



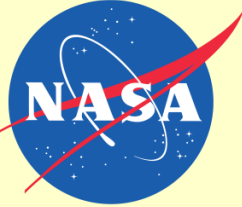
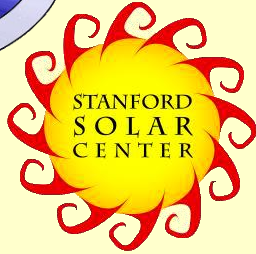
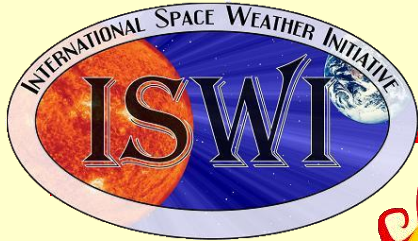
IHY/ISWI EPO & SIDs A Retrospective

Deborah Scherrer *Stanford University (retired)*

- **Lead of SID Space Weather Monitor Instrument Program as part of Education in IHY/ISWI**
- **Chair of the US IHY Edu Advisory Cmte (i.e. AGU Space Physics and Aeronomy's Education & Public Outreach cmte)**
- **Informally involved with NASA developing nations programs**



It takes a village....



World Space Week





Overview

- **Why do this?**
- **The SID instrument education program for IHY and ISWI**
- **GIFT Teacher Workshops for IHY and ISWI**



Motivation

The IHY presented a unique opportunity for expanding the education about, and awareness of, space and Earth sciences. As a result Education became a cornerstone of the IHY initiative.

- IHY Goal: Demonstrating the beauty, relevance and significance of space and Earth science to the world.
- Objective: **inspire** the next generation of space and Earth scientists and explorers; and **spread the knowledge** of our solar system and the exciting process of scientific exploration to the people of the world.



SID Space Weather Monitors

A Stanford Solar Center education project to build and distribute inexpensive ionospheric monitors to high-school-age students around the world. The monitors detect solar flares and other ionospheric disturbances. Goal is to provide kids with hands-on access to real scientific data.

The SID project was chosen to be part of the IHY & ISWI education and instrument distribution programs





SID Instruments

3 versions

- **AWESOME** – research quality
“big brother” of SID monitor
- **Original SID** – for IHY
\$200 to build, but distributed for free
- **SuperSID** – redesigned for ISWI –
better, simpler, cheaper
\$50 to build, but distributed free



SID Space Weather Monitors



- Package comes with **extensive educational materials**, was peer-reviewed and incorporated into NASA's Wavelength database.

“This may be the best package I have ever reviewed for NASA”

grin.....

- Materials translated into
 - **Chinese**
 - **Spanish**
 - **Russian**



Chinese SID cake

- Stanford continues to support a **centralized data repository** with free access to all (inconjunction with NASA's SDO)



Who distributes SIDs now?

- We were smart/lucky enough to find someone else to take this over:

Society of **A**mateur **R**adio **A**stronomers

- SARA people build the boxes then sell them to amateurs for \$50, and use those funds to support free distribution to students all over the world
- GAWD BLESS 'EM!



Several extensive country-wide SID programs were set up



Germany – Barbara Bernert



China & Mongolia – Sharon Murrell



Malaysia – Mardina Abdullah



Lebanon – Antoun Daou



Nigeria



Italy – Lucia Abbo & Esther Antonucci



Ireland – Peter Gallagher

Student Research & Programs



Published papers in China, USA, Tunisia, others

Hassen Ghalila, U of Tunis, Tunisia
Set up SID research projects for undergrads & grads
1 PhD dissertation based on SID data

Student paper sample topics:

- Sunrise/sunset phenomena & changes over time, season, latitude, distance from transmitter, site, weather, etc.
- Identifying solar flares, tracking back to Sun, perhaps predicting
- Antenna design; electrical interference
- Unusual events – Thunderstorms, meteor showers, CMEs, GRBs, planetary waves, earthquakes
- Associations with earthquakes
- Eclipses
- Correlation with local events (e.g. photovoltaic power plant increases associated with flares, local hospital admissions, etc.)

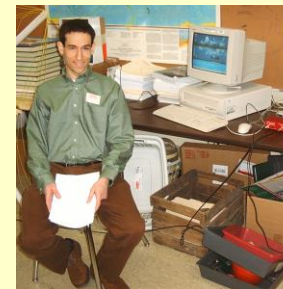
Space Weather Innovation Competition

Mardina Abdullah, Alina Marie Hasbi and Badariah Bais
Space Science Center (formerly known as Institute of Space Science-ANGKASA, UKM)
Universiti Kebangsaan Malaysia (UKM)- *The National University of Malaysia*
Malaysia

Malaysia nation-wide competition



Uruguay



Thailand nation-wide competition

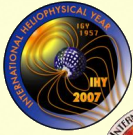
USA

United Nations & SID

- Han Haubold, previous Director of the UN's Office of Outer Space Affairs, really liked the SIDs & got one for himself.
- Hans included them in IHY & ISWI, and put one on display in the rotunda of the UN in Vienna.
- **This was the 1st research instrument to ever be put on permanent display at the UN!**



IHY/ISWI SID Instrument Tutorials & Workshops



- Acapulco, Mexico 2007
- Ethiopia - 2007
- Tunisia - 2009
- Sharjah, UAE - 2010
- Goa, India - 2010
- Indonesia - 2012
- Kenya - 2013
- Peru - 2014
- Calgary, Alberta 2015

Most of these were associated with IHY or ISWI workshops



25 SID instruments were hand-delivered to researchers at the IHY workshop in Ethiopia



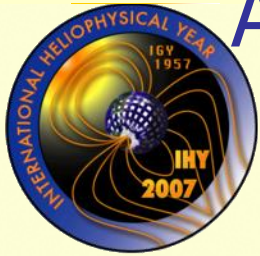
Moving on to Teacher Workshops

Geophysical Information For Teachers

- Began ~2002 by AGU (Remember, the SPA EPO Committee of AGU was the US Edu Advisory group to the IHY)
- “GIFT Workshops allow science teachers to hear about the latest geoscience research from the scientists making the discoveries, and to explore new classroom resources for their students.”
- 5 held in coordination with IHY/ISWI

Teacher Workshop #1

Acapulco, Mexico – May 2007



- Held in conjunction with AGU meeting
- IHY rep from Mexico involved
- All done in Spanish
- 1 day; 75 teachers
- Included Family Science Event
 - Hands-on materials & interactions with scientists
 - Planetarium dome and solar telescopes
 - Very well attended (in spite of poor advertising)





Teacher Workshop #2

Addis Ababa, Ethiopia – Dec 2007

- Organized by US IHY/Edu Advisory Cmte; sponsored by NASA & the Houston Museum of Natural History; held in conjunction with IHY-Africa Space Weather Science & Education Workshop
- 1-day, 70 teachers from wide area of Ethiopia
- Featured a Discovery Dome (portable planetarium) which was later donated to the university. 1st portable planetarium in Africa!
- Significant coverage in Geoff Haines-Stiles' **Passport to Knowledge** IHY documentary



Teacher Workshop #3

Zambia 2009



- 1-day; held in conjunction with ISWI conference
- 20 teachers (teacher strike limited planned attendance of ~100)
- Discovery Dome donated to the Zambian Education Ministry by Houston Museum of Natural History – 2nd country in Africa to have a portable planetarium!
- Included visits to public schools



Teacher Workshop #4 Indonesia 2012



Organized by D. Scherrer;
co-presented with "The Astro Wizard"
(Dave Rodrigues)

- Sponsored by Indonesian Space Agency (LAPAN)
- 1 day; 50 teachers
- Held in conjunction with ISWI & MAGDAS School on Space Science
- Best-organized workshop ever!



Teacher Workshop #5

Kenya 2013



- Organized by D. Scherrer, supported by Gopal, Mark Meisch, Jesper Schou
- In conjunction with ISWI/SCOSTEP Summer School
- Gave workshop to 18 undergrad students in physics from the university



NASE Workshop Kenya 2013



- Organized by Rosa M. Ros, Technical U of Catalonia
- NASE = Network for Astronomy School Education; IAU
- 3-day Educator Workshop in conjunction with ISWI/SCOSTEP School
- 20 participants, teachers & U of Nairobi students
- This workshop was also given in Ghana





Lessons Learned

If you offer science,
people will come.



**Potential scientists
exist all over the
world. They just need
resources & a chance.**



NASA has significantly cut
its EPO programs so...

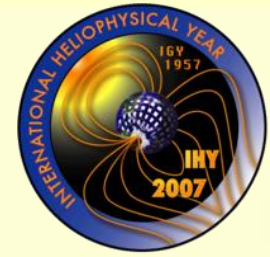
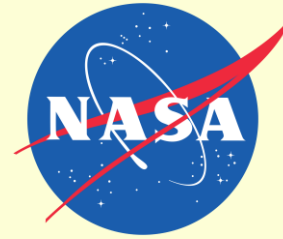
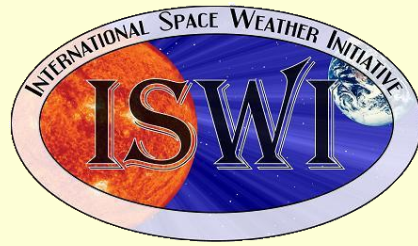


The future of
science education
is up to....

YOU!

and people like her →





This has been a team effort...

A million thanks
to each of you!!!



It's been a great ride....