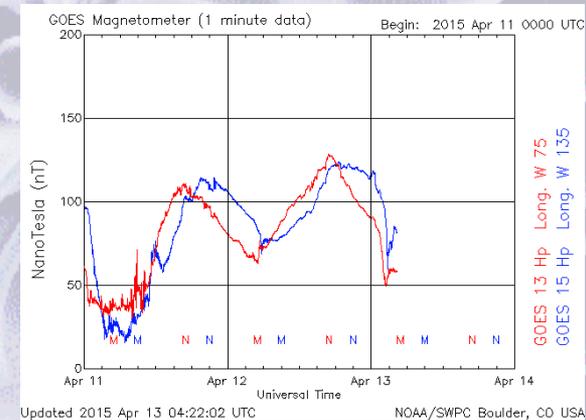
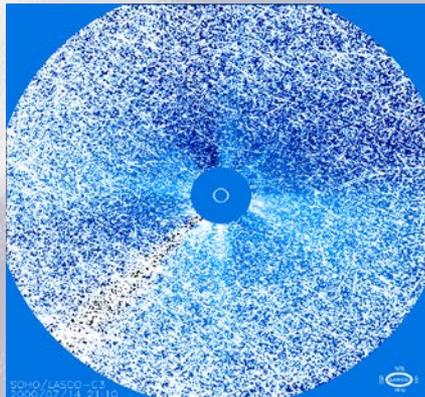


GOES-VW in-situ: Forecaster Perspective

Outline

Particles	Magnetometer
What we have today	
How the data are used	
What is needed	

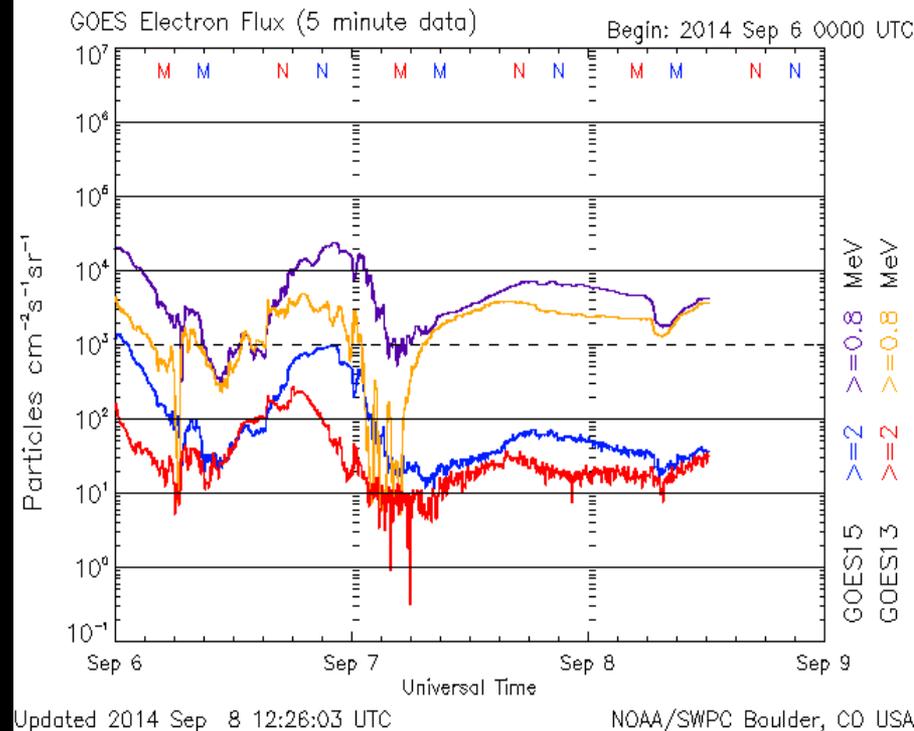
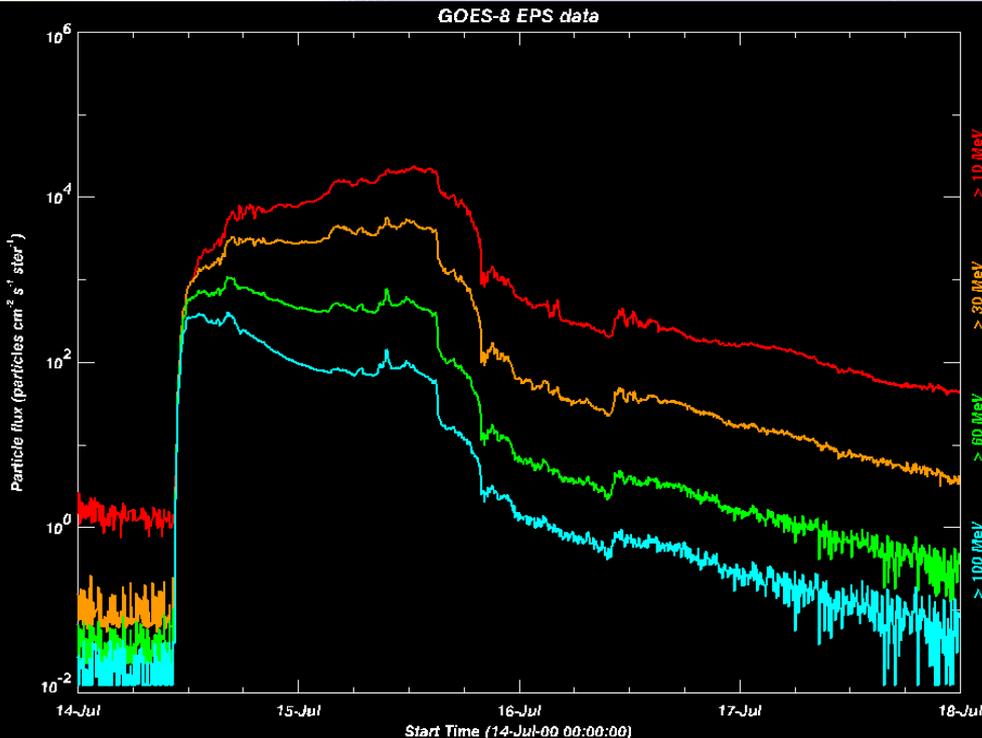


Christopher Balch
NOAA Space Weather Prediction Center
GOES VW Workshop
Boulder – 4/13/2015



Particles – what we have

- Integral Flux – 5 minute averages
- Protons: 1, 5, 10, 30, 50, 60, 100 MeV (\geq energy levels)
- Electrons: 0.8, 2, 4 MeV (\geq energy levels)



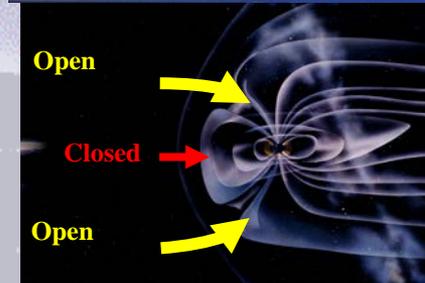
Particles - How Used

Impact Areas

- **Radiation Effects**
 - Human health hazard
 - Spacecraft Electronics
- **Communication Effects**
 - The Polar Ionosphere
 - Airline operations
- **Electrons**
 - Charging at geosynchronous

SWPC products

- Twice per day forecasts & discussions
- Warnings (based on solar observations)
- Alerts (based on observed conditions)



Particles - how used

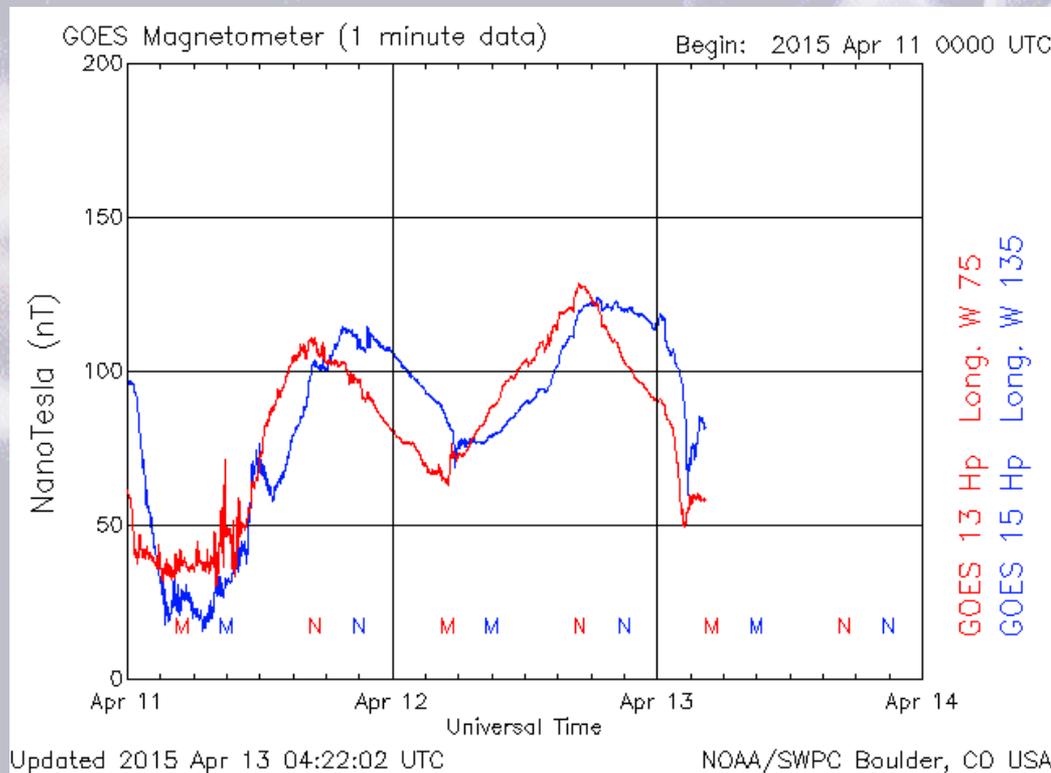
- **Alert Levels - protons**
 - ≥ 10 MeV : 10, 100, 1000, 10000, 100000
 - ≥ 100 MeV: 1
- **Warnings – protons**
 - ≥ 10 MeV : 10 (but predicted peak is routinely included)
 - ≥ 100 MeV: 1
- **Alert level – electrons – ≥ 1000 for ≥ 2 MeV**

Particles - what is needed

- **Continuity**
 - **Keep consistent with the past**
 - **Ability to develop forecast techniques is enhanced by long, consistently measured data**
- **Would recommend higher time cadence if possible (e.g. 1 minute instead of 5 minute)**
- **SWPC forecasters want to ensure customers are getting what they need to deal with Space Wx – Input from impacted users is essential**

Magnetometer – what we have

- Three components, 1 minute, real-time
- Two satellites (typically)



Mag - How Used

- **Magnetopause Crossings**
 - (Requires the spacecraft to be on the day side)
- **Sudden Impulse/Sudden Storm Commencement**
- **Indication of substorm probability**
 - (Requires the spacecraft to be on the night side)

SWPC products

- **Included in the twice per day forecast discussions**

Mag - what is needed

- Full usage would improve with better local time coverage
- Anticipate Mag to be important for Geospace model validation
- Perhaps MAG can be assimilated at some time in the future
- MAG could use some focus for future operational product development
 - Example – can I use GOES mag to help interpolate ground-based magnetometer data?