

# The Operational Swx Data System in NSSC, Chinese Academy of Sciences

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Gong

National Space Science Center, CAS

# Outline

- I. **General information of Space Environment Prediction Center (SEPC)**
- II. **Operational Swx Data System(OSDS) in SEPC**
- III. **Summary**

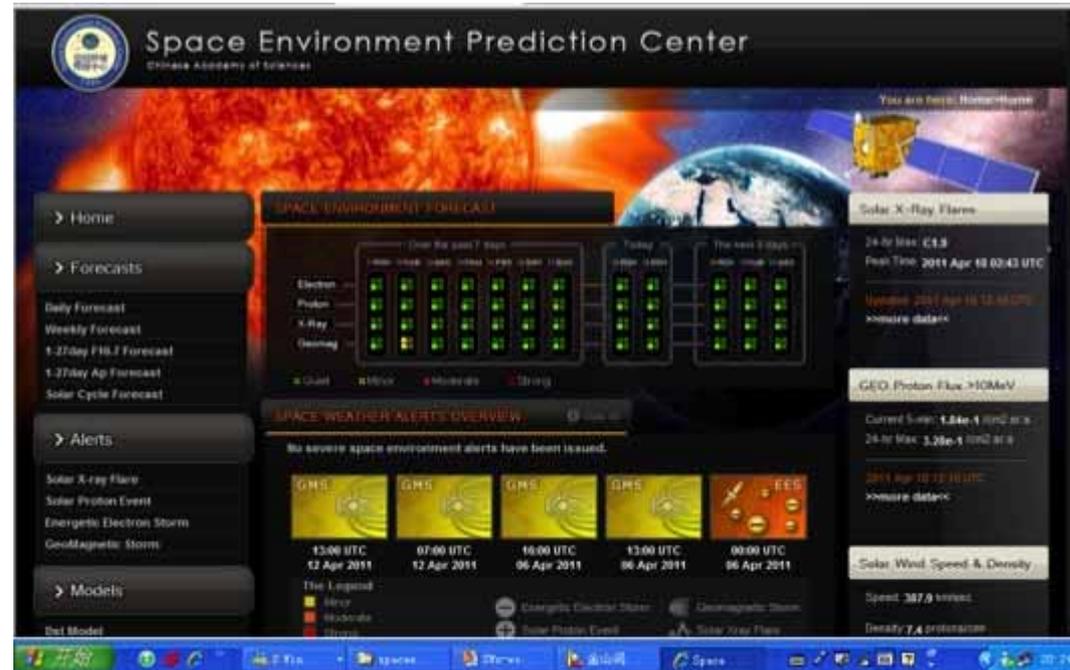
# SEPC – Foundation

- To support China manned space missions, SEPC was established in 1992 in NSSC,CAS;
- SEPC Set up its space environment operational system and forecasting team in 1998.
- Started to issue space environment prediction via internet and provide space environment prediction service for customers in 1998 .

❖ 7days/week, 365days/year

<http://www.sepc.ac.cn>

n



# RWC-China

- SEPC is one of the four sub-centers of Regional Warning Center-China (RWC-China, ISES).



**SAPC** (Solar Activity Prediction Center)



**NAO/CAS** (National Astronomical Observatories)

**SEPC** (Space Environment Prediction Center)



**CSSAR/CAS** (Center for Space Science and Applied Research)

**IDPC** (Ionospheric Disturbance Prediction Center)



**RPRI** (Radio--Wave Propagation Research Institute)

**GSPC** (Geomagnetic Storm Prediction Center)



**GGI/CAS** (Geology and Geophysics Institute)

# SEPC – Organization

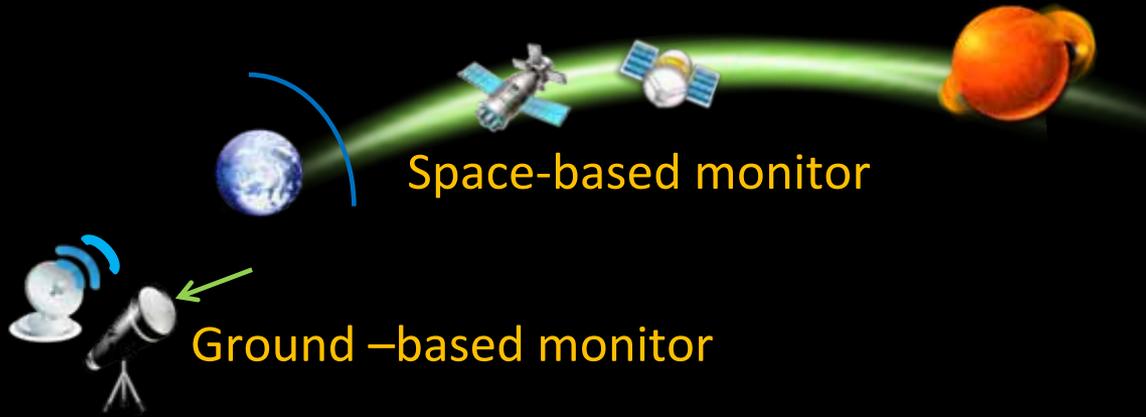
- SE forecast group (6)
- SE forecast research group (5)
- SE model research group (3)
- SE effects research group (3)
- SE operation system developing group (5)
- Space debris group (4)
- SE Monitoring Group (3)
- 30 employee
- 17 forecasters come from different groups



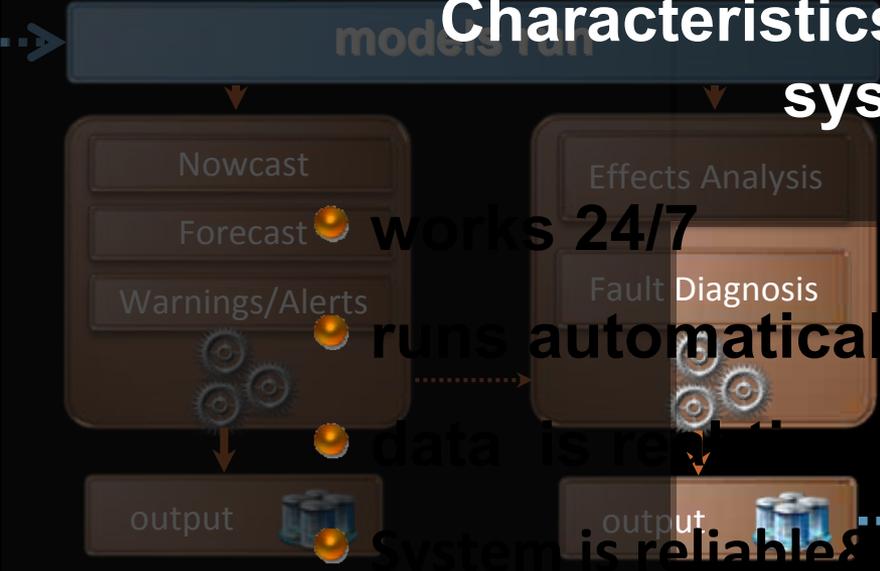
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# The importance of OSDS



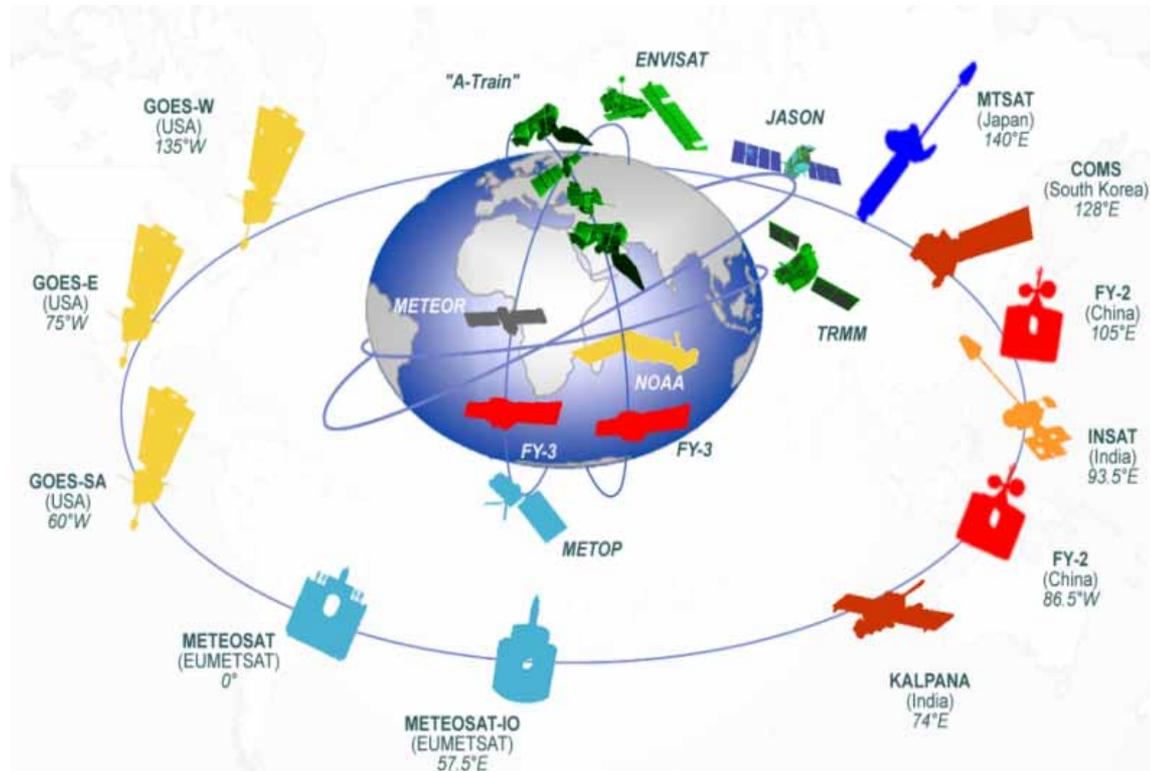
## Characteristics of operational system



# Five Parts of OSDS

- **Monitor**
- Data Reception
- Data Processing
- Data Management
- Data Application

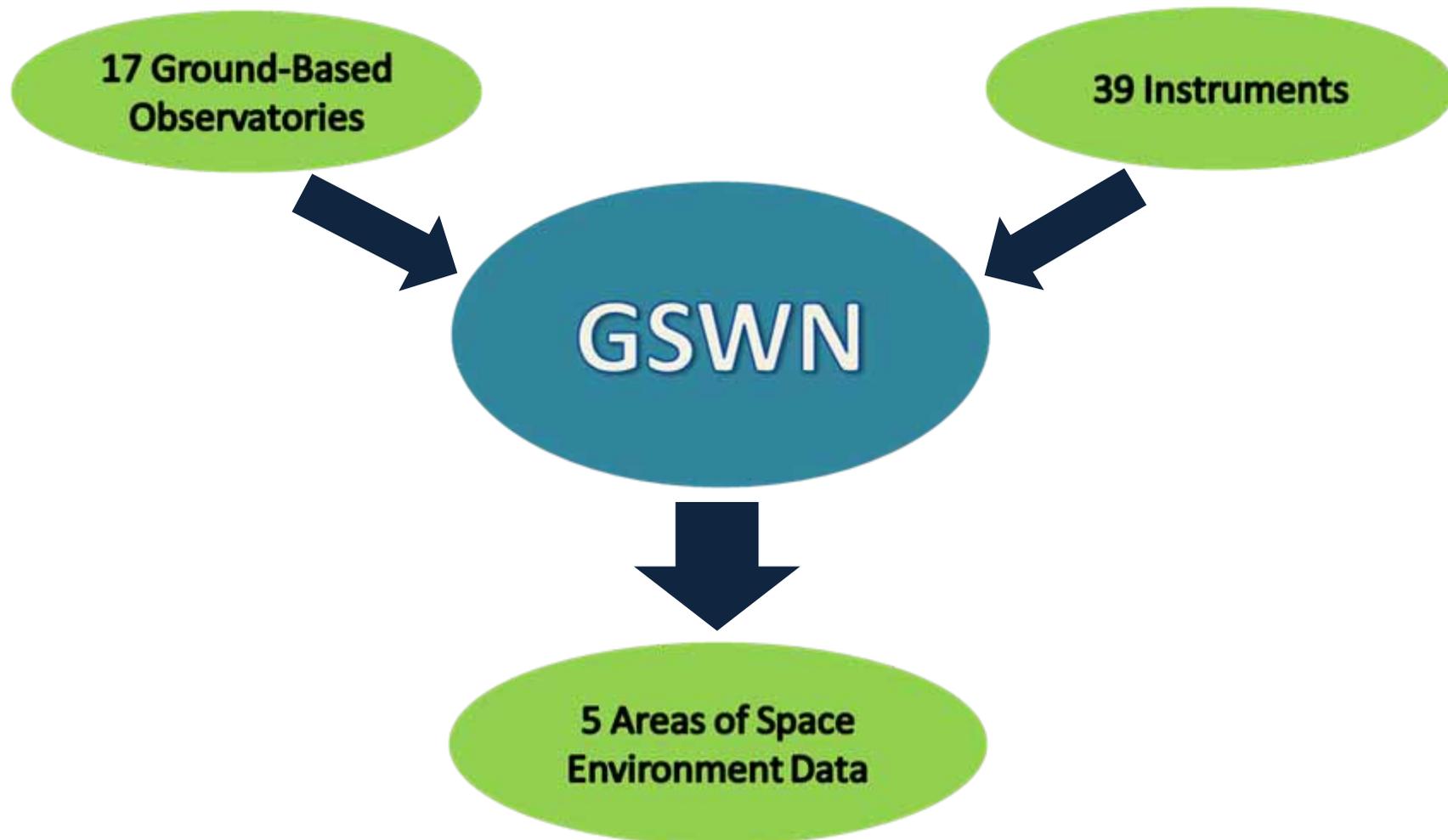
# Space-based SWx Monitor



- National space-based monitor (GEO,IGSO,LEO)
- International space-based monitor (L1,Earth's orbit,GEO ,LEO)

GOES, ACE, STEREO , SOHO , SDO,NOAA etc.

# Ground-based SWx Network (GSWN)



# Ground-based SWx Monitor

## -17 Ground-Based Observatories



# Ground-based SWx Monitor

## -39 Instruments



: Solar Radio Telescope



: Solar Optical Telescope



: Cosmic Ray Telescope



: Geomagnetic Field Magnetometer



: Ionospheric Scintillation



: Ionosonde



: GPS Receiver



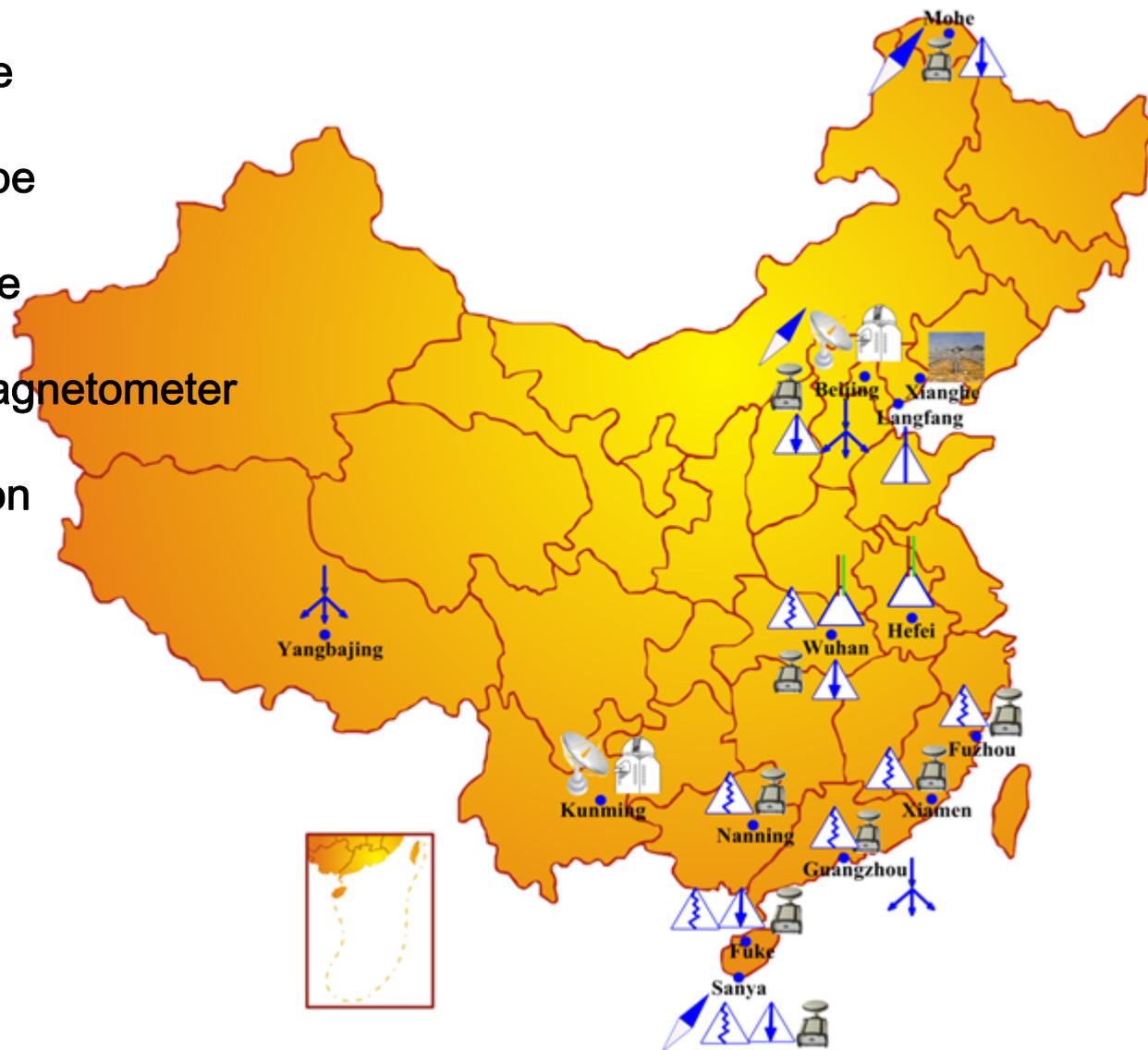
: MST Radar



: MF radar



: Lidar



# Five Parts of OSDS

- Monitor
- **Data Reception**
- Data Processing
- Data Management
- Data Application

# Key points

ect data automatically

How to maintain on time and accurate

Space-based monitor

Ground-based monitor

Data Reception

Data processing

Data management

DataBase(30G/day)

The screenshot shows a software interface with a list of data sources on the left and configuration options on the right. A red arrow points to the list, and another red arrow points to the configuration section.

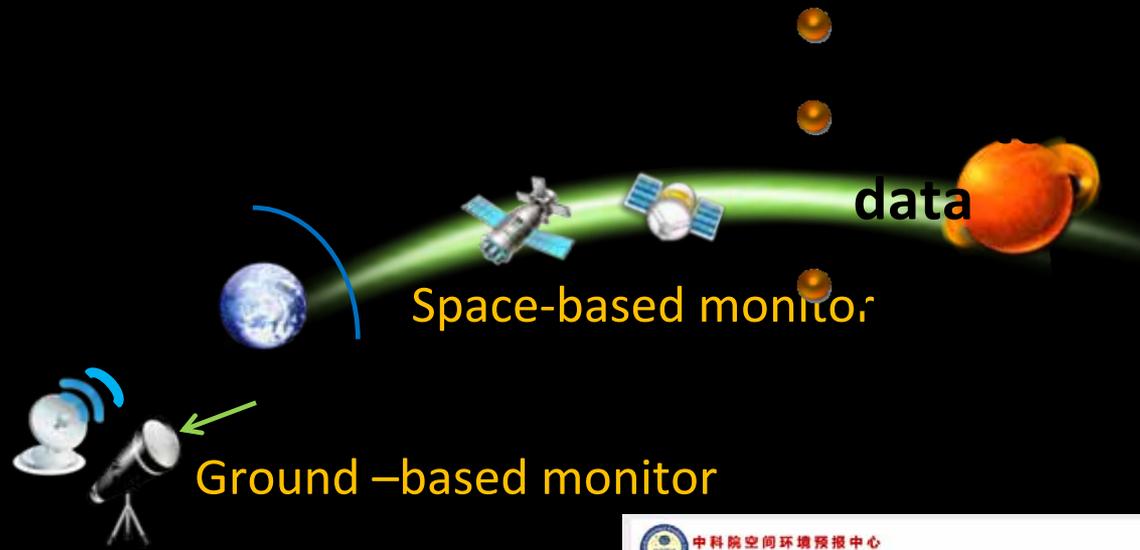
**Maissive Data source**

**Standardized data source definition**

# Five Parts of OSDS

- Monitor
- Data Reception
- **Data Processing**
- Data Management
- Data Application

# Key point

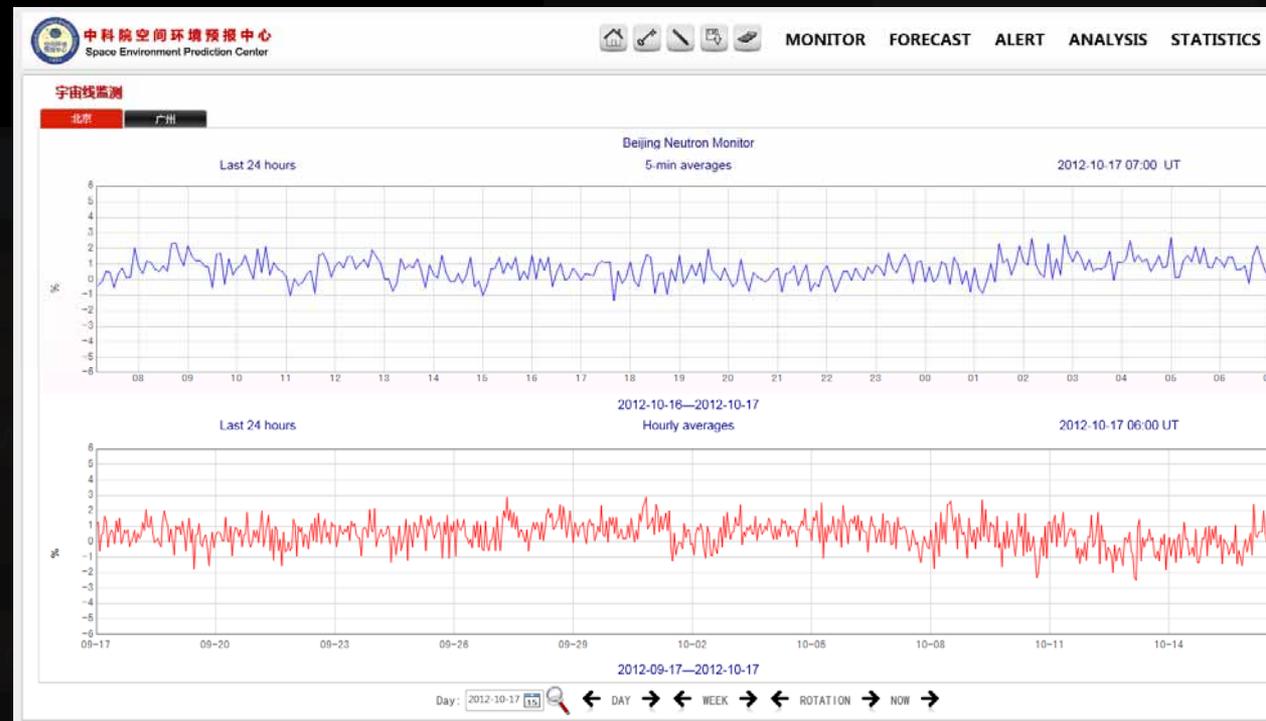


Data Reception

Data processing

Data management

DataBase(30G/day)



# Five Parts of OSDS

- Monitor
- Data Reception
- Data Processing
- **Data Management**
- Data Application



Space-based monitor

Ground-based monitor

程序管理系统

管理菜单

基础信息管理

模式程序管理

状态监控

模式状态

数据状态

数据报表

服务器状态

状态概述

用户管理

系统介绍

您当前所在位置: 状态监控->模式状态

数据收集/预处理程序							
模式名称	服务器IP	产品时间	运行时间	运行周期(分钟)	状态	操作	
SDO历史图片	192.168.10.223	2012052312	2012-06-06 09:28:18	-	●	启动	停止   更新
LASCO实时图片下载	192.168.10.223	2012052312	2012-10-17 14:45:48	12	●	启动	停止   更新
SDO活动区实时图片	192.168.10.223	2012052312	2012-10-17 14:51:40	15	●	启动	停止   更新
SDO实时图片	192.168.10.223	2012052312	2012-10-17 14:52:02	15	●	启动	停止   更新
Det抓取程序	192.168.10.223	-	2012-05-14 14:27:51	2.5	●	启动	停止   更新

空间环境预报/观测模式							
模式名称	服务器IP	产品时间	运行时间	运行周期(分钟)	状态	操作	
弓波磁层预报预报	192.168.10.223	201210091800	2012-10-17 14:51:51	5	●	启动	停止   更新
D区电高层吸收预报	192.168.10.223	201210170648	2012-10-17 14:53:34	5	●	启动	停止   更新
Det未来3小时预报	192.168.10.223	2012101707	2012-10-17 14:58:01	60	●	启动	停止   更新
F10.7米50天预报	192.168.10.223	20121018	2012-10-17 14:57:13	1440	●	启动	停止   更新
F10.7米27天预报	192.168.10.223	20121017	2012-10-17 14:57:40	1440	●	启动	停止   更新
观测程序	192.168.10.223	2012101706	2012-10-17 14:57:24	5	●	启动	停止   更新
监视程序	-	-	-	-	●	启动	停止   更新
-	-	201210090100	2012-10-09 09:59:01	30	●	启动	停止   更新
Ap未来31天预报	192.168.10.223	20121018	2012-10-17 14:57:39	1440	●	启动	停止   更新

空间环境事件警报模式							
模式名称	服务器IP	产品时间	运行时间	运行周期(分钟)	状态	操作	
EE警报模式	192.168.10.169	201210170645	2012-10-17 14:52:58	5	●	启动	停止   更新
SXR警报模式	192.168.10.169	201210170656	2012-10-17 14:57:56	5	●	启动	停止   更新
SPE警报模式	192.168.10.169	201210170650	2012-10-17 14:52:54	5	●	启动	停止   更新
MAGS警报模式	192.168.10.169	2012101704	2012-10-17 14:31:09	120	●	启动	停止   更新

空间环境短信服务模式							
模式名称	服务器IP	产品时间	运行时间	运行周期(分钟)	状态	操作	

Data Reception

Data processing

Data management

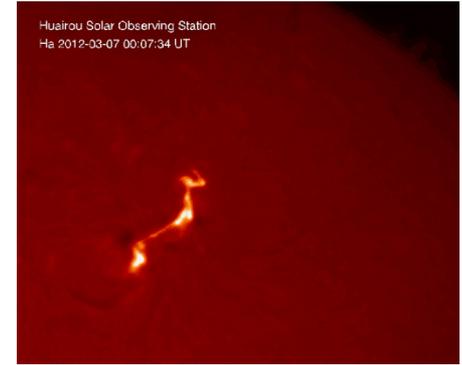
DataBase(30G/day)

# Five Parts of OSDS

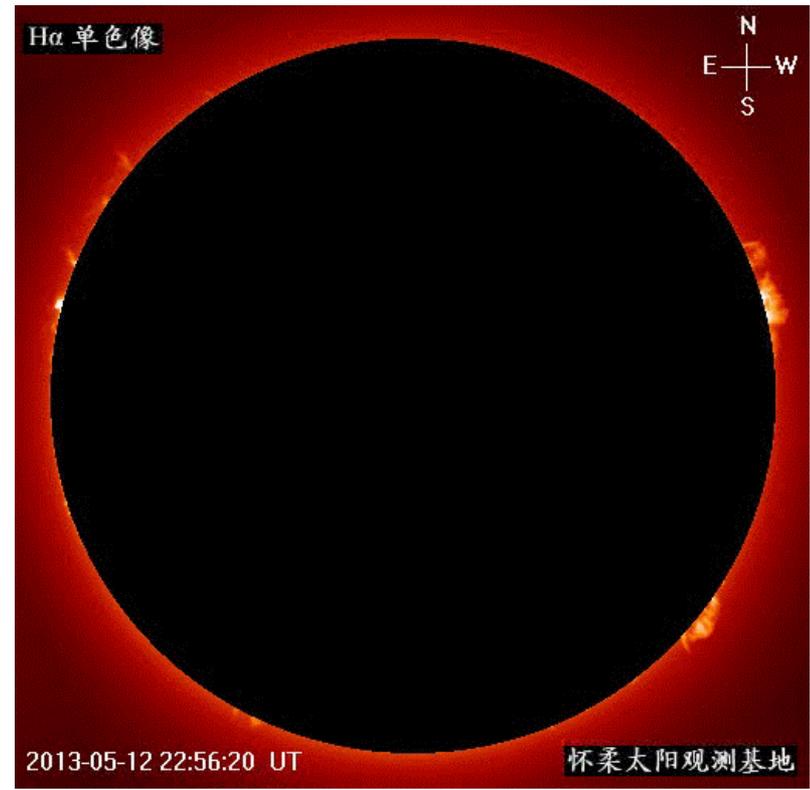
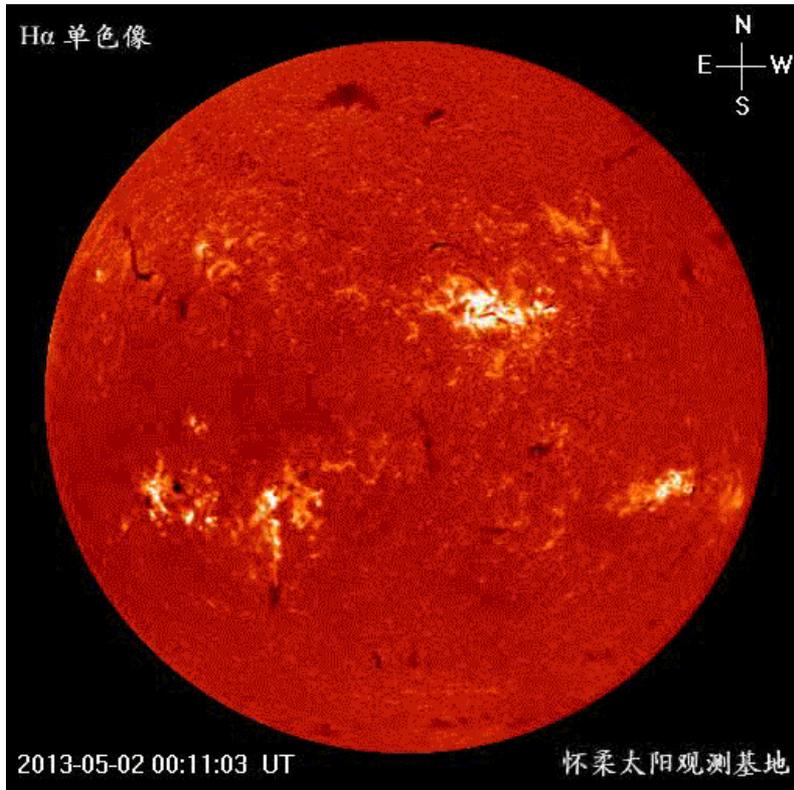
- Monitor
- Data Reception
- Data Processing
- Data Management
- Data Application

# Chromosphere

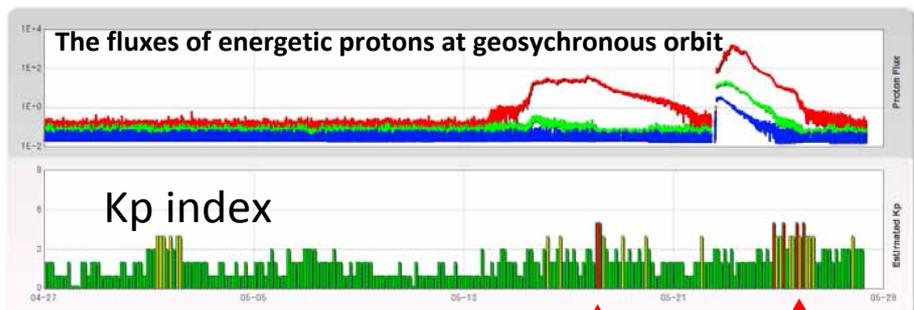
- Filament
- Solar Active Region
- Prominence



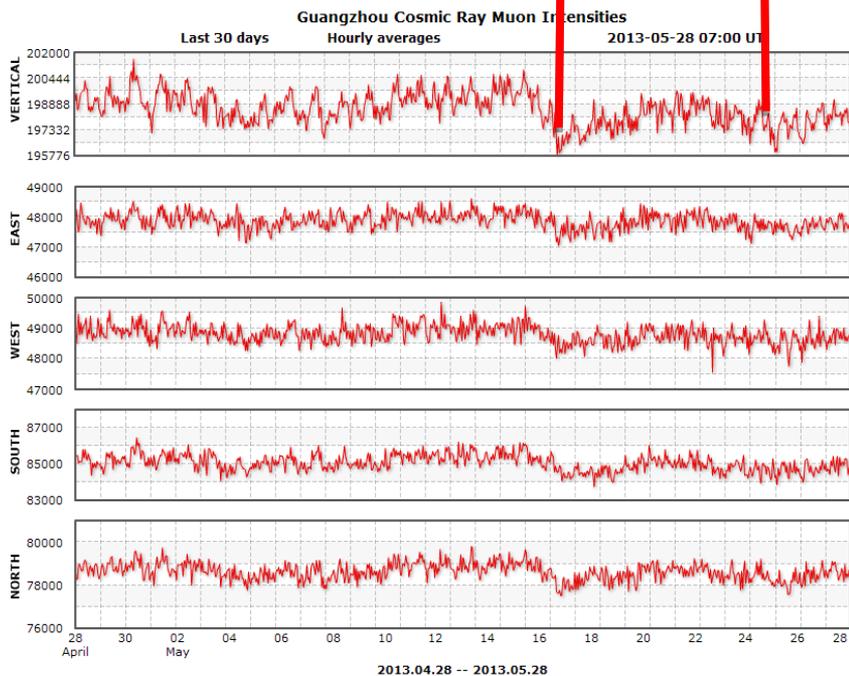
H $\alpha$  Solar Telescope



## Event in May 2013

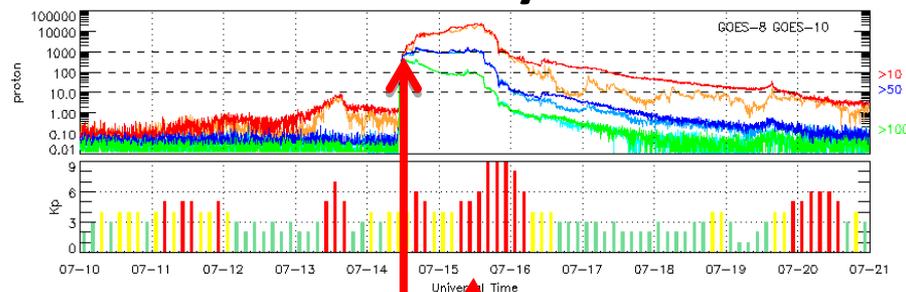


**CME**



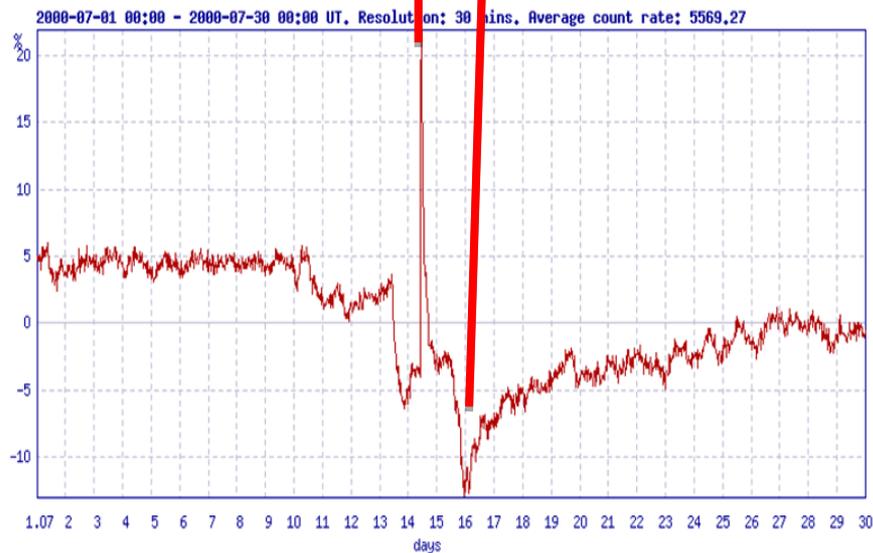
2013.04.28 -- 2013.05.28

## Event in July 2000

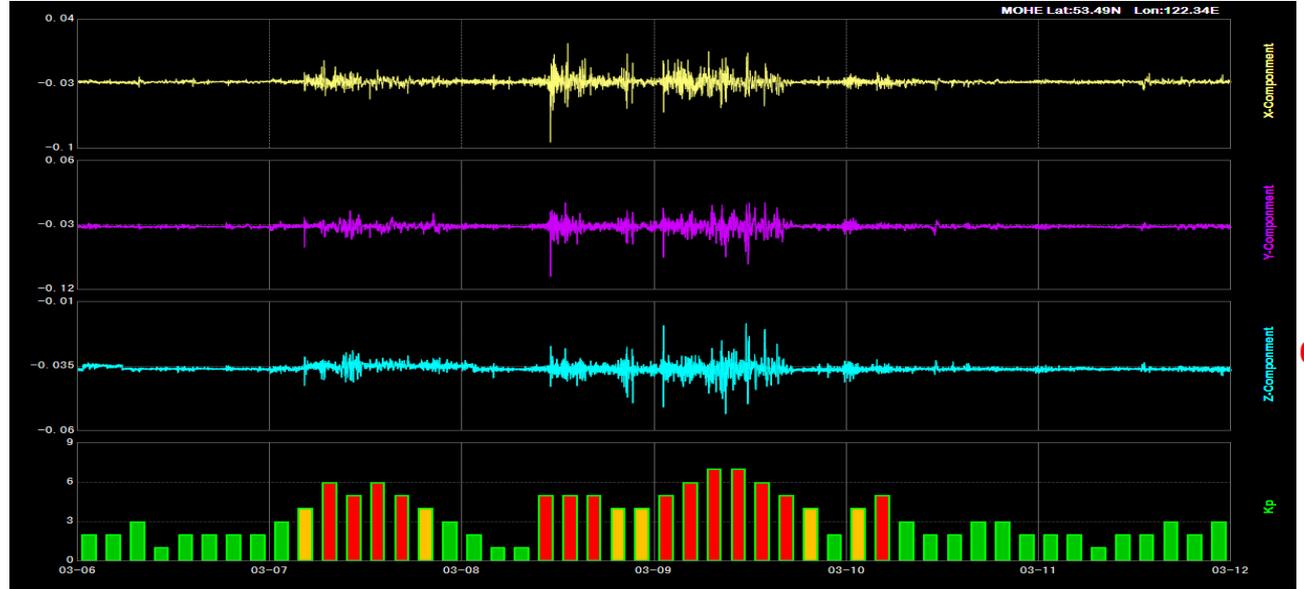


**SPE**

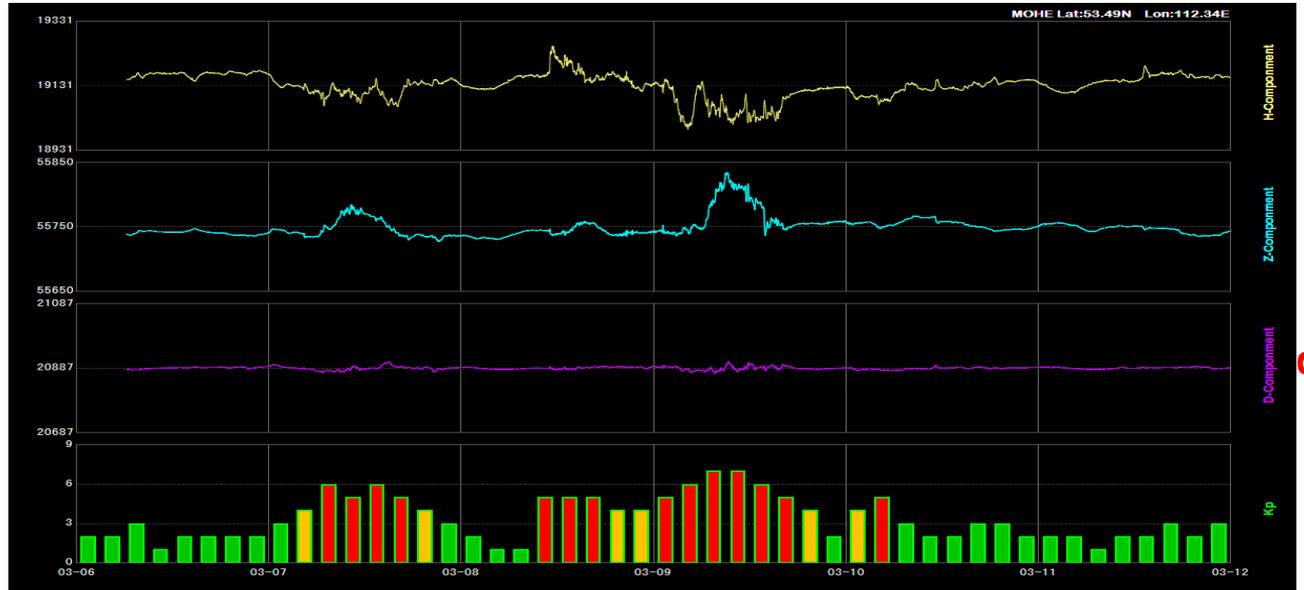
**CME**



# Geomagnetic Field



Induction Magnetometer



Flux-Gate Magnetometer



Mohe



Beijing



Sanya



## Ionospheric Scintillation and GPS Receiver

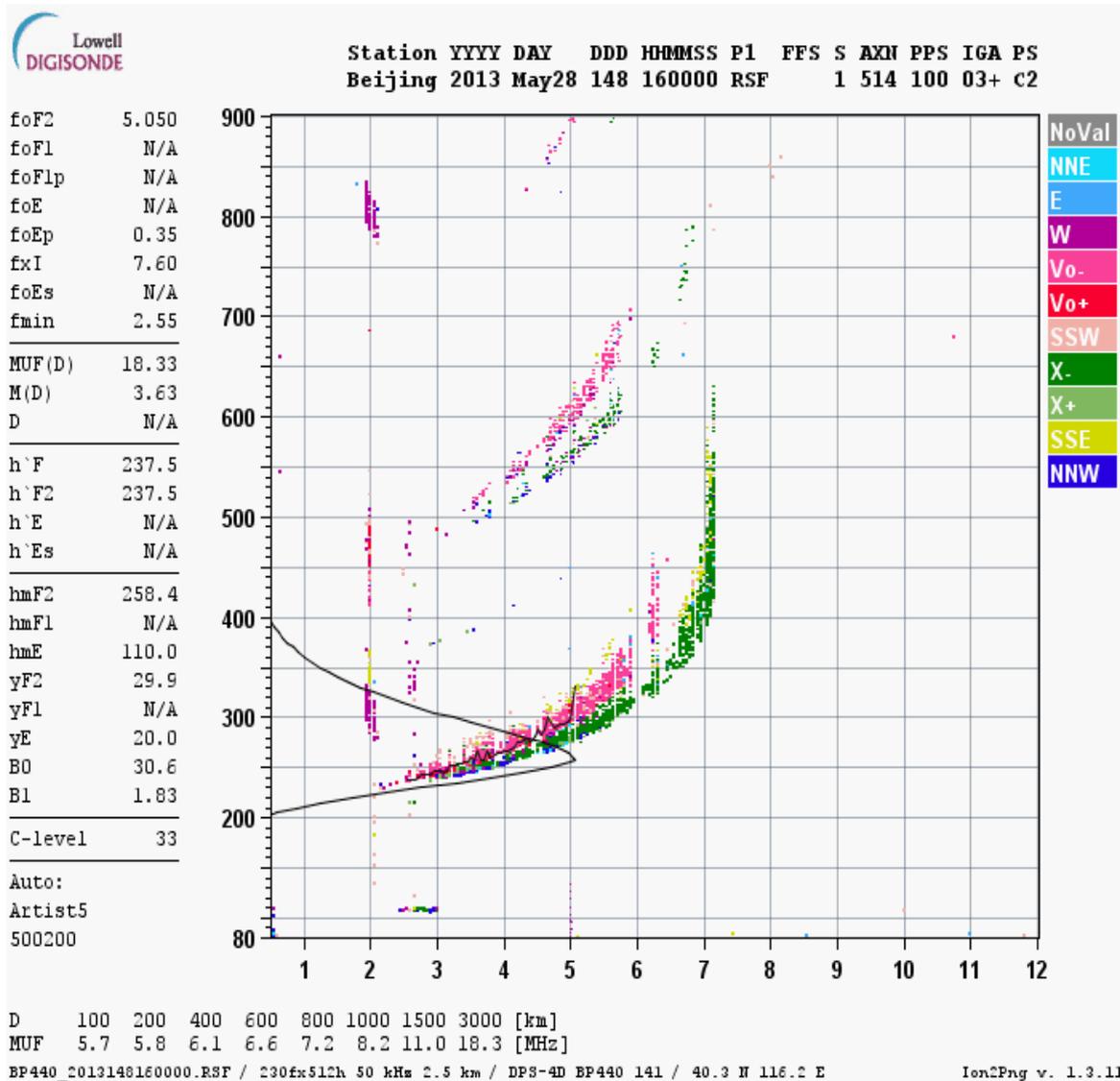


DSP-4 Ionosonde

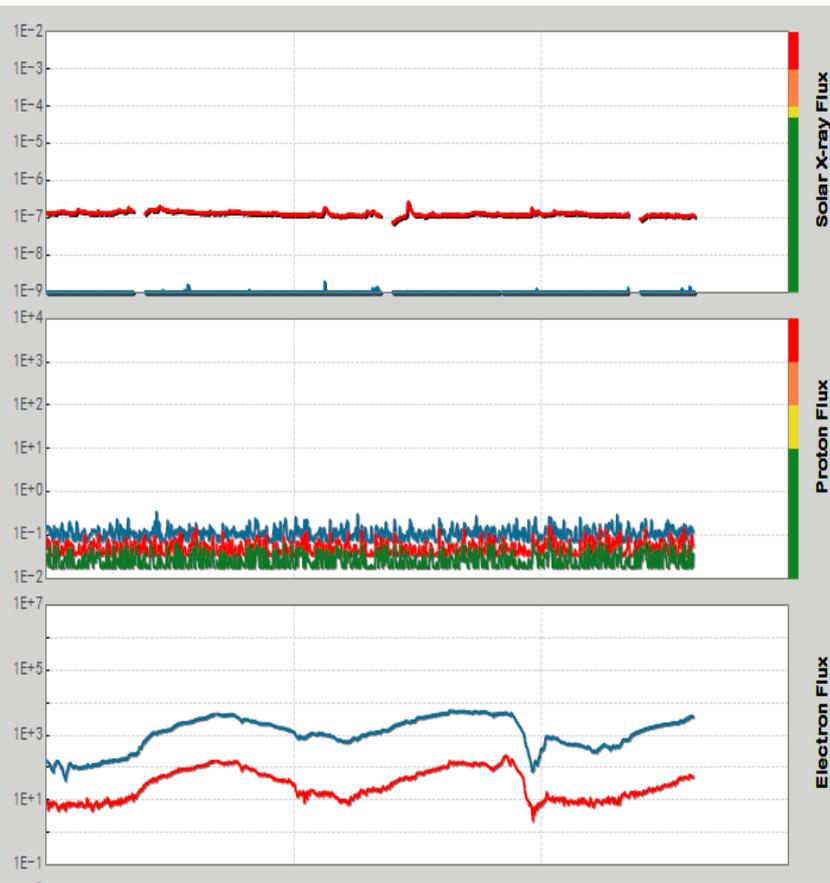


# Ionosphere

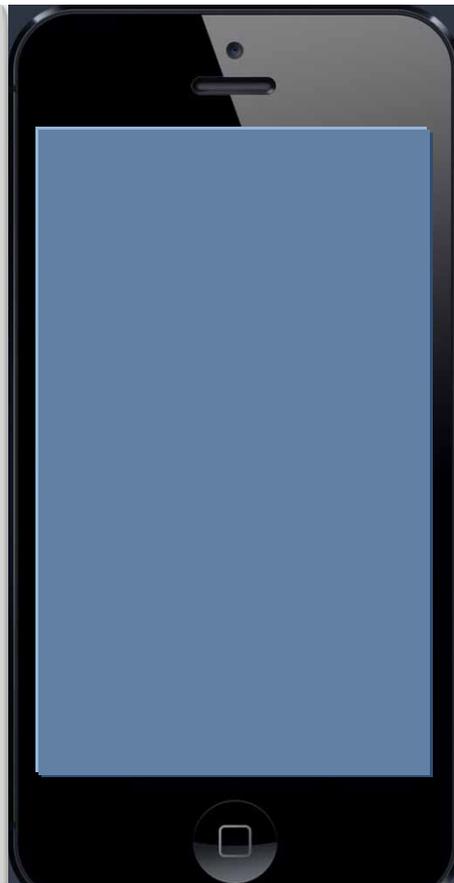
- Scintillation
- TEC
- foF2



# Space weather alerts



GOES data



## Alerts:

- X- ray flare
- Solar proton event
- Relativistic electron enhancement

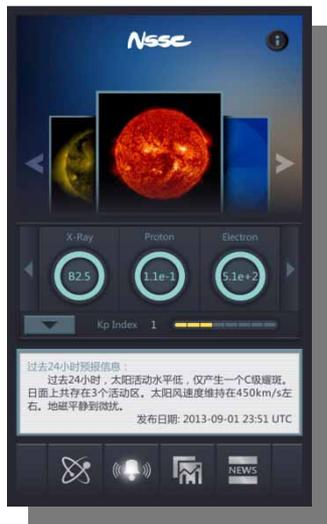
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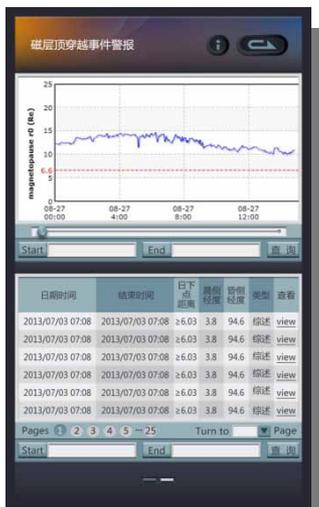
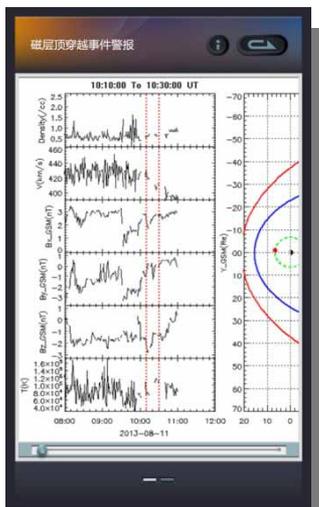
# Summary

- I. OSDS is the first operational SWx data system in China that has integrated functions of space weather monitoring and data transferring, pretreatment, and analyzing.
- II. Use the operational data to run forecast models
- III. Good operational data and forecast models are needed

# Space weather App in SEPC

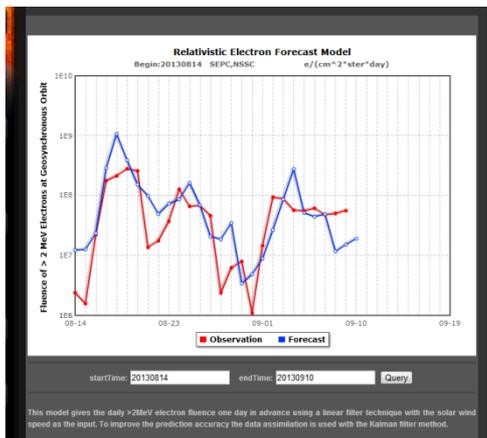
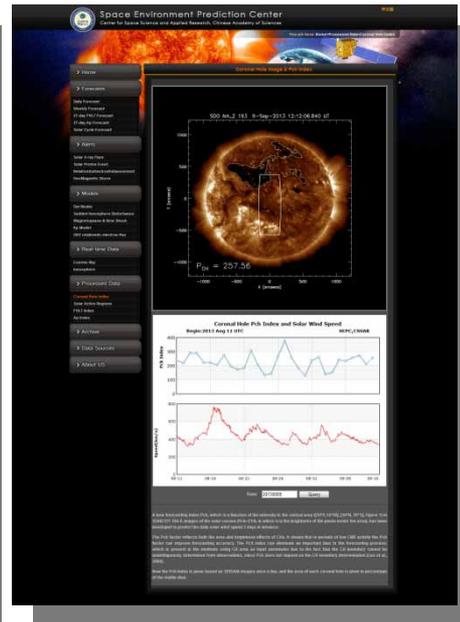
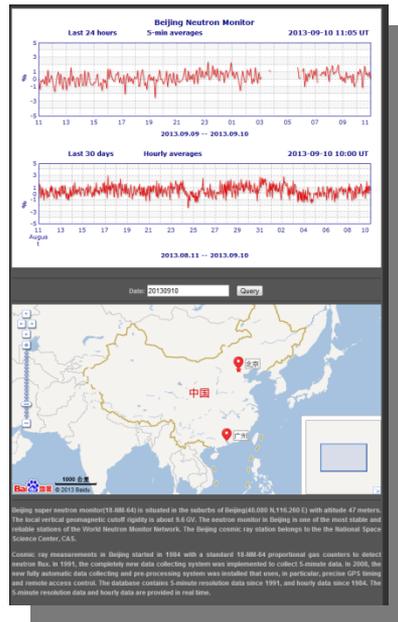
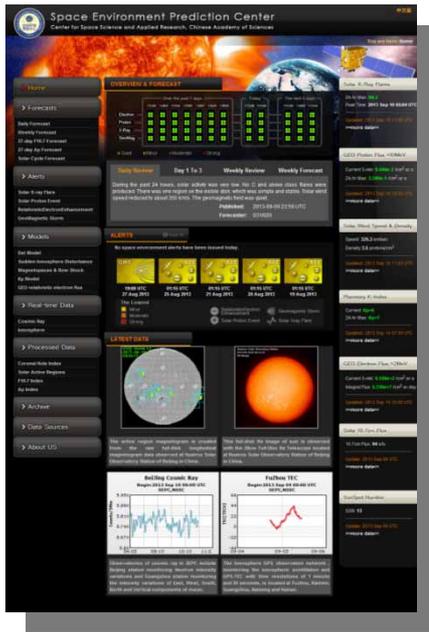


- Portable to use
- Initiative push
- Easy interaction
- Local language



- Alerts
- Forecasts
- Observing data
- Timely news

# Official Website of SEPC: [www.sepc.ac.cn](http://www.sepc.ac.cn)



- More information of space weather
- Real time station observing data in China is shared
- Space weather forecast products are presented
- Data analysis for forecast
- Products subscribed by E-mail

Thank you for attention