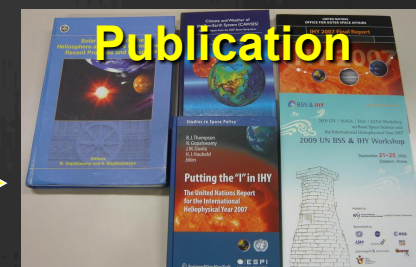
- to provide the basic knowledge that will help humans work in space
- to create the foundations of Space Weather Study, Geospace Science and Space Terrestrial Study
- to explore the synergy of space science, space engineering, and space medicine

Roles

- Enlarge the scope of its space weather research
- Conduct more detailed investigation of the links between geospace changes, climate changes, and natural disasters
- Start new research in the biomedical aspects of geospace
- Evolve internationally as the Center for Space Weather Science and Education consistent with **the Abuja International Space Weather Initiative resolution (A/AC.105/1018: IV)**

From SERC to ICSWSE : Capacity Building

training on “deployment on instrumentation”,
“data analysis” and “space weather science”



From SERC to ICSWSE : ISWI Activities

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 space weather science to study at Japanese universities.

ICSWSE : "iku-sei" : 育成

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

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

- Short stay program to the ICSWSE, we have original fund for capacity building
- Oversea program for graduate student, you will two or three option,
 - (1) Government scholar ship from Japan or your own country
 - (2) JSPS Global 30 program, which is you can directly apply to Kyushu University