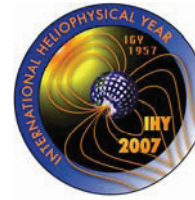




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United Nations Basic Space Science Initiative
International Heliophysical Year 2007
International Space Weather Initiative

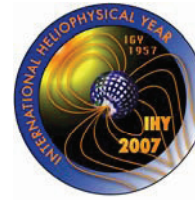
Sharafat Gadimova and Hans Haubold

United Nations Office at Vienna
Office for Outer Space Affairs
Space Applications Section

United Nations/Ecuador Workshop on the International Space Weather Initiative

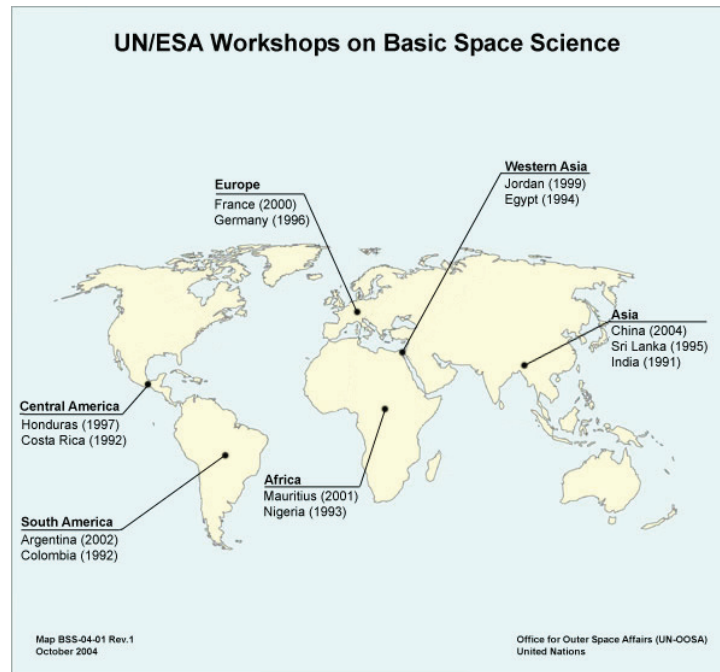
08 – 12 October 2012

Quito, Ecuador



Workshops on Basic Space Science (1991 – 2004)

The status of astronomy in Asia and the Pacific, Latin America and the Caribbean, Africa, and Western Asia were addressed in the following series of workshops:

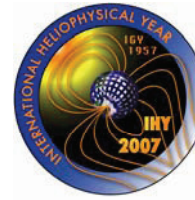


- **Regional:**
India (1991), Costa Rica (1992), Colombia (1992), Nigeria (1993), Egypt (1994)
- **Inauguration of optical telescopes:**
Sri Lanka (1995), Honduras (1997), Jordan (1999)
- **International:**
Germany (1996), France (2000), Mauritius (2001), Argentina (2002)
- **Review of all workshops:**
P.R. China (2004)

Website: <http://neutrino.aquaphoenix.com/un-esa/>



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Workshops on Basic Space Science (BSS): 1991 – 2004

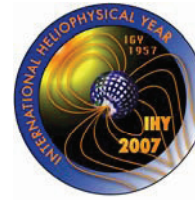
- ◆ Through the Official Development Assistance (ODA) of Japan astronomical telescope facilities were inaugurated in 7 developing nations, and planetariums in 20 developing nations
- ◆ Teaching material, hands-on astrophysics material, and variable star observing programmes had been developed for the operation of such astronomical telescope facilities in an university environment: basic space science TRIPOD concept

BSS TRIPOD: Telescope, Observing, Teaching

- ◆ **Equipment: astronomical telescope**
 - ◆ National Astronomical Observatory Japan (NAOJ), Government of Japan
- ◆ **Data taking and analysis: observing programmes**
 - ◆ American Association of Variable Star Observers (AAVSO)
- ◆ **Teaching: astrophysics for university physics courses**
 - ◆ International Astronomical Union (IAU)

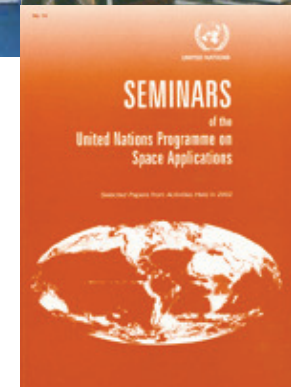


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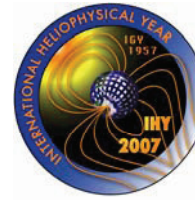
Workshops on Basic Space Science (1991 – 2004):
BSS TRIPOD –Telescope, Observing, Teaching

- **Government of Japan (NAOJ): Japanese Cultural Grant Aid**
 - 45cm reflecting telescope
 - CCD & computer equipment
 - Building/ dome/ maintenance provided by local institution
- Singapore 1987, Indonesia 1988, Thailand 1989, Sri Lanka 1995, Paraguay 1999, The Philippines 2000, Chile 2001, Mongolia 2008
- **American Association of Variable Star Observers (AAVSO):**
 - Hands-on Astrophysics
 - Setting Up a Variable Star Observing Programme
 - Astronomy, mathematics, computer science
- **International Astronomical Union (IAU): Astrophysics for University Physics Courses**
 - Study/ comparison of university education curricula in developing countries
 - Elementary calculus
 - Classical and Statistical mechanics
 - Thermodynamics applied to astronomy





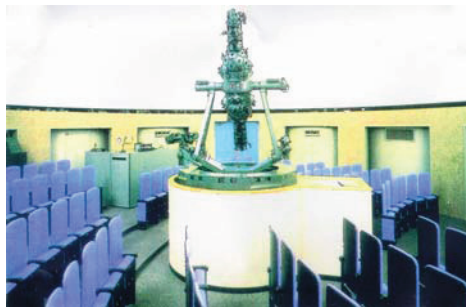
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Workshops on Basic Space Science (1991 – 2004):

Planetariums

- **Government of Japan: National Astronomical Observatory Japan**
- **Host country**
- **United Nations Office for Outer Space Affairs**
 - **Myanmar (1986), Jordan, Malaysia, the Philippines, India, Argentina, Uruguay, Vietnam (1998), Thailand, Sri Lanka, Uzbekistan, Paraguay, Ecuador, Honduras, Costa Rica, Peru (2003), Bolivia, Cuba, El Salvador (2007)**



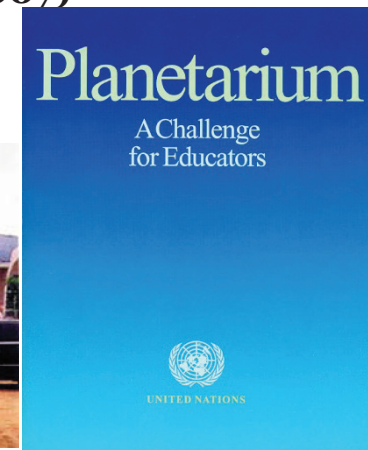
Myanmar 1986



Peru 2003



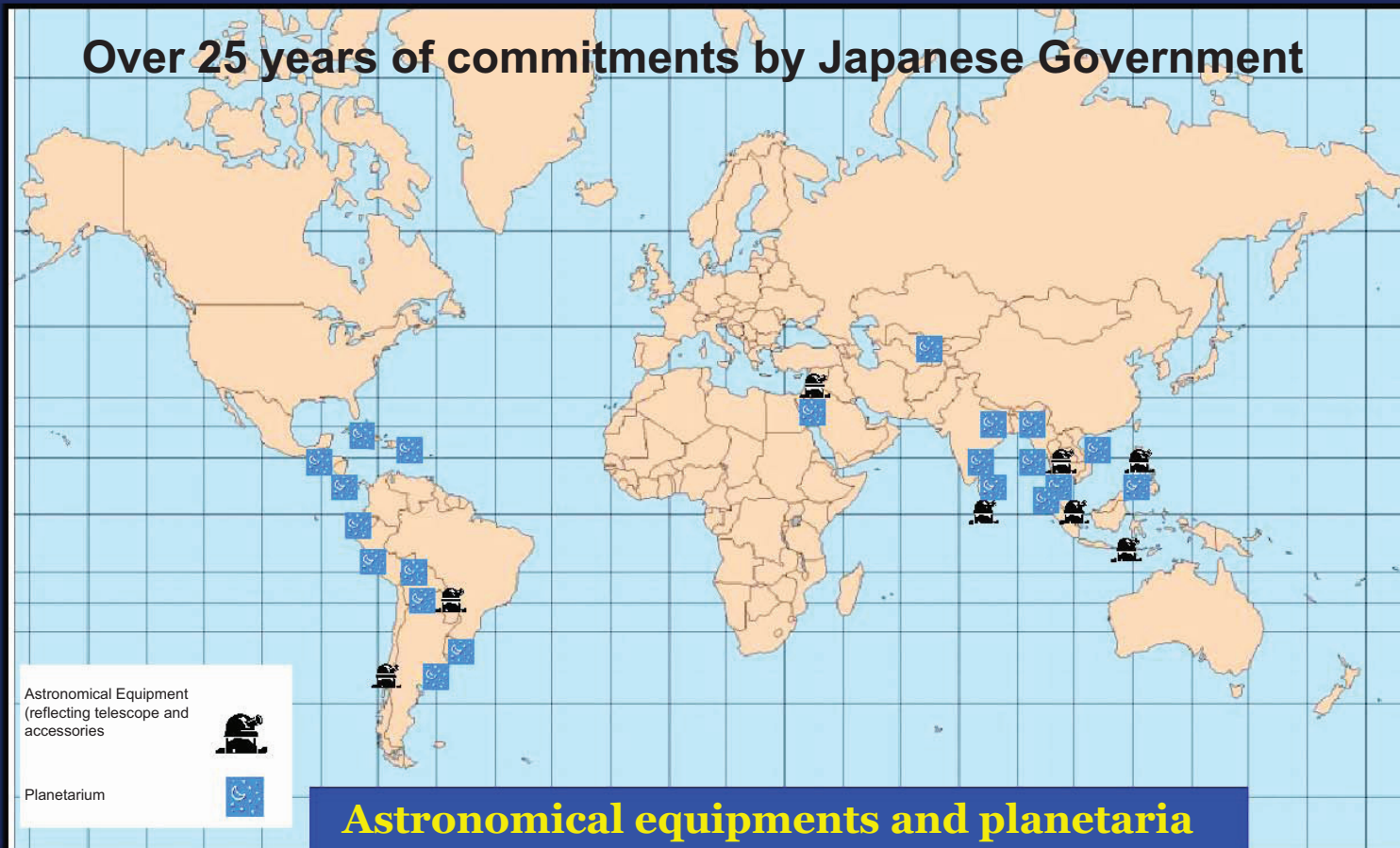
Viet Nam 1998



Workshops on Basic Space Science (1991 – 2004):

Planetariums

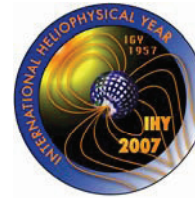
Over 25 years of commitments by Japanese Government



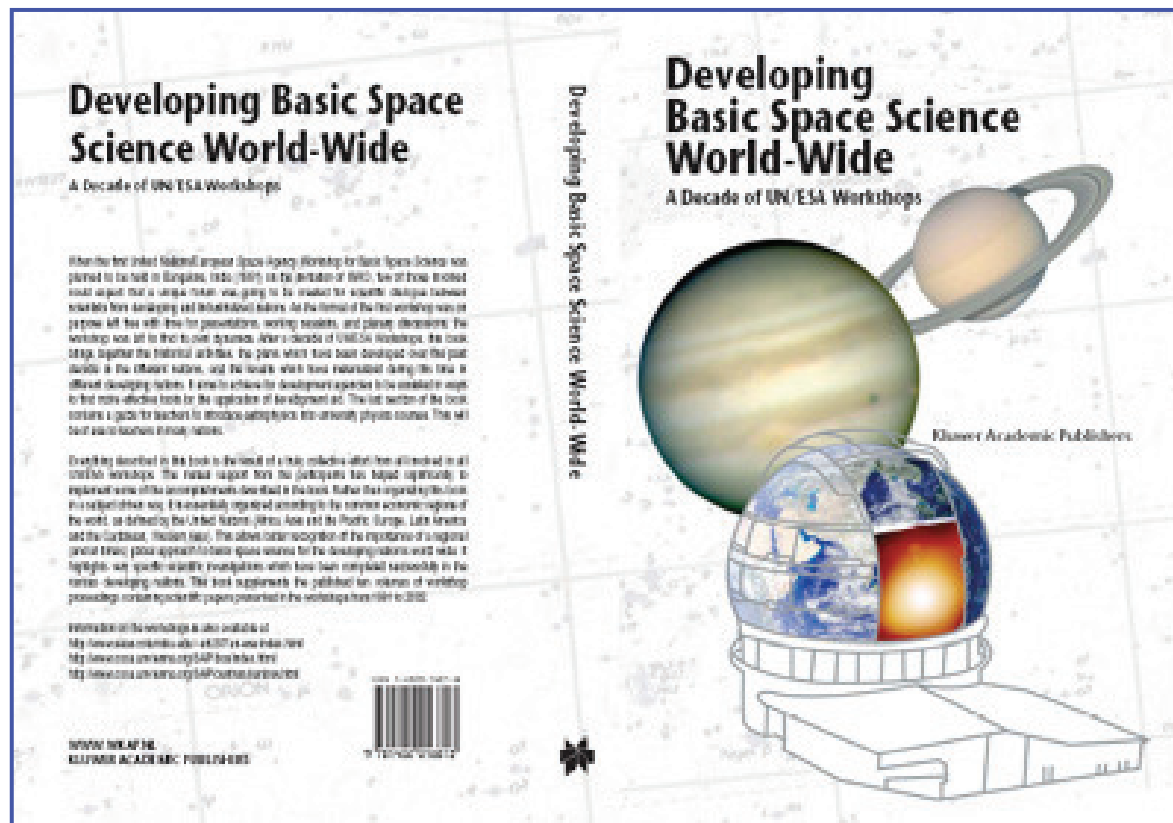
**Astronomical equipments and planetaria
donated by Japanese ODA**



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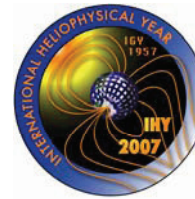
Workshops on Basic Space Science (1991 – 2004):
Final Report: Developing Basic Space Science World-Wide



- 40 workshop follow-up projects
- 70 scientists and engineers
- Regionally and internationally



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Workshops on International Heliophysical Year 2007 (IHY): 2005– 2009

Advancing understanding of the heliospherical processes that govern the Sun, Earth, and Heliosphere, and demonstrating the beauty, relevance, and significance of space and Earth science to the world

◆ **2004: Session of UNCOPUOS called for addressing solar-terrestrial interaction: global climate, space weather, Sun-Earth-heliosphere-system**

- ◆ **Workshops:** United Arab Emirates (2005), India (2006), Japan (2007), Bulgaria (2008), South Korea (2009)
- ◆ **Outreach:** flyers, posters, brochures, booklets
- ◆ **Follow-up projects:**

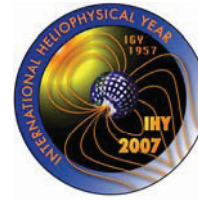
- ◆ Low-cost, ground-based world-wide instrument arrays
- ◆ ADS
- ◆ Virtual observatories
- ◆ **BSS TRIPOD - -> IHY TRIPOD**
- ◆ GNSS on board of instrument arrays

The collage contains several key documents and graphics:

- UN General Assembly Resolution:** A document titled 'Resolution 60/109' regarding the International Heliophysical Year 2007, adopted on 12 December 2005.
- UN Basic Space Science Initiative Flyer:** A flyer with the UN logo and text in English and Arabic, including the heading 'UN Basic Space Science Initiative for the International Heliophysical Year'.
- 'What is IHY?' Brochure:** A brochure with text in English and Arabic, explaining the goals of IHY and the opportunities for involvement.
- IHY 2007 Graphic:** A graphic featuring the IHY 2007 logo and Arabic text: 'الهيئة العامة للغذاء والدواء' and 'مبادرة السنة الفيزيائية الشمسية'.



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Workshops on International Heliophysical Year 2007 (IHY): 2005– 2009

UNBSS TRIPOD - - > IHY TRIPOD

IHY TRIPOD: Instrument Array, Data, Teaching

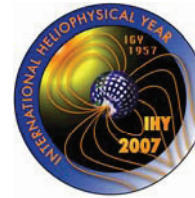
- ◆ **2005: Deploying small inexpensive instruments** such as magnetometers, radio antennas, GPS receivers, particle detectors around the world to make global measurements of ionospheric, magnetospheric and heliospheric phenomena
 - ◆ **Partnerships** between instrument providers and instrument host nations
 - ◆ Provision of instrumentation by PI
 - ◆ Host institution makes available manpower, facilities, and operational support
 - ◆ **Data** taking, sharing, analysis, publication
 - ◆ **Teaching** space science at university level utilizing data

- ◆ *Coordinated Investigation Programmes in disciplines: heliosphere and cosmic rays, solar, magnetospheres, ionized atmospheres, climate, astro/heliobiology*

**International Heliophysical Year 2007 (IHY2007) to
International Year of Astronomy 2009 (IYA 2009)
UNGA 62/200 of 2007**

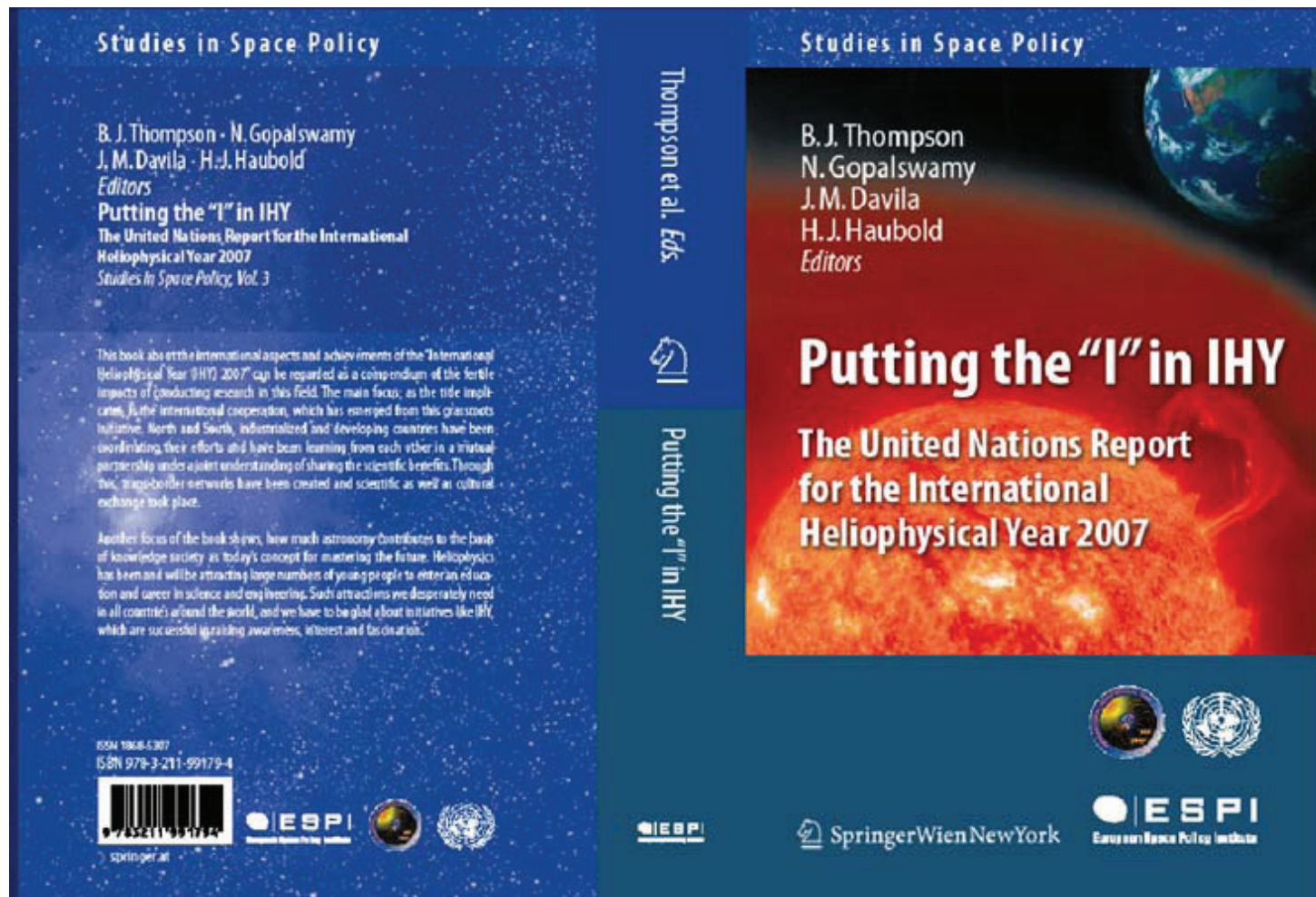


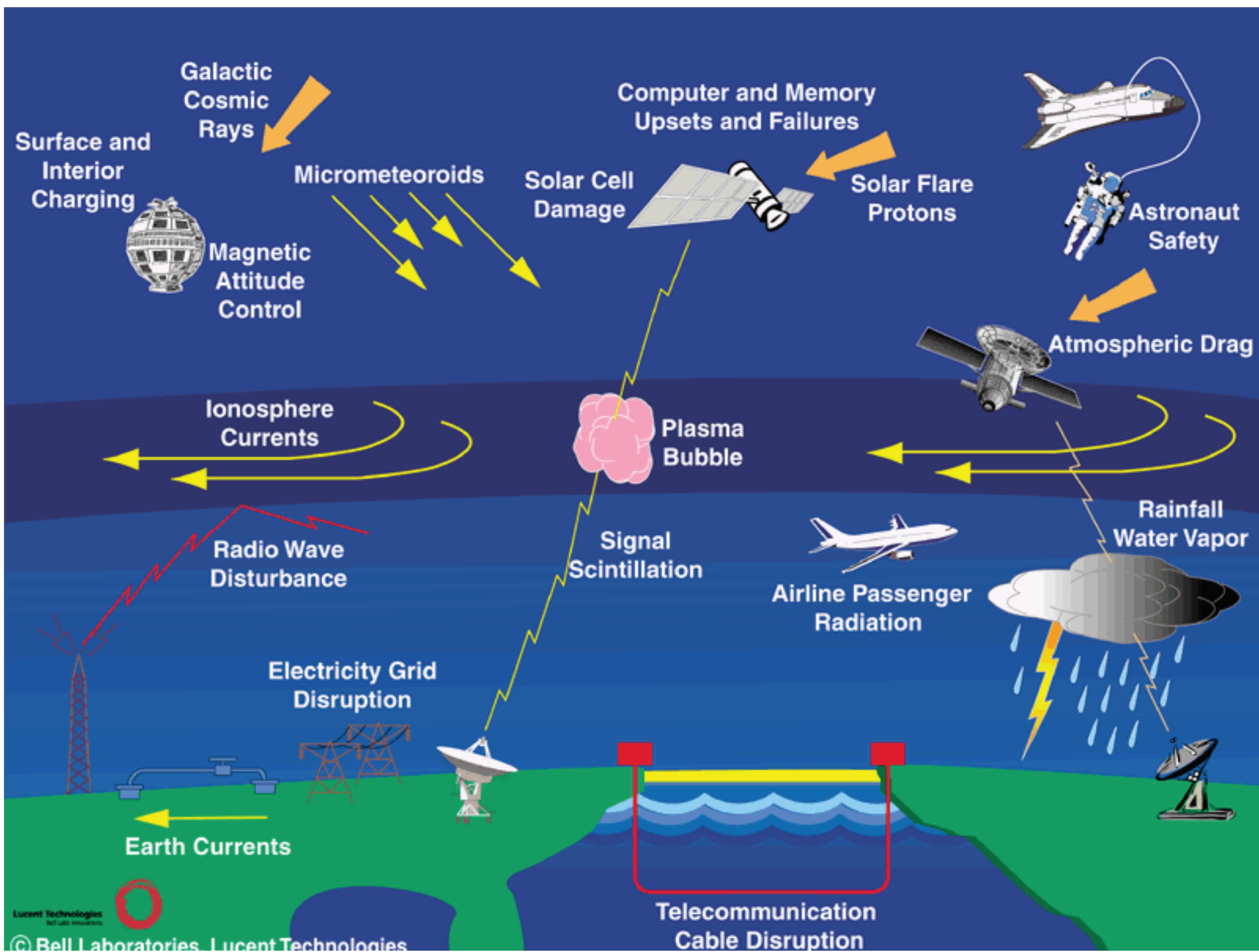
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Workshops on International Heliophysical Year 2007 (IHY): 2005– 2009

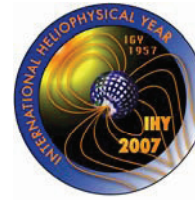
Final Report IHY







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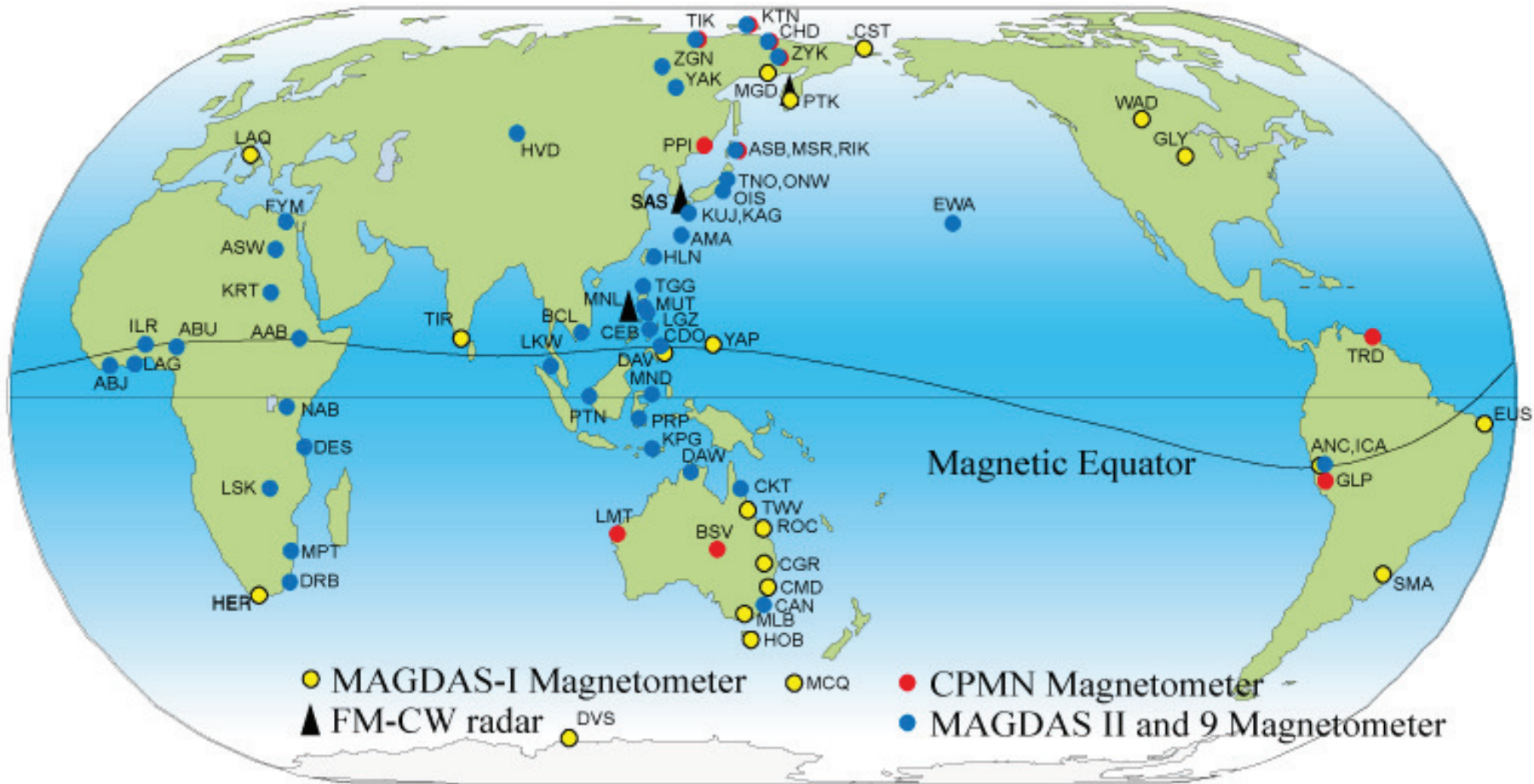
Workshops on International Space Weather Initiative (ISWI): 2010– 2012

2010: The Workshops focused on the International Space Weather Initiative as mandated in a three-year work-plan as part of deliberation of the United Nations Committee on the Peaceful Uses of Outer Space.

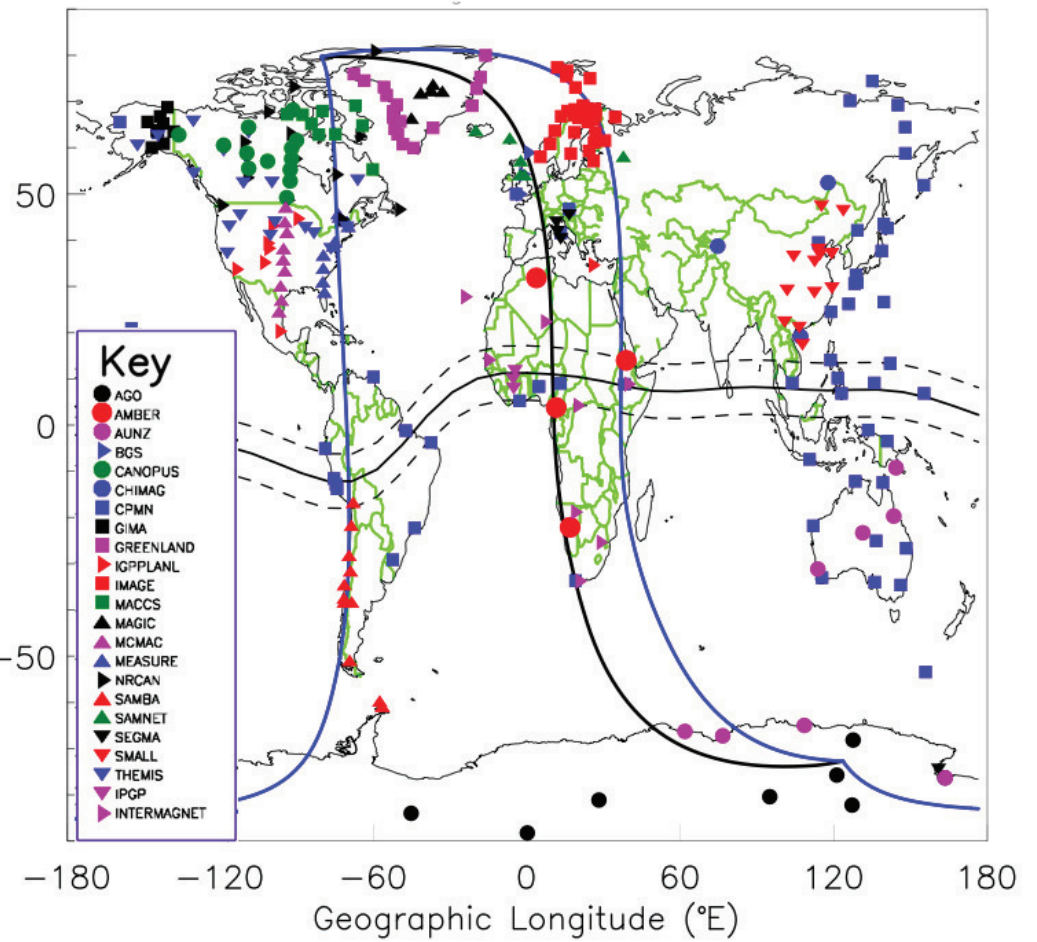
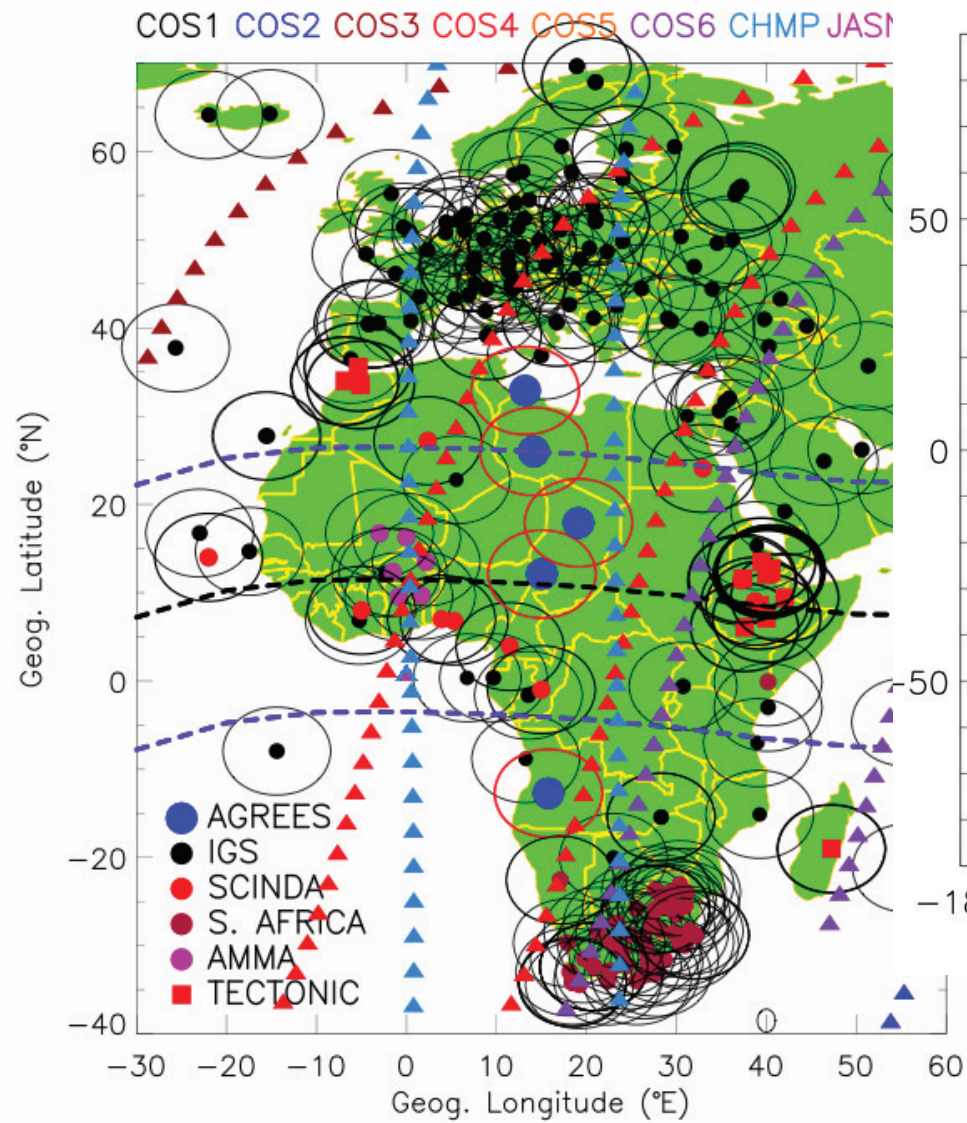
- ◆ **Workshops: Egypt (2010), Nigeria (2011), Ecuador (2012)**
 - ◆ **Review the results of the operation of the instrument arrays**
 - ◆ **Discuss ways and means to continue space weather research and education, particularly focusing on programmes as implemented by the International Centre for Space science and Education at Kyushu University, Fukuoka, Japan**
 - ◆ **Similar research centres and education centres were also established in Nigeria and India**

MAGDAS/CPMNP

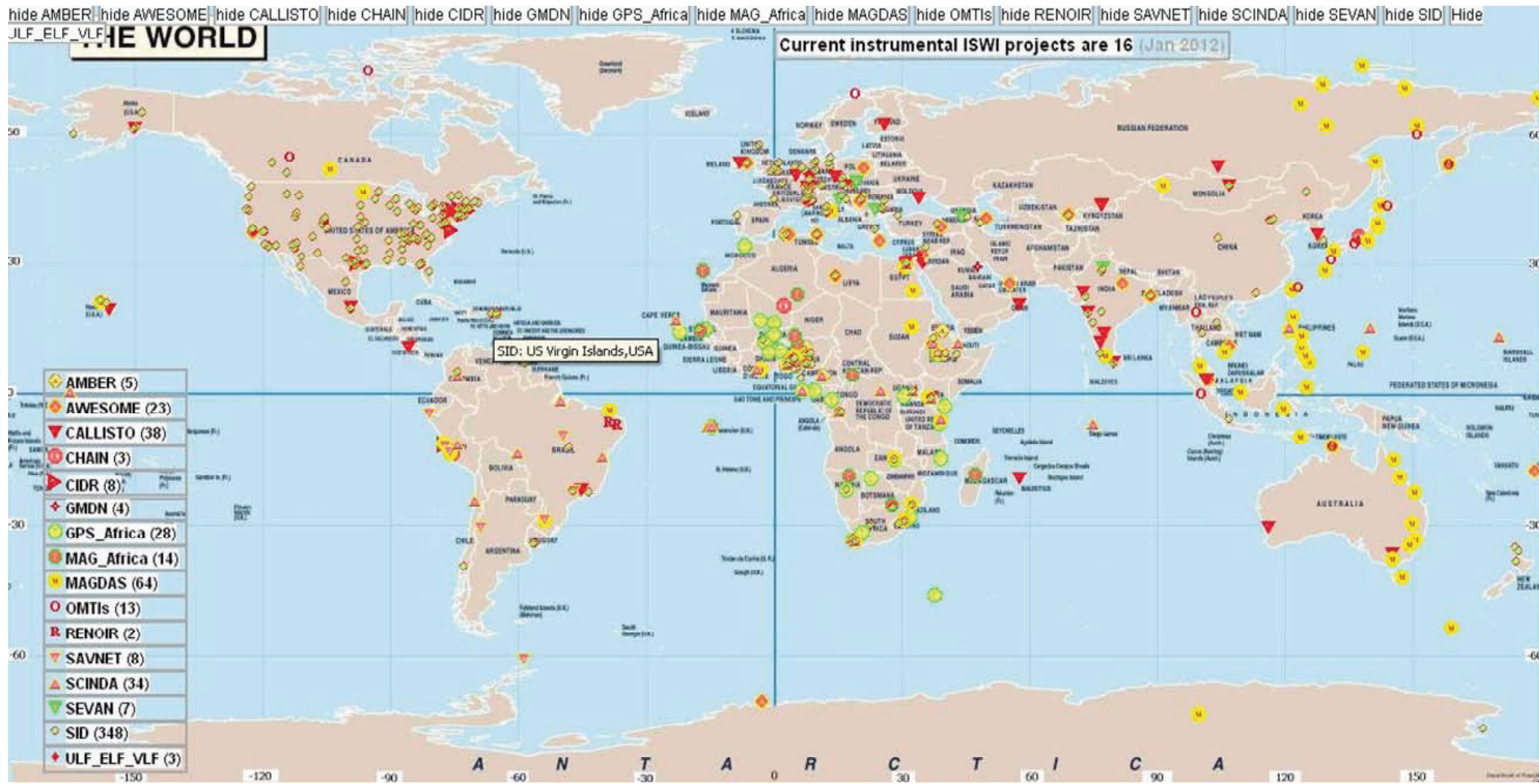
(MAGnetic Data Acquisition System/Circum-pan Pacific Magnetometer Network)



Location of the 64 MAGDAS stations



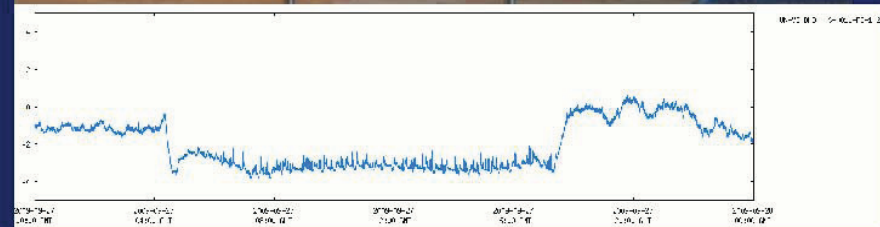
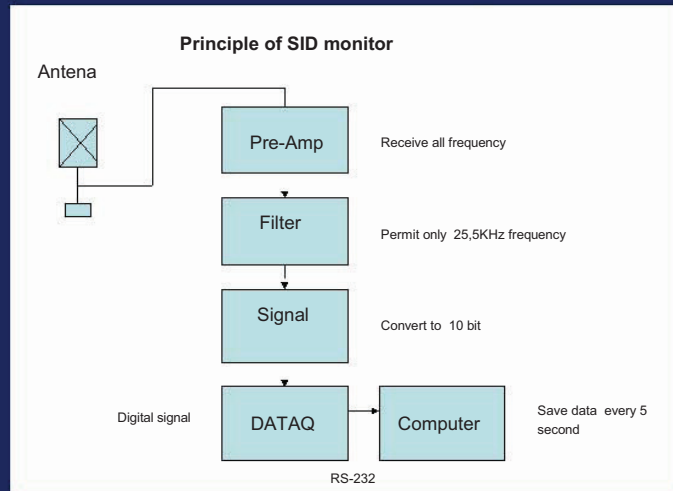
GPS Network and AMBER Mags



ISWI 2012: 16 + 2 Instrument Arrays

Instrument Programme

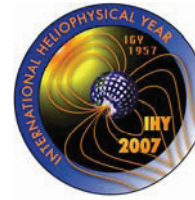
Sudden Ionospheric Disturbance Monitor (SID) operated by UNOOSA



International Space Weather Initiative



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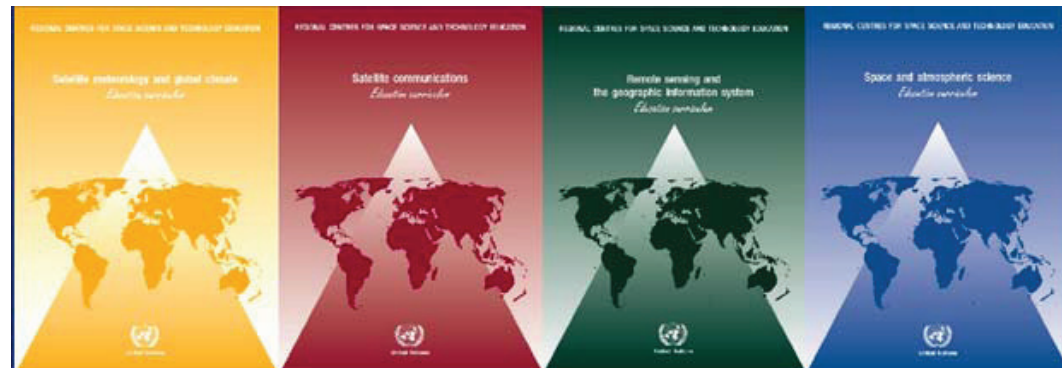


Information Dissemination and Capacity Building

Training for capacity building in developing countries:

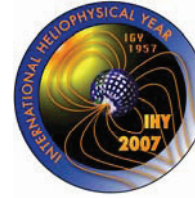
provide support to the regional centres for space science and technology education, affiliated to the United Nations, which also act as the ICG Information Centres

- ◆ *Africa: Morocco and Nigeria*
- ◆ *Latin America and the Caribbean: Brazil and Mexico*
- ◆ *Asia and the Pacific: India*
- ◆ *Western Asia: Jordan (2011)*
- ◆ *Remote Sensing & GIS, Satellite Meteorology & Global Climate, Satellite Communications, Space & Atmospheric Science and Global Navigation Satellite Systems (in development)*





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Web: <http://www.unoosa.org>