Recent Activities at Space Environment Center

Joseph M. Kunches
Chief, Space Weather Operations
NOAA Space Environment Center
Boulder, Colorado USA

SWENET: Space Weather European Network
3-5 November 2003, ESTEC, Noordwijk

Outline

- Political Turmoil
- Recent Space Weather!!!
- Recent Verification Update
- New Operational Model – STORM
- SEC move to the National Weather Service
- Customer Feedback

Calendar No. 274

108TH CONGRESS

Report

SENATE

1st Session

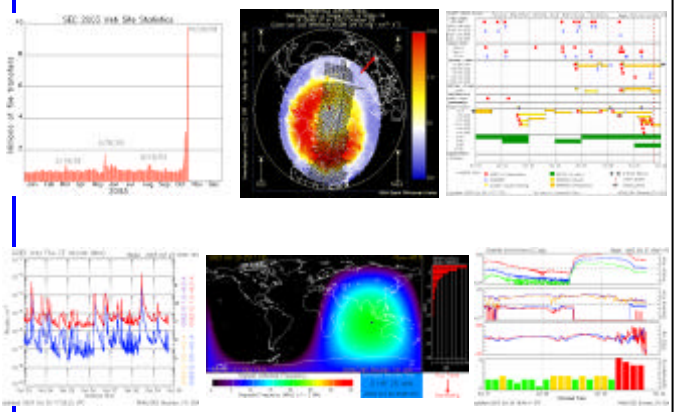
108-144

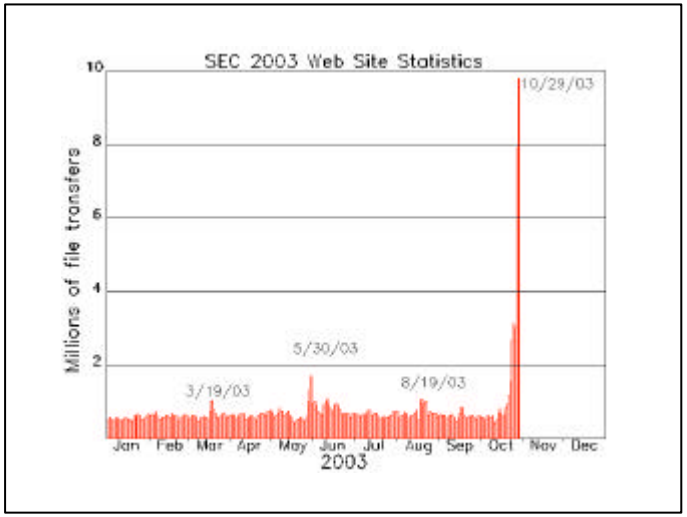
DEPARTMENTS OF COMMERCE, JUSTICE, AND STATE, THE JUDICIARY, AND RELATED AGENCIES APPROPRIATION BILL, 2004

Solar observation. - The "Atmospheric" in NOAA does not extend to the astral. Absolutely no funds are provided for solar observation. Such activities are rightly the bailiwick of the National Aeronautics and Space Administration and the Air Force.

SEC Web Statistics and Products

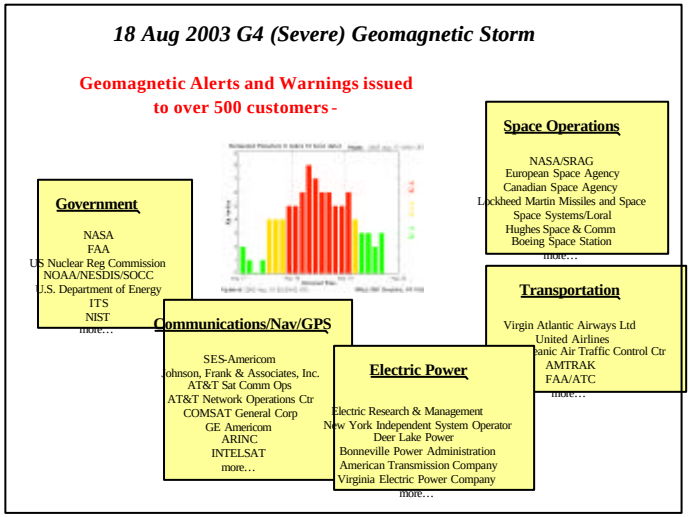
NOAA Space Environment Center




SEC 2003 Web Site Statistics
Millions of file transfers
10
8
6
4
2
10/29/03
5/30/03
3/19/03
8/19/03
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2003


BBC NEWS
Solar storm buffets Earth
The Earth has been buffeted by a cloud of superhot gas thrown off the Sun a few days ago. Scientists report it caused a moderate "geomagnetic storm".
Charged particles affected electric utilities, airline communications and satellite navigation systems.
"We predicted it would be a mid-level storm, and that's where it is," said Joe Kunches, chief of space weather operations at the National Oceanic and Atmospheric Administration's Space Environment Center in Boulder, Colorado.
Power grid operators and satellite users were notified about the storm and no serious problems have been reported.
"We've heard from the power grid operators. They're doing ok, but they're seeing the effects of the storm in their data," Kunches said.
Balancing act
Communications systems in northern Canada are reported to have also seen some effects of the storm.
Disruptions to electrical systems are caused by wild

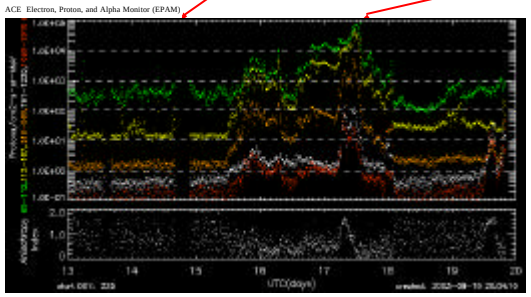

CNN.com
Major power outage hits New York, other large cities
Thursday, August 14, 2003 Posted: 11:45 PM EDT (0345 GMT)
NEW YORK (CNN) -- Power began to flicker on late Thursday evening, hours after a major power outage struck simultaneously across dozens of cities in the eastern United States and Canada.
By 11 p.m. in New Jersey, power had been restored to all but 250,000 of the nearly 1 million customers who had been in the dark since just after 4 p.m., a spokeswoman for Public Service Energy and Gas said.
The Upper West Side of Manhattan is seen from Weehawken, New Jersey
Ottawa
Toronto
Michigan
Detroit
Toledo
Cleveland
Ohio
Erie
Pennsylvania
Albany
New York
Vermont
Massachusetts
Connecticut
New York
New Jersey


18 Aug 2003 G4 (Severe) Geomagnetic Storm
Geomagnetic Alerts and Warnings issued to over 500 customers -
Government
NASA
FAA
US Nuclear Reg Commission
NOAA/NESDIS/SOCC
U.S. Department of Energy
ITS
NIST
more…
Space Operations
NASA/SRAG
European Space Agency
Canadian Space Agency
Lockheed Martin Missiles and Space
Space Systems/Loral
Hughes Space & Comm
Boeing Space Station
more…
Transportation
Virgin Atlantic Airways Ltd
United Airlines
anic Air Traffic Control Ctr
AMTRAK
FAA/ATC
more…
Communications/Nav/GPS
SES-Americom
Johnson, Frank & Associates, Inc.
AT&T Sat Comm Ops
AT&T Network Operations Ctr
COMSAT General Corp
GE Americom
ARINC
INTELSAT
more…
Electric Power
Electric Research & Management
New York Independent System Operator
Deer Lake Power
Bonneville Power Administration
American Transmission Company
Virginia Electric Power Company
more…

18 Aug 2003 G4 (Severe) Geomagnetic Storm – ACE EPAM

Solar eruption occurred on 14 Aug

Large mass ejection impacts ACE on 17 Aug

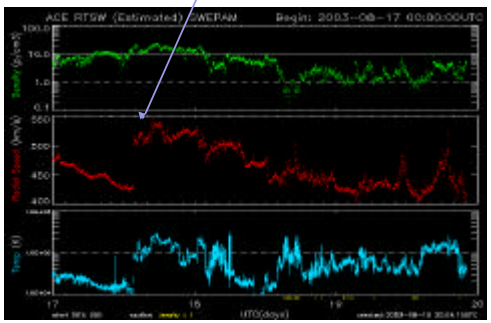


- The enhancements in the low energy protons alerted forecasters to the strong possibility of an Earthbound coronal mass ejection, over 24 hours in advance!

- The magnitude of the enhancement suggested a strong magnetic storm was possible.

18 Aug 2003 G4 (Severe) Geomagnetic Storm – ACE SWEPAM

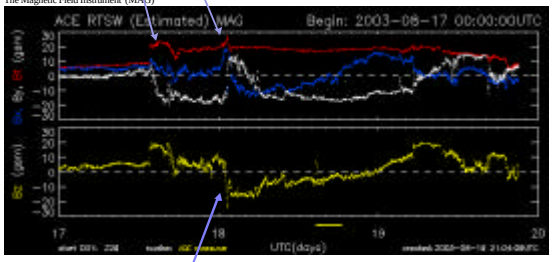
The mass ejection impacts ACE on 17 Aug/1340Z – almost 66 hours after the eruption on the sun.



Measurements at L1 provide 30-45 minutes leadtime before the mass ejection impacts the Earth's magnetic field, but interplanetary magnetic field information will determine which warnings should be issued.

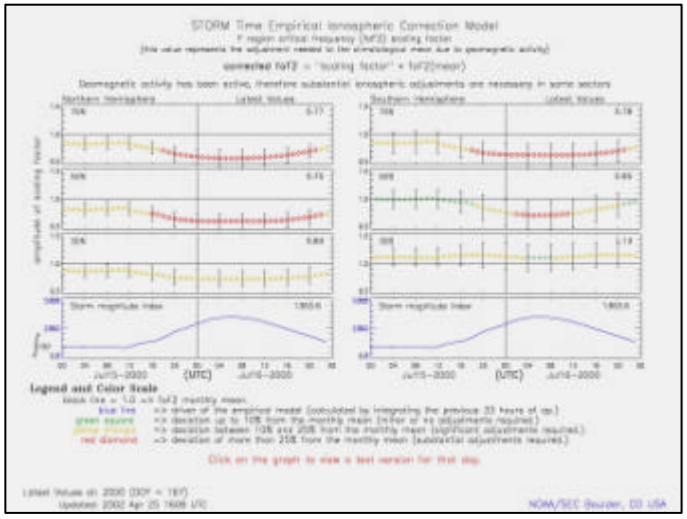
18 Aug 2003 G4 (Severe) Geomagnetic Storm – ACE Mag

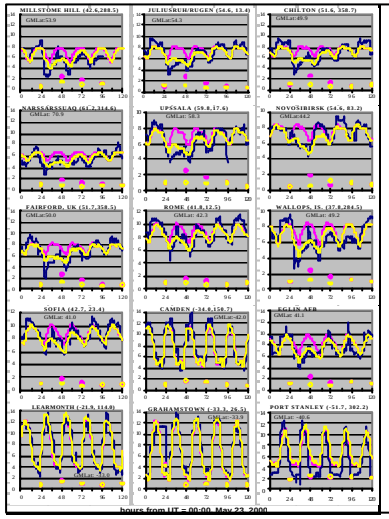
Strong magnetic field measurements at ACE alert forecasters to potentially severe geomagnetic storming.



- Forecasters wait for "rotation", then issue K6 warning at 18/0439Z to over 400 customers.

- K6 occurs at 18/0641Z – 2:02 Hours Leadtime!

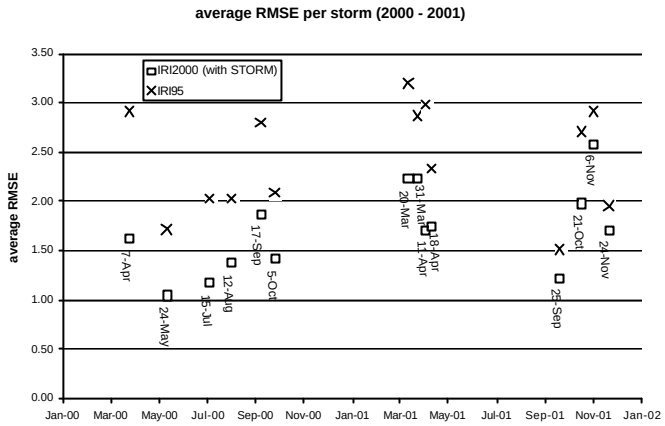


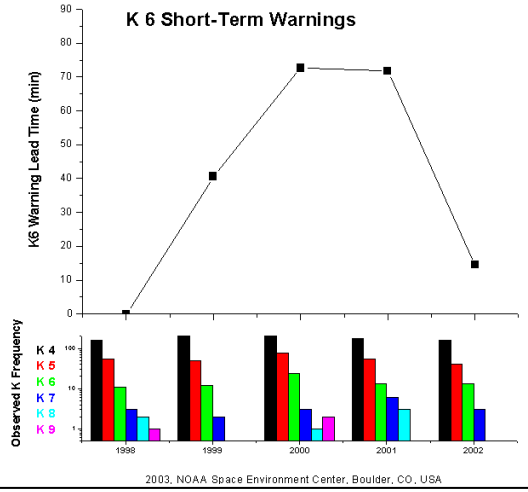


May 23-27, 2000

- IRI2000 (with STORM)
- IRI95
- foF2 observed
- RMSE IRI95
- RMSE IRI2000

Statistical Comparison





K 6 Short-Term Warnings (1999-2002)
Contingency Table

K 6 Warning Issued	K 6 Observed: YES	K 6 Observed: NO
YES	HIT 35	FALSE ALARM 13
NO	MISS 33	Correct Null 11,607

Statistic	Value
Hits	35
Misses	33
False Alarms	13
Bias	0.70
Heidke Skill Score	0.60
Critical Success Index (CSI)	0.43
Probability of Detection (POD)	0.51
False Alarm Ratio (FAR)	0.27

Note: Please see verification glossary for statistics definitions

2003, NOAA Space Environment Center, Boulder, CO, USA

M Flare Forecast Reliability