



Program Management Review

11 Jan 2007

1QFY07

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OUTLINE



STP Program Management Review

- **STP Overview/Status (10)**
- **Earth Observation Group (5)**
- **Earth Geophysics Group (5)**
- **Space Environment Group (8)**
- **Solar Program – Deep Dive (10)**
- **STP Business Plan (Template) (1)**
- **Concluding Remarks (1)**



WHO WE ARE

STP Overview



Solar and Terrestrial Physics Division
William Denig/F Chief
Janet Brown/F, Secretary

**Space Environment Group
(SEG)**

Eric Kihn/F, Team Lead

- Terry Bullett, AFRL
- Craig Clark/F
- Helen Coffey/F
- Ray Conkright/C
- Ed Erwin/F
- Justin Mabie/C
- Rob Redmon/F
- Herb Sauer/C
- Dan Wilkinson/F
- Jim Manley/C

**Earth Observation Group
(EOG)**

Chris Elvidge/F, Team Lead

- Kim Baugh/C
- Pat Hayes/C
- Ara Howard/C
- Ben Tuttle/C
- Vacant – Data Manager/F

Key

F – Federal
C – CIRES/CIRA
S – Student

**Earth Geophysics Group
(EGG)**

Sue McLean/F, Team Lead

- Patrick Alken/C
- Ron Buhmann/F
- Paula Dunbar/F
- Karen Horan/F
- Joy Ikelman/F
- Stefan Maus/C
- Rob Prentice/C
- Jesse Varner/C
- Chris Hammond/S
- Andrew Kimbrel/S
- Kelly Stroker/C
- Don Herzog/C
- Tatiana Sazonova/C
- Ruth Brocko/C



Personnel Changes

STP Overview



- **Gains**
 - Jim Manley – SEG – Ionosonde Data Scientist (CIRES PRA)
- **Losses – None**
- **Vacancies**
 - EGG Geomag RA (CIRES PRA) – paperwork submitted to CIRES
 - EOG Data Manager (Federal) – on hold
- **Inbound**
 - Fran Coloma – EGG – CORS Geodesist (CIRES PRA): 16Jan
- **Pending**
 - Ron Buhmann/F (EGG) – Scheduled retirement: 02Feb
 - Helen Coffey/F (SEG) – Scheduled retirement: 03Apr
- **Visitors – None**



FY06 Milestones

***** FINAL *****



PPBES Program	STP FY06 Milestones	Status	Planned Completion Date	Actual Completion Date	Responsible Person	
AOP →	Space Weather	Complete the rescue of the PCI data including, archive preservation, integration in the SPIDR and quality analysis.	C	(Q1) 12/31/2005	(Q1) 12/15/2005	Kihn
	Space Weather	Construct a 15-year gridded database of results from linked assimilation models	C	(Q2) 3/31/2006	(Q2) 3/20/2006	Kihn
	Space Weather	Complete the rescue of the RSTN data including, archive preservation, integration in SPIDR and quality analysis	C	(Q2) 3/31/2006	(Q2) 1/9/2006	Coffey
	Space Weather	Publish a Looking Forward to GOES-R web announcement for current users of GOES and POES SEM data	C	(Q2) 3/31/2006	(Q2) 1/17/2006	Wilkinson
	Space Weather	Add 50 Gigabytes of high resolution daily solar H-alpha images to NGDC archives	C	(Q3) 6/30/2006	(Q3) 5/20/2006	Coffey
	Space Weather	Automate the collection, analysis, archive, and dissemination of the USAF ionospheric sounding stations	C	(Q4) 9/30/2006	(Q4) 9/26/2006	Redmon
AOP →	Space Weather	Publish Space Weather Analysis (SWA) derived products such as indices via the web	C	(Q4) 9/30/2006	(Q4) 8/28/2006	Kihn
	Space Weather	Complete migration of space weather data to the ADIC TLS: GOES SEM, POES SEM, and GOES SXI	C	(Q2) 3/31/2006	(Q2) 3/28/2006	Wilkinson
AOP →	Space Weather	Integrate the NASA CDAWeb data resources with the Space Physics Interactive Data Resource (SPIDR) system.	N/A	(Q1) 12/31/2007	O.B.E. - ViRBO	Kihn
	Marine Transportation Systems	Improve resolution of crustal magnetic field model from degree 90 to 720 to improve ENC navigation models.	C	(Q4) 9/30/2006	(Q4) 9/26/2006	McLean
AOP →	Tsunami	Establish archive of tsunami program DART and BPR historical data (3 GB)	C	(Q2) 3/31/2006	(Q2) 3/28/2006	Stroker
	Tsunami	Review and document 60% of deadly past tsunami events	C	(Q2) 3/31/2006	(Q2) 3/28/2006	Dunbar
	Marine Transportation Systems	Increase volume of CORS GPS data ingested annually and placed into the archive by 2 TB.	C	(Q2) 3/31/2006	(Q2) 3/28/2006	McLean
	Marine Transportation Systems	Increase the volume of the DMSP tape library archive by 4 TB	C	(Q4) 9/30/2006	(Q4) 9/5/2006	Erwin
	Marine Transportation Systems	Delivery of 3 TB of DMSP data on line.	C	(Q4) 9/30/2006	(Q4) 9/5/2006	Elvidge
	Marine Transportation Systems	Generation of first global DMSP OLS imagery constructed area grid at 1 km resolution	C	(Q4) 9/30/2006	(Q4) 9/30/2006	Elvidge
	Marine Transportation Systems	Implementation of new near-real time satellite data processing and delivery system for DMSP OLS	C	(Q1) 12/31/2007	(Q4) 7/1/2006	Elvidge



FY07 Milestones STP Overview



PPBES Program	STP FY07 Milestones	Status	Planned Completion Date	Actual Completion Date	Responsible Person
AOP → Tsunami - Hazard Assessment	Develop a robust document for delivering accurate tsunami data rapidly to TWCs and then to other NOAA and the public	Y	(Q1) 12/31/2006	Under NTHMP Review	McLean
AOP → Tsunami - Hazard Assessment	Develop a tsunami hazard assessment for all U.S. coastal states, territories and commonwealths (as called for by the SDR)	Y	(Q1) 12/31/2006	Under NTHMP Review	Dunbar
AOP → Space Weather	Incorporate NGDC Virtual Radiation Belt Observatory into NASA Living With a Star (LWS) program for initial operating capability	G	(Q2) 3/31/2007		Kihn
AOP → Space Weather	Demonstrate initial operating capability (IOC) for acquiring, processing and disseminating near real-time total electron content data to NWS/SWPC for US-TEC model	G	(Q2) 3/31/2007		McLean
Marine Transportation Systems	Generate 1st global grid of population numbers in poverty estimated from satellite imagery	P	(Q2) 3/31/2007		Elvidge
Space Weather	Develop database management tools with SPIDR for the NGDC geomagnetic archive	P	(Q3) 6/30/2007		Kihn
Space Weather	Develop & release next upgrade (Version 4.0) of the Space Physics Interactive Data Resource (SPIDR)	P	(Q3) 6/30/2007		Kihn
AOP → Space Weather	Replicate operational GOES-13 Space Environment Monitor (SEM) relational database at NGDC	G	(Q3) 6/30/2007		Wilkinson
Marine Transportation Systems	Produce an updated degree-720 crustal field model incorporating newly released marine & aeromagnetic data to improve Electronic Navigation Chart (ENC) nav models	P	(Q3) 6/30/2007		Maus
Marine Transportation Systems	Implement near real-time visible and thermal global mosaic generation and online access system for nighttime DMSP Operational Linescan System (OLS)	P	(Q3) 6/30/2007		Elvidge
AOP → Space Weather	Integrate Mirrion real-time ionospheric data access system with the Space Physics Interactive Data Resource (SPIDR)	G	(Q4) 9/30/2007		Redmon
AOP → Tsunami - Hazard Assessment	100% of the retrospective DART data archived & research data accessible through integrated tsunami hazards WMF server utilizing standard GML and standard metadata	G	(Q4) 9/30/2007		Stroker
AOP → Tsunami - Hazard Assessment	Increase volume of historic tsunamis, DART, bathymetric, and model data described, archived, and accessible on-line	G	(Q4) 9/30/2007		Stroker

AOP → AOP milestone (submitted)

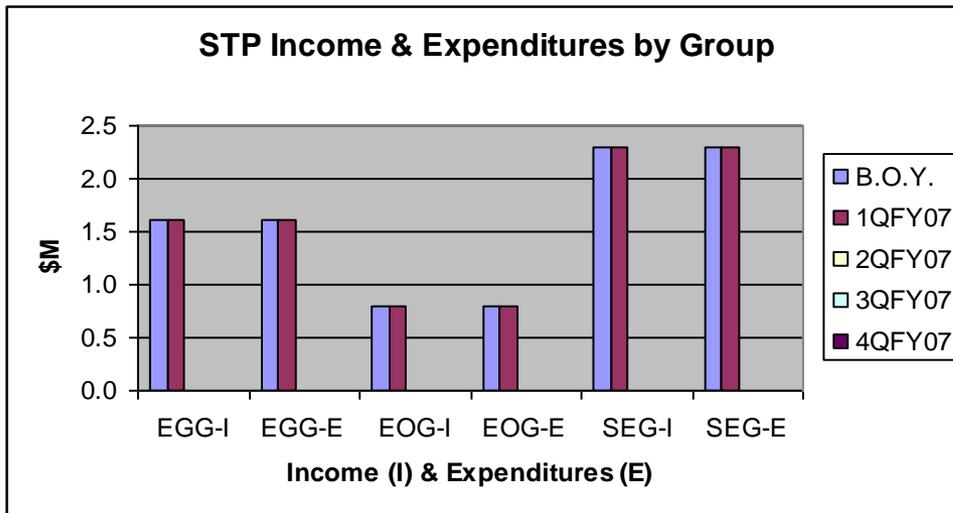
Change this quarter



Financial STP Overview



<u>Team</u>	<u>Income</u>	<u>Expenses</u>	<u>Net</u>	<u>Status</u>
SEG	2,303.4K	2,303.4K	0.0K	G
EOG	802.3K	862.3K	-60.0K	Y
EGG	1,613.7K	1,613.7K	0.0K	G

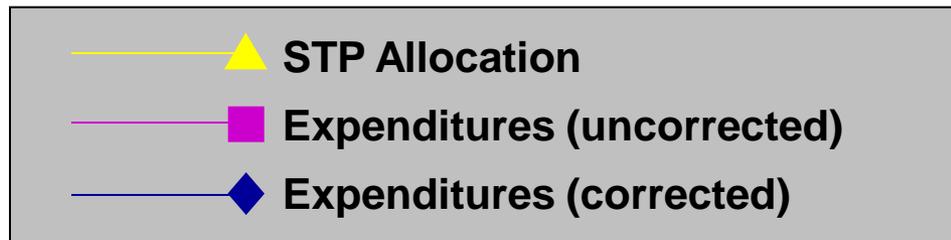
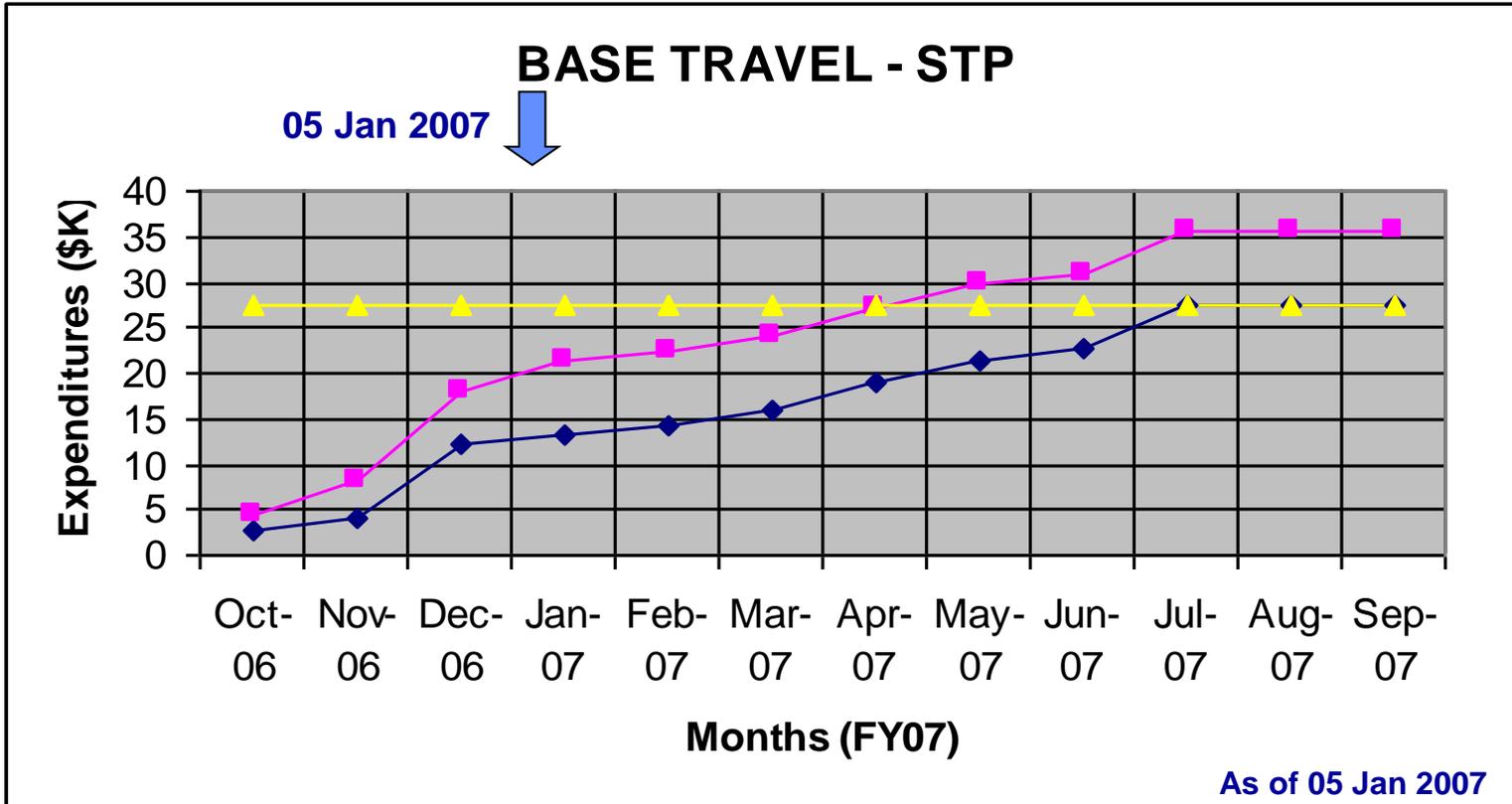


- G** Income is within 5% of Expenditures
- Y** Income is within 10% of Expenditures
- R** Income is not within 10% of Expenditures



Travel

STP Base Travel





CDMP FY07 Proposals

STP Overview



Subject	New - FY07	Continuing	POC	Contractor (\$K)	NGDC (\$K)	Comments
Heat capacity mapping mission		X	Elvidge	145.0	16.6	<i>Proposed</i>
DMSP film scanning		X	Elvidge	1,000.0	113.5	<i>Proposed</i>
DMSP P/L Activation Messages	X		Elvidge	<i>TBD</i>	44.0	<i>Proposed</i>
Historical solar spectral data		X	Coffey	<i>TBD</i>	21.4	<i>Proposed</i>
Cosmic rays - Forbush archives	X		Coffey	<i>TBD</i>	25.2	<i>Proposed</i>
Historical solar observations		X	Coffey	<i>TBD</i>	45.2	<i>Proposed</i>
Historical ionosonde records		X	Redmon	250.0	45.5	<i>Proposed</i>
Rescue of historical tsunami data		X	Ikelman	<i>TBD</i>	27.6	<i>Proposed</i>



MOUs / MOAs STP Overview



STATUS

NGDC	Team	Type		NOAA Legal	DOC Legal	NGDC Signed	Partner Signed	Start	End	Status	
DMSP Archive	SEG	MOA	DMSP	X	X	X				Y	<i>AFWC/CC in-box</i>
SWx Climatology	SEG	MOU	AFCCC	X	X	X	X	27-May-04	01-Oct-14	G	In place - nothing to report
Ionospheric Data	SEG	MOU	AFWA	X	X	X	X	21-Aug-06	21-Aug-11	G	<i>In place - nothing to report</i>
NASIC	EOG	MOU	NASIC	X	X	X	X	09-Mar-06	01-Jan-11	G	In place - nothing to report
CORS Support	EGG	n/a	NGS	X	X	X	X			Y	<i>1-year extention in process - info only</i>
World Mag Model	EGG	MOU	NGA	X	X	X				Y	<i>Awaiting NGA signature - info only</i>

Change this quarter



SEC-NGDC Summit

Action Item (AI) Status



AI-1 Determine which NWS SWx products are archived from the NOAA Weather Wire Service (NWS)

Status: Complete – recommend closure

AI-2 Determine the status of SEC datasets and products archived within NGDC

Status: On-going – action currently on SEC to prioritize datasets

AI-3 Establish a Data Interface Working Group (DIWG) to recommend roles & responsibilities for data sharing between SEC & NGDC

Status: On-going – GOES-13 PLT used for pilot development

AI-4 Establish an Archive Interface Working Group (AIWG) to address the resource accommodations for current and future (new) SEC data products within NGDC

Status: On-going – Initial focus on GOES-13 – SA planned



Technology Thrust Areas

STP Overview



- **Earth Observation Group (EOG)**
 - DMSP Archive, Products & Services
- **Earth Geophysics Group (EGG)**
 - Natural Hazards Database
 - Continuously Operating Reference Station
 - Geomagnetic Data & Services
- **Space Environment Group (SEG)**
 - Space Physics Interactive Data Resource
 - Space Weather Analysis
 - CLASS Recon Force
 - Satellite SWx Data
 - Solar Data Services
 - Ionospheric Digital Database



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Earth Observation Group Overview

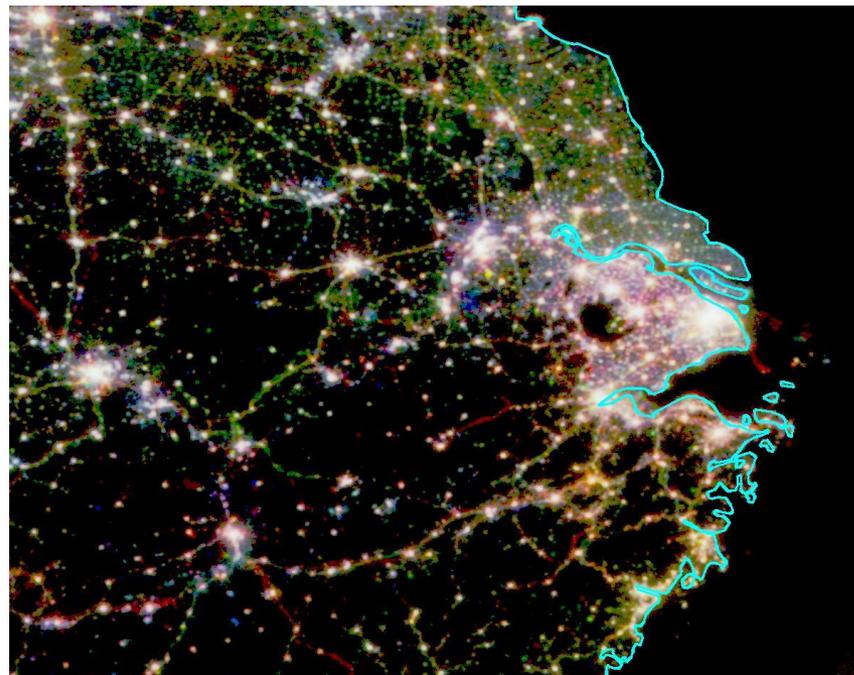


The mission of the EOG is to provide archive data management (ingest, archive and access) for NOAA and other earth observation remote sensing data, development and production of higher-level products, development of data delivery / customer base, and participation with scientific communities

Group Leader: Dr. Chris Elvidge

- Archive grows 15 GB/day
- Archive now at 56 TB¹
- Annual composites are distilled from about 1 TB of geolocated OLS data

¹Does not include DMSP “raw” data backup



DMSP-OLS Average visible band DN color composite of Shanghai (2003, 1998, 1992 as red, green, blue)



STP/EOG Task

DMSP Archive, Products & Services



NightTime Lights of the World



Background – DMSP OLS (visible and infrared) imagery from 1973 to present is used to observe lights from cities, fires, gas flares and fishing boats.

Purpose – DMSP NightTime lights are used to map changes in economic activity, population numbers and constructed area. The products are widely recognized as a key satellite observation of humanities presence on the land and ocean surface.

Upcoming Milestones

2QFY07 – Generate 1st global grid of population numbers in poverty from satellite imagery [*TBD*]

3QFY07 – Implement near real-time visible and thermal global mosaic generation and online access system for nighttime DMSP Operational Linescan System (OLS) [*TBD*]

Team Members: Chris Elvidge, Kim Baugh, Ara Howard, Pat Hayes, Ben Tuttle

Status: Re-processing of the DMSP nighttime lights imagery is progressing at a slow rate. Chris Elvidge speaks at World Bank forum on gas flaring.

www.ngdc.noaa.gov/dmsp/global_composites_v2.html



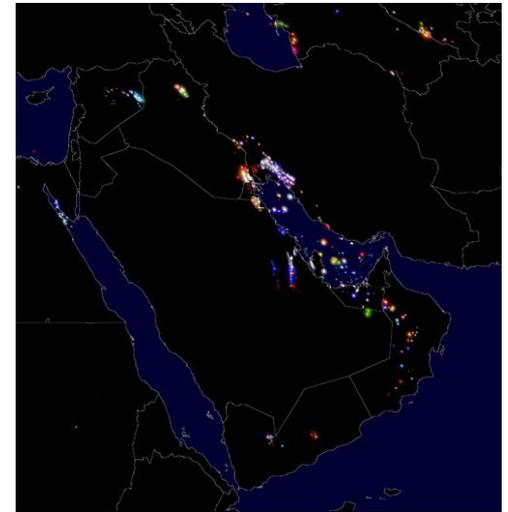
STP/SEG Significant Event

Dr. Elvidge Speaks at World Bank Forum



Background: NGDC's Earth Observation Group has produced the first satellite derived estimate of natural gas flaring volumes using DMSP nighttime lights data. Satellite data are now recognized as the most means of deriving gas flaring estimates.

The image on the right shows gas flaring in the Middle East from 2004 (red), 1998 (green) and 1992 (blue). The coloration of the flares can be related the variations in flaring activity within these three years.



Significance: The 2004 global gas flaring estimate was 175 billion cubic meters (BCM), equivalent to 28% of the annual US natural gas consumption. Utilization of the “waste” gas flared can displace other fuels and, in addition, reducing total carbon emissions to the atmosphere.

World Bank Global Forum on
Flaring Reduction and Gas Utilization
Paris, France, 13-15 December 2006.



Accomplishments (1QFY07)

Earth Observation Group



- One manuscript submitted to a peer-reviewed publication
- Demonstrated recovery of 1978-80 Heat Capacity Mapping Mission data from High Density Tapes marked for purge by NASA (CDMP activity)
- Presented DMSP derived estimates of global gas flaring at international forum
- Initiated production of near-RT global VIS and IR mosaics
- Experimentally opened web mapping service access to the near real-time global mosaics for feedback from users



Issues & Concerns

Earth Observation Group



- Can DMSP archive & access be migrated into CLASS?
- Near real-time ingest & processing system vulnerable to hardware failures – hardware refresh has been requested from ground segment budget
- Film scan archive (50 TB) needs completion of software development and processing to enable geolocation and web access with spatial / temporal query, browse, download
- DMSP raw data archive is in the new ADIC tape library – awaiting reprocessing
- EOG would like to shift from a dedicated processing cluster to a center wide processing cluster



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Earth Geophysics Group Overview



The focus of the EGG is to provide scientific stewardship, products, & services for data from Earth's physical environment supporting safe navigation and mitigating the impact of geophysical hazards. The EGG also supports international data collection, exchange and visiting scientists through the WDC.

Team Lead: Susan McLean





STP/EGG Milestone (AOP) Natural Hazards



Milestone – Develop a tsunami hazard assessment for all U.S. coastal states, territories & commonwealths (as called for by SDR).

Background – The National Tsunami Hazard Mitigation Program (NTHMP), a partnership between federal agencies and states, provides the organizational framework to execute the President’s tsunami initiative, *Tsunami Risk Reduction for the United States: A Framework for Action*. The first specific action called for in this plan is to “Develop standardized and coordinated tsunami hazard and risk assessments for all coastal regions of the United States and its territories.” NOAA’s NGDC has the lead responsibility, working with the USGS.

Completion Date:

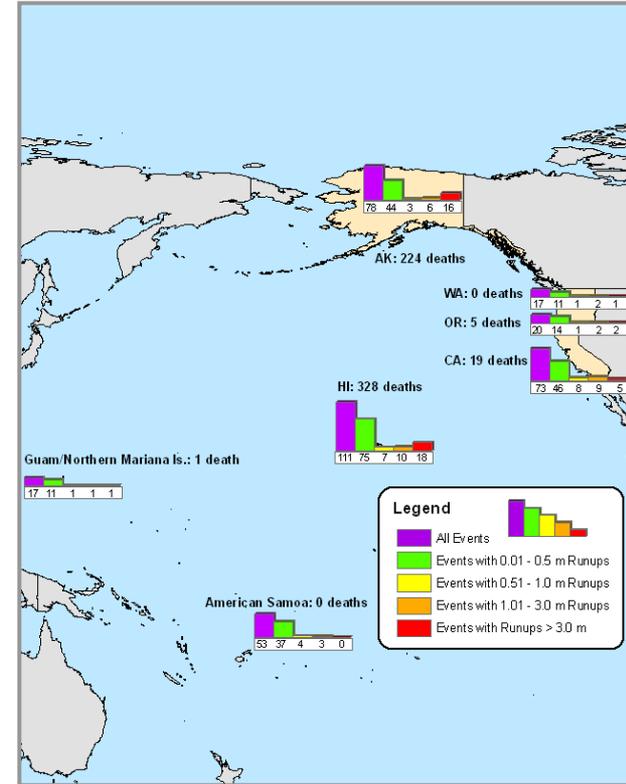
Planned: (Q1) 12/31/2006

Current: (Q1) **Under NTHMP Review** (1/7/2007)

Status – The Hazard Assessment is currently undergoing the final review within NTHMP and the USGS. After approval, the report will be sent to the NOAA PCO to coordinate NOAA approval for print and distribution.

Cognizant Person: Paula Dunbar

Program:



Map showing total number of tsunami events and events by runup heights for states and territories in the Pacific Ocean



STP/EGG Milestone (AOP)

Natural Hazards



Milestone – Develop a robust document for delivering accurate tsunami data rapidly to TWCs and then to other NOAA and the public.

Background – At the heart of the enhanced NOAA Tsunami Program, is the capability to forecast tsunamis. This capability relies on rapid access to data for real-time evaluation, and reliable access to quality retrospective data for research and hazard assessment. This document identifies the flow of data from acquisition to archive, partially addressing Action 6 of the

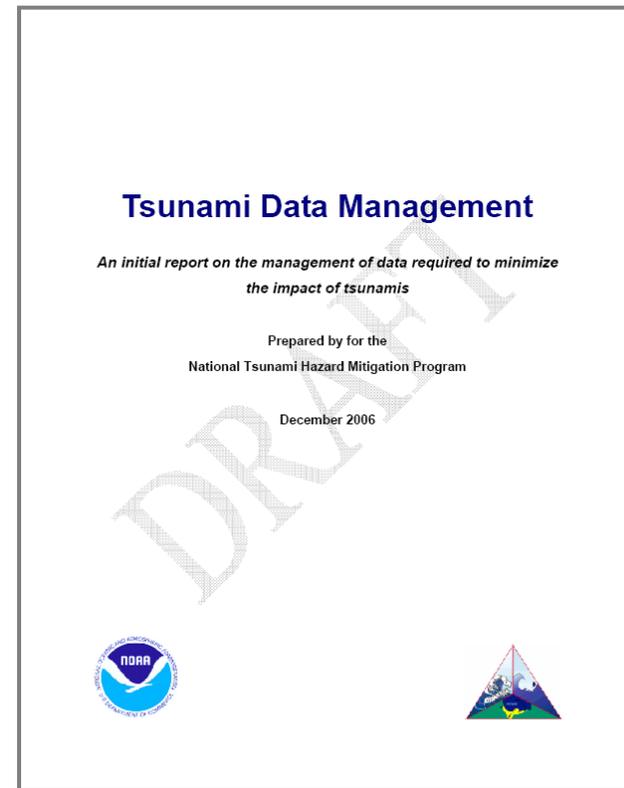
President’s Framework for Action “Encourage data exchange and interoperability”.

Completion Date - Planned: (Q1) 12/31/2006

Current: (Q1) **Under Review** – 1/7/2007

Status – The Hazard Assessment is currently undergoing the final review within NTHMP and NOAA. After approval, the report will be sent to the NOAA PCO to coordinate NOAA approval for print and distribution.

Cognizant Person: Susan McLean



Cover of the draft Tsunami Data Management Report

Program: Tsunami



Accomplishments

Earth Geophysics Group



- **Completed first national tsunami hazard assessment for the U.S. States and Territories; Final draft under NTHMP review**
 - **Completed qa of historic database for all U.S. coasts**
- Completed national tsunami data management report; Final draft under NTHMP review
- *Scientific and Technical Issues in Tsunami Hazard Assessment for Siting of Nuclear Power Plants*; Final Draft 2006. Science Review Working Group: González (Chair), Bernard, **Dunbar**, Geist, Jaffe, Kanoglu, Locat, Mofjeld, Moore, Synolakis, Titov
- **Reached agreement with INTERMAGNET for the acquisition, archive, and distribution of definitive geomagnetic data**
 - 440 observatory years of data prepared for archive and SPIDR
 - Developed template for station-level metadata using the NMMR
- **Completed the NOAA candidate for the IAGA World Digital Magnetic Anomaly Map**; Selected by WDMAM at AGU as base map
- CORS data archive nears 20 Terrabytes
- Staff attended CODATA, NTHMP, and AGU conferences; presented papers, posters, and chaired sessions



Issues & Concerns

Earth Geophysics Group



- **Vacancies**
 - CIRES PRA Geodesist offer accepted, begin date ~15 Jan (Ron Buhmann retirement date set for 2 February)
 - Non-real time data librarian vacancy ready to fill if approved
 - CIRES / Geomag RA vacancy to be advertised 01/2007
- **Publication of NTHMP / NOAA Reports**
 - Two reports under auspices of NTHMP and at request of SDR
 - Path for approval likely to be NTHMP, USGS & NOAA PCO
 - Susan McLean and Paula Dunbar NOAA leads
 - Final drafts under NTHMP & USGS review now
- **Serving Times Series Data**
 - Reviewing content & capability for geomagnetic data in SPIDR
 - Expanding geomagnetic station histories in SPIDR
 - DART data new dynamic plot capability using ORACLE and JPLOT in final review
- **Supporting Real-time Operational USTEC**
 - Single points of failure in acquisition & transfer of receiver data



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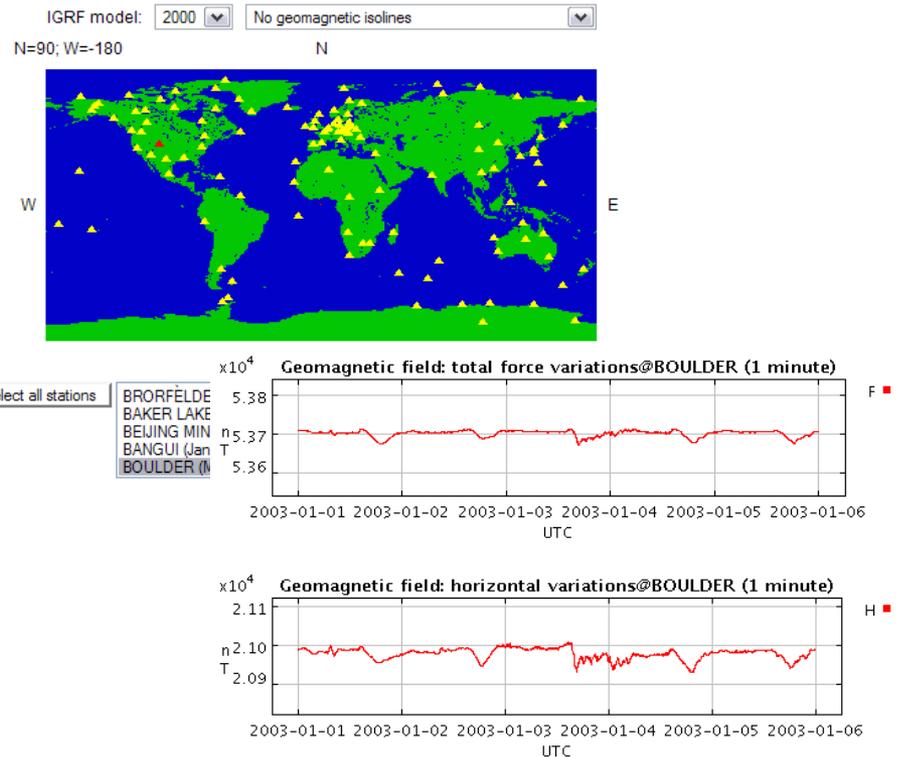
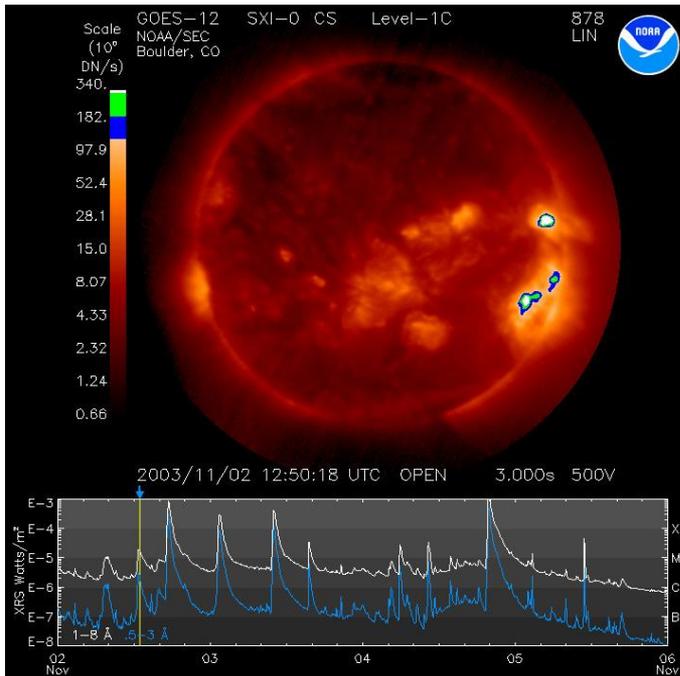


Space Environment Group Overview



The Space Environment Group is focused on the archive and management of NOAA's space environmental data. The SEG also supports international data exchange and collection through World Data Center activities.

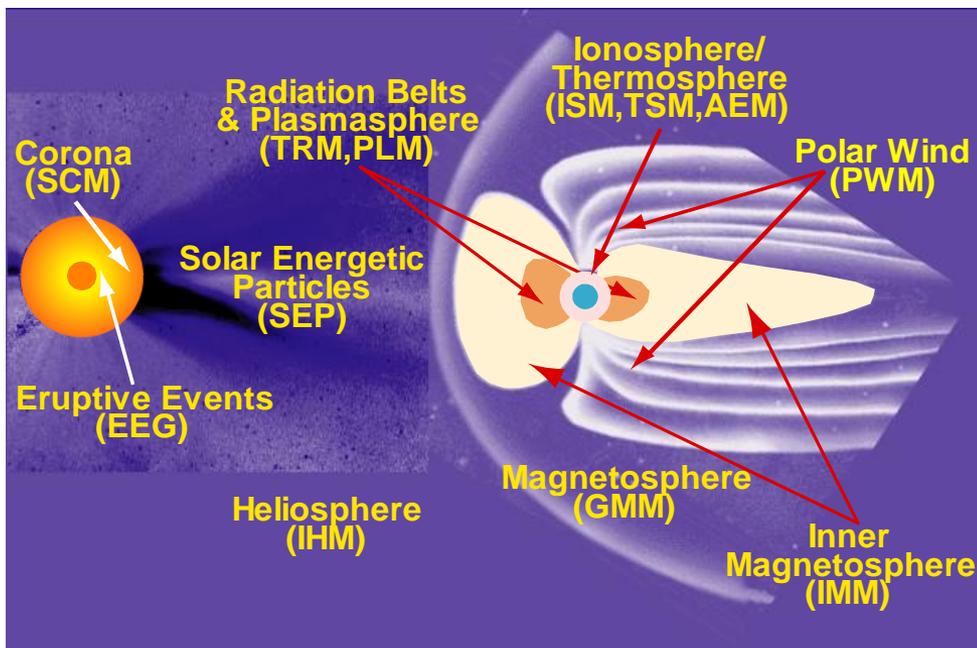
Group Leader: Dr. Eric Kihn



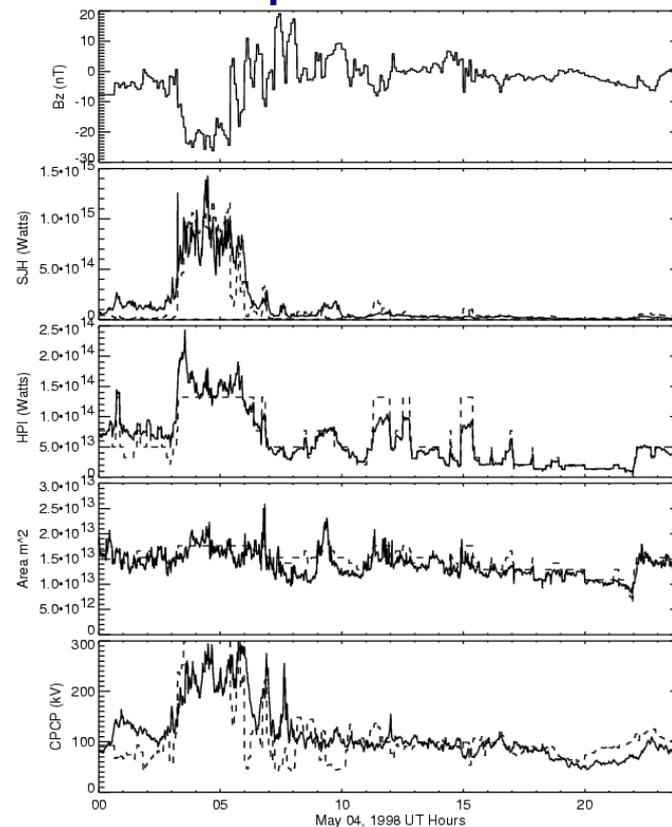
Special Interest Item

GEM New Campaign

Background: At the December AGU meeting the Geospace Environment Modeling steering to committee met to consider new GEM campaigns replacing those expiring in 2006. Of the two chosen one “Space Climatology” is directly the result of the SWA work. This group will be headed by Paul O’Brien of Aerospace and will be active in GEM over the next five years.



Sample SWA Product



Significance: The adoption of this working group means the scientific community recognizes the importance of space weather climatology and is willing to commit resources in this area.



STP/SEG Task CLASS Recon Force



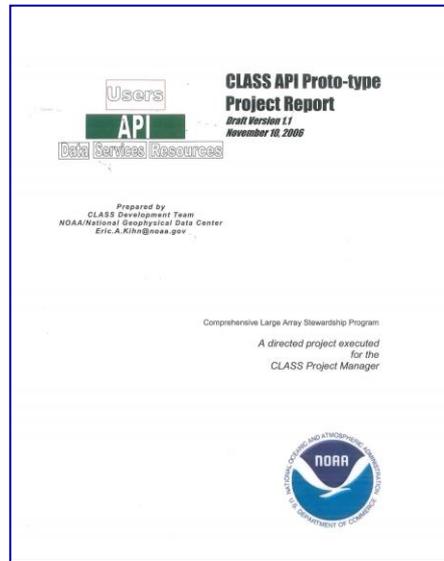
Comprehensive Large Array-data
Stewardship System (CLASS)



Background – CLASS is the archive and distribution system for NOAA’s large array data. NGDC is getting a node.

Purpose – NGDC would like to rapidly proto-type and develop an “open-CLASS” architecture capable of integrating many of NGDC’s diverse data sets with the CLASS-ADS.

**CLASS API
Proto-type
Project Report
Draft Ver 1.1
10 Nov 2006**



Team Members: Eric Kihn, Rob Redmon, Rob Prentice, Mikhail Zhizhin, Ted Habermann

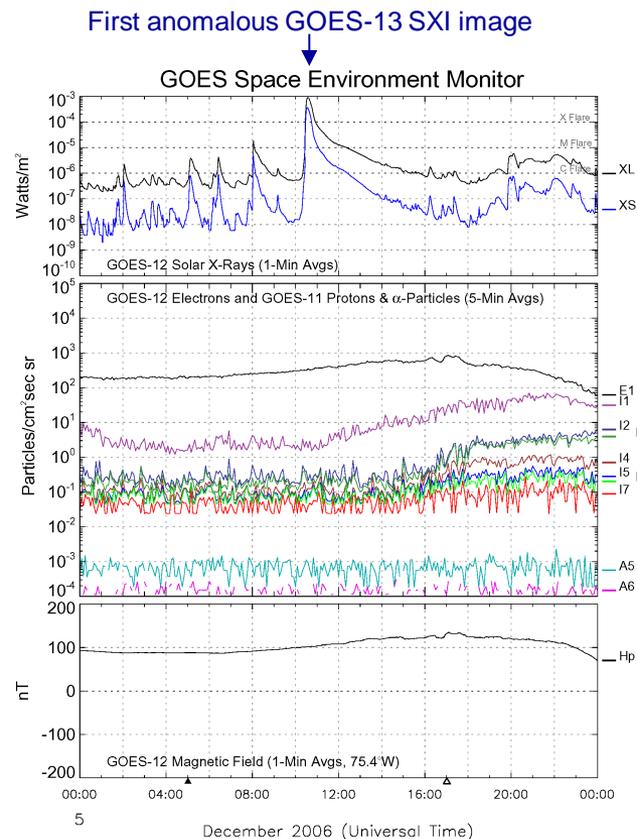
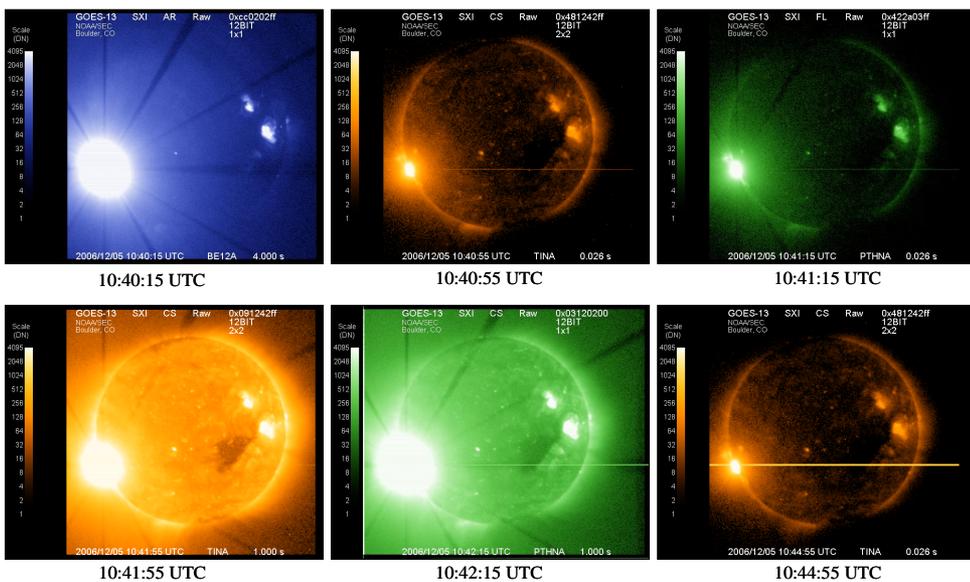
Status – SEG has been funded to develop Application Program Interfaces (APIs) for CLASS. API code development was completed in 1QFY07 and the products, with associated documentation, delivered to the CLASS program office in Nov 2006.

Space Weather program

Special Interest Item

SXI Anomaly

Background: GOES-13 SXI experienced a CCD anomaly during the X9 solar x-ray event on December 5th 2006. A preliminary flare report based on GOES-12 XRS data indicates that the flare in question began at 10:18 UT, peaked at 10:35 UT, and ended at 10:45 UT. The first GOES-13 image to show a faint indication of the anomaly was taken at 10:40:15. X-ray emissions from the solar flare seriously damaged the SXI focal plane.



Significance: The degradation in capability for the SXI has serious operational consequences for SWx and will require increased instrument oversight to minimize the possibility of further damage.



STP/SEG Significant Event

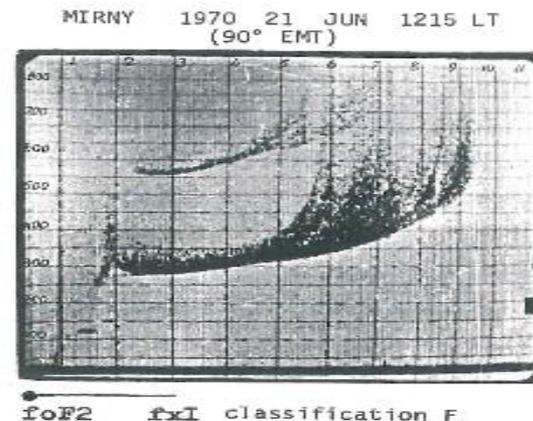
IRI Symposium



International Reference Ionosphere
Bueno Aires, Argentina
16-19 October 2006.

Background: Rob Redmon was invited to present a paper at the International Reference Ionospheric (IRI) workshop to discuss issues and status of the SPIDR ionospheric database. Mr Redmon provided an overview of the situation and discussed mitigation strategies underway within STP to ensure the integrity of the database.

Figure on the right is a sample ionogram used to determine features of the ionosphere. SPIDR database includes considerable holdings of ionograms from 1942 to present.



Significance: NGDC maintains the world's most extensive record of ionosonde data available. Maintaining the integrity of the database is critical to supporting the needs of the research community. Long-term records of the ionosphere also have application in climate change studies.



STP/SEG Task Ionospheric Data Rescue



Paper Records



Data Volume: 190,000
Percent Complete: ~1%
Estimated Done: N/A

Status: CDMP project redirected. Task is currently on hold

Film Ionograms



Data Volume: 12,000
Percent Complete: ~.1%
Estimated Done: TBD

Status: CDMP kntr is having significant film processing issues

Magnetic Tape



Data Volume: 23,000
Percent Complete: 35%
Completion Date: FY08

Status: In-house task. Expected completion in FY08



Accomplishments (FY07 Q1)

Space Environment Group



- CLASS – API delivery complete
- **Passed field tests with USGS for ionosonde-magnetometer collocation**
- *Finished QAing and reloading IPS ionosonde data*
- ***Presented SPIDR ionosphere status and plans at IRI and retrieved 5 years of Tucuman ionospheric data.***
- *AGU: 4 presentations*
- *CODATA: 2 presentations and 1 session chair*
- ***Served as NGDC representative to Interdisciplinary Scientific Environmental Technology (ISET) Program***



Issues & Concerns

Space Environment Group



- **SEG has critical need for 20+ Tb of spinning disk storage – with redundancy (*reference discussions with ISD*)**
- **Development of ADIC-API needed Center-wide (*Action with STP*)**
- **Upcoming retirement – Helen Coffey**

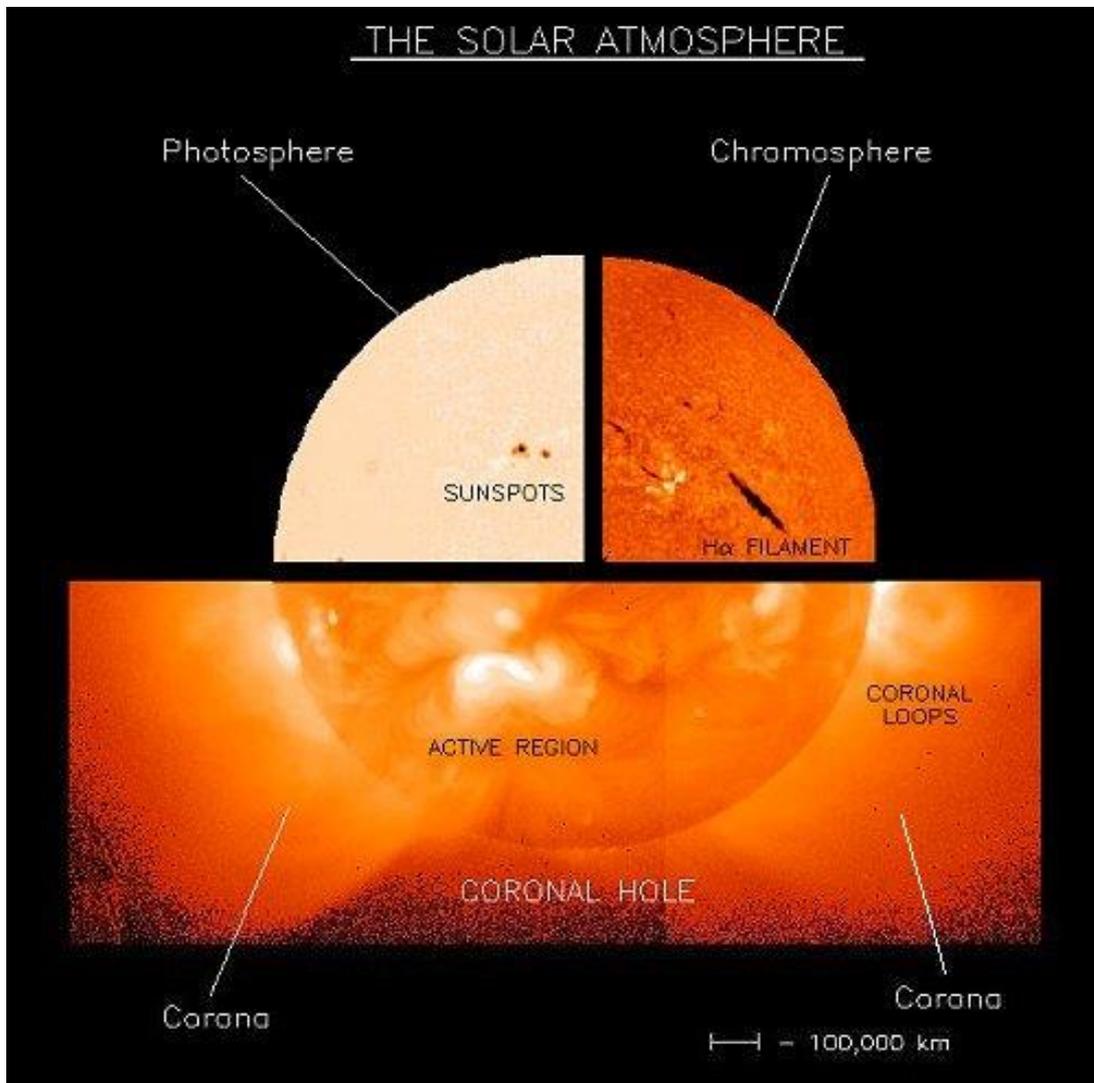


OUTLINE



STP Program Management Review

- **STP Overview/Status**
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- **Earth Geophysics Group**
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- **STP Business Plan**
- **Concluding Remarks**



Surface Layers of the Sun

Photosphere – Visible (gas) surface of the Sun. The temperature of the photosphere is $\sim 5,700$ °K. Typically imaged in white light and in magnetograms. Features include sunspots, faculae, granules¹ and supergranules¹.

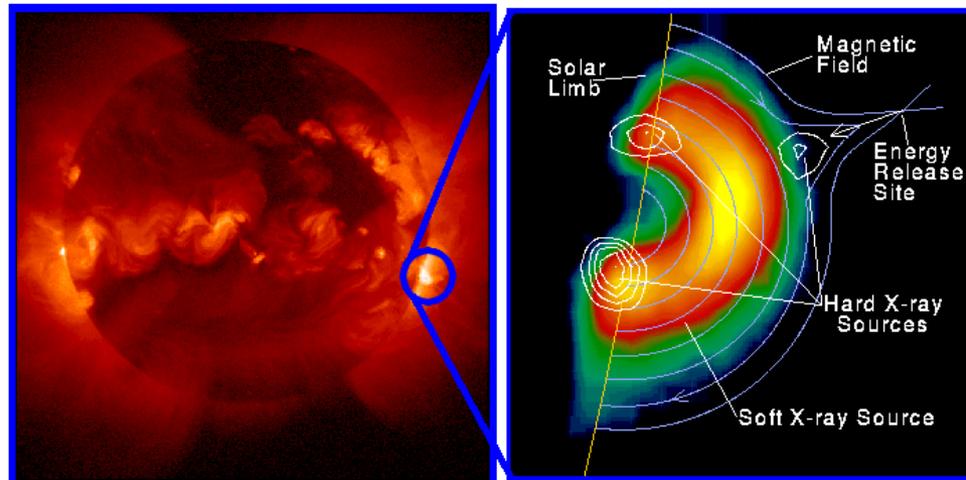
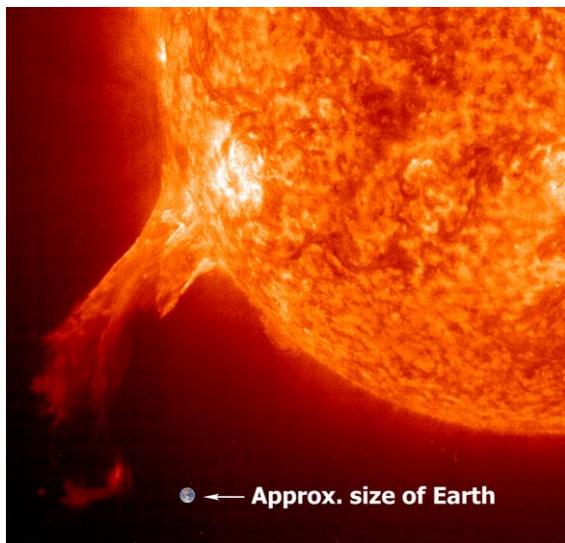
Chromosphere – Hotter, less dense outer thin layer. Thickness is ~ 2000 km. The temperature of the chromosphere is 6,000-to $\sim 50,000$ °K. Spectrally imaged in H-alpha (656.3 nm, Ca-II K (393.4 nm), He I (108.3 nm) and He II (304Å). Features include the chromospheric network, filaments, plage, prominences and spicules¹.

Corona – Faint, outer-most layer. Imaged in radiowaves, X-rays and spectral lines of H-alpha, Ca-II K, Fe XIV (530.3 nm) and Fe X (637.4 nm). Features include helmet streamers, polar plumes, coronal loops, coronal holes, CMEs and solar flares.



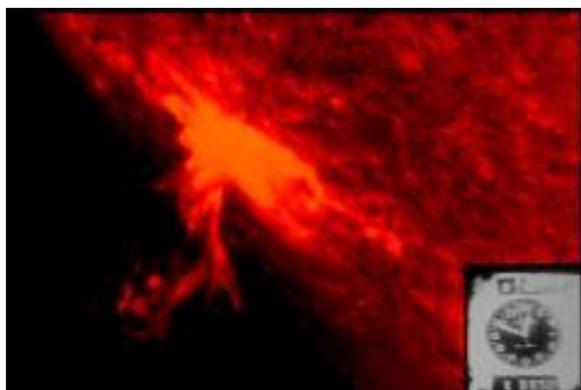
SOLAR DATA SERVICES

Corona – Features - Solar Flares



Yokohoh X-ray image of a solar flare

Solar Flare – A flare is defined as a sudden, rapid, and intense variation in brightness. A solar flare occurs when magnetic energy that has built up in the solar atmosphere is suddenly released. Radiation is emitted across virtually the entire electromagnetic spectrum, from radio waves at the long wavelength end, through optical emission to x-rays and gamma rays at the short wavelength end.



*Big Bear Solar Observatory
(viewed in H-alpha)*

Note: GOES SXI is a soft X-ray detector 6-60 A (0.2-2.1 keV)
GOES XRS: 0.5-4 A (3-25 keV) & 1-8 A (1.5-12 keV)



SOLAR DATA SERVICES

NGDC Solar Program – History



- 1942 J. V. Lincoln (NBS) & A. Shapley (DTM) use solar data for ionosphere assessments
- 1946 CRPL formed to study solar and geophysical effects on radio propagation
- 1947 Shapley moves to NBS & appointed as Chief, Sun-Earth Relationships Section
- 1949 McNish and Lincoln publish McNish-Lincoln sunspot prediction method
- 1955 NBS begins monthly publication of Solar-Geophysical Data (SGD) bulletin**
- 1957 WDC's created during IGY including WDC-A for Solar Activity at CU
- 1966 ASDC established within NBS – includes SGD and solar archives
- 1967 WDC-A for Solar Activity transferred from CU to ASDC**
- 1972 NGSDC established – Lincoln appointed Director, WDC-A for Solar-Terrestrial Physics
- 1972 Helen Coffey joins NGSDC**
- 1973 Catalog of Data on Solar-Terrestrial Physics, Report UAG-30, published
- 1980 Begins digital RSTN database.
- 1991 SGD publishes Yohkoh solar X-ray images.
- 2006 SGD publication celebrates 50 years!



SOLAR DATA SERVICES

Data Sources - Ground



Debreceen Heliophysical Observatory
Debreceen, Hungary



Belgrade Astronomical Observatory
Location: Belgrade, Serbia (Yugoslavia)



Wilcox Solar Observatory
Stanford, CA



Observatoire de Paris-Meudon
Meudon, France



Lomnický štít Observatory
Lomnický Peak, Slovakia



Kodaikanal Solar Observatory
Kodaikanal, India



**Dominion Radio
Astrophysical Observatory**
Penticton, BC Canada



**Sacramento Peak
National Solar Observatory**
Sacramento Peak, NM



Mount Wilson Solar Observatory
Mt Wilson, CA



Kitt Peak National Observatory
Kitt Peak, AZ



ABASTUMANI ASTROPHYSICAL OBSERVATORY
Republic of Georgia



SOLAR DATA SERVICES

Solar Observations



Radiant Emissions

- Total Solar Irradiance
G00547 – Total irradiance
- Solar UV
G00542 – UV radiance
- Solar Radio
G00540 – Quiet sun
G00216 – Spectral radio
- Solar Magnetic Field
G10129 – Sun as a star

Solar Imagery

- Photosphere
G10109 – Solar images
- Chromosphere
G00535 – Calcium
G00039 – Solar brightness
- Solar Corona
G00538 – Solar corona
- Solar Magnetic Imagery
G00533- Solar magnetic field

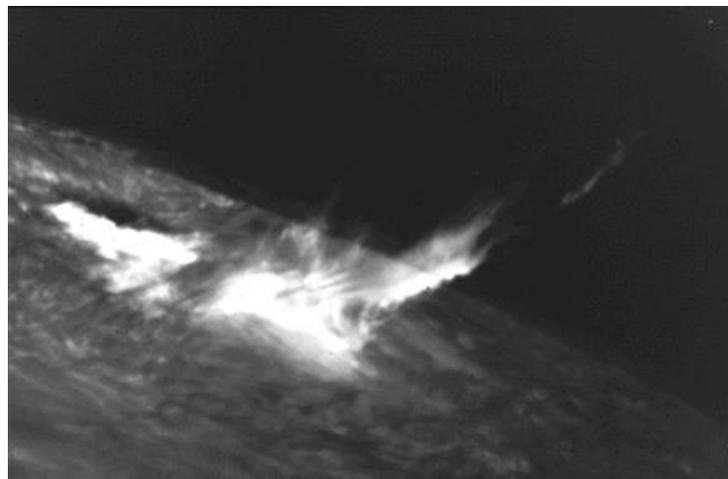
Solar Features

- Solar Flares
G00537 – Solar flare tables
G00580 – XRS (GOES)
G00118 – H-alpha
G01256 – H-alpha/X-rays
G00747 – Solar flares/sunspots
- Prominences & Filaments
G00534 – Prominences/filaments
G00536 – Cartes synoptique
- Plage Regions
G01251 – Solar active regions (CD)
G10111 – Solar chromosphere
- Sunspots
G00532 – Sunspot numbers
G01350 – Zurich sunspot # (slides)
- Solar Radio
G00130 – Solar radio events
G01254 – Solar radio bursts
G00549 – Solar radio scans



SOLAR DATA SERVICES

Solar Flare Data



National Solar Observatory

Surge Prominence and Flare in H-alpha

BACKGROUND

Title: H-Alpha, EUV, X-ray, White Light, Coronal Line and Radio Observations and Comments About Associated Activity

Description: Table of solar transients including H-alpha, EUV, X-ray, while light, coronal line and radio observations. Includes recommended flare classification and location of the solar disk.

Source: Ground-based solar observatories

STATUS

Media: available on-line

Dates: 1938 - present

BAT IUD: 1592 (G00537)

<http://www.ngdc.noaa.gov/stp/SOLAR/ftpsolarflares.html>



Activity Level (CY2006):

	#hits	#users	xfr (Mb)	Vol (Mb)
https	6,210	2,548	316	-
ftp	145,451	1,786	65,590	262

STP PMR – 11 Jan 2007

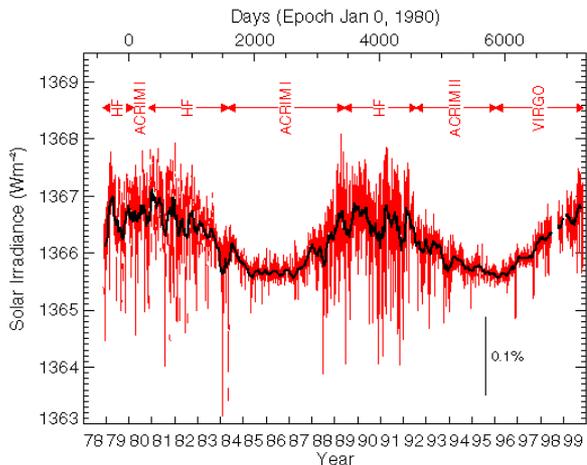
RECOMMENDATIONS

[Users Overview](#) –



SOLAR DATA SERVICES

Solar Irradiance



Solar Irradiance (1978 – 2000)

BACKGROUND

Title: Solar Irradiance

Description: The "solar constant" is, in fact, not constant and variations on solar rotational and active region time scales do occur. Short-term decreases are caused by sunspots in magnetically active regions whereas short-term increases occur due to solar faculae.

Source: Satellite and high altitude aircraft measurements

STATUS

Media: All data available online

Dates: Varies by mission, ~1978 to present

BAT IUD: 1533 (G00547)

<http://www.ngdc.noaa.gov/stp/SOLAR/ftpsolarirradiance.html>

Activity Level (CY2006):

	#hits	#users	xfr (Mb)	Vol (Mb)
https	4,269	2,047	77	-
ftp	11,663	1,530	2,050	27

STP PMR – 11 Jan 2007

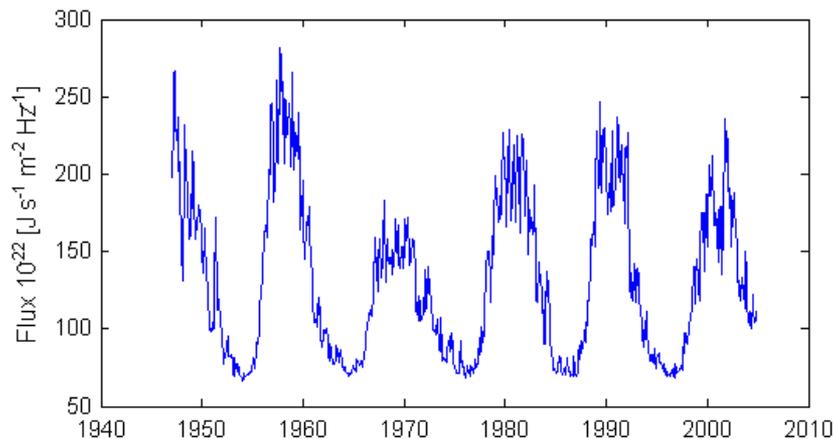
RECOMMENDATIONS

[Users Overview](#) –



SOLAR DATA SERVICES

Solar Radio Emissions – Quiet Sun



Solar F10.7 Flux (1947 – present)

BACKGROUND

Title – Recording of the quiet sun emissions of radio energy (slowly varying intensity)

Description – Measurements of solar radio emissions at specific wavelengths between 1 cm & 1 m. Slowly varying or S-component at 10.7 cm attributed to A.E. Covington (Penticton solar radio flux values).

Source – Ground-based solar observatories (up to 55, primarily DMAO and USAF RSTN)

STATUS

Media: Available online

Dates: 1947 - present

BAT IUD: 1549 (G00540)

<http://www.ngdc.noaa.gov/stp/SOLAR/ftpsolarradio.html#noonflux>



Activity Level (CY2006):

	#hits	#users	xfr (Mb)	Vol (Mb)
https	5,858	2,466	442	-
ftp	87,219	1,814	2,670	5

STP PMR – 11 Jan 2007

RECOMMENDATIONS

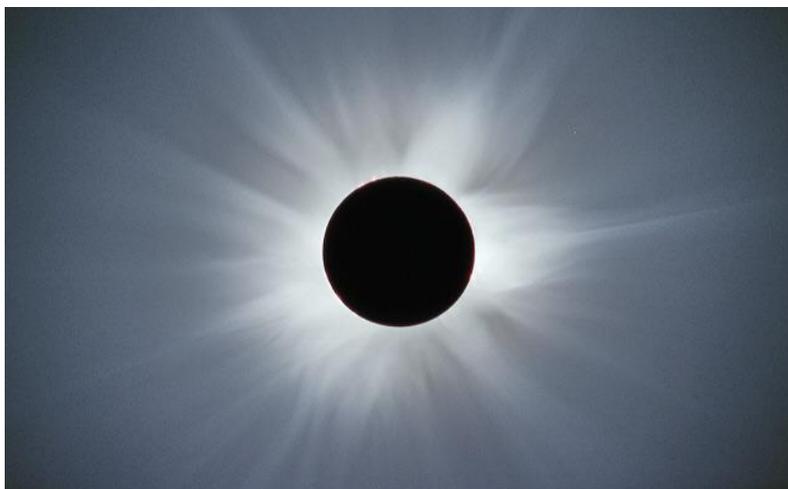
[Users Overview](#) –

Solar Radio Emissions



SOLAR DATA SERVICES

Solar Corona



2001 Africa eclipse

BACKGROUND

Title: Solar Coronal Data

Description: Measurements of the solar corona detected in Fe XIV (530.3 nm), H-alpha (656.3 nm) synoptic charts and coronal holes

Source: Ground observatories (Lomnický Observatory, Kitt Peak, etc.) and satellite measurements (OSO, SkyLab)

STATUS

Media: Available on-line

Dates: 1939 - present

BAT IUD: 1590 (G00538)

<http://www.ngdc.noaa.gov/stp/SOLAR/ftpsolarcorona.html>



Activity Level (CY2006):

	#hits	#users	xfr (Mb)	Vol (Mb)
https	3,080	1,169	169	-
ftp	60,489	489	5,540	75

RECOMMENDATIONS

[Users Overview](#) –



SOLAR DATA SERVICES

NGDC Solar Program – Current Status



- Efforts within the NGDC Solar Program primarily support World Data Center (WDC) functions & responsibilities¹
- Solar data are mostly derived from ground-based solar observatories – majority of the solar satellite data maintained by NASA and WDC for Rockets & Satellites
- NGDC has the world's most comprehensive solar archive in terms of longevity and data diversity
- Monthly Solar Geophysical Data (SGD) bulletin is a valuable resource referenced by the research community

The Boulder Solar Alliance (BSA) may be asked to comment on future directions for the NGDC solar program

¹Caveat: GOES XRS & SXI are part of the NOAA Observing System Architecture



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Business Plan

Solar & Terrestrial Physics Division



Solar and Terrestrial Physics Division (STP)

- 1.0 Executive Summary**
 - 1.1 Objectives**
 - 1.2 Mission**
 - 1.3 Keys to Success**
- 2.0 Company Summary**
- 3.0 Products**
- 4.0 Market Analysis Summary**
- 5.0 Strategy and Implementation**
- 6.0 Management Summary**
- 7.0 Financial Plan**

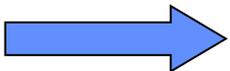


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Concluding Remarks

STP Program Management Review



METRICS (1QFY07)

- Peer Review Publications: 2 published; 5 submitted
- Reports: 0 published; 5 external review
- Presentations: 18 (2 IRI / 4 Codata / 8 AGU / 4 others)
- Milestones: 2 Completed / 8 Pending / 5 Proposed

ISSUES

- Succession: Solar Data Manager – pending retirement
03 Apr 07
- Real-time Data Manager – mission-essential position?
- STP Business Plan due to the Director