

GOES Magnetometer

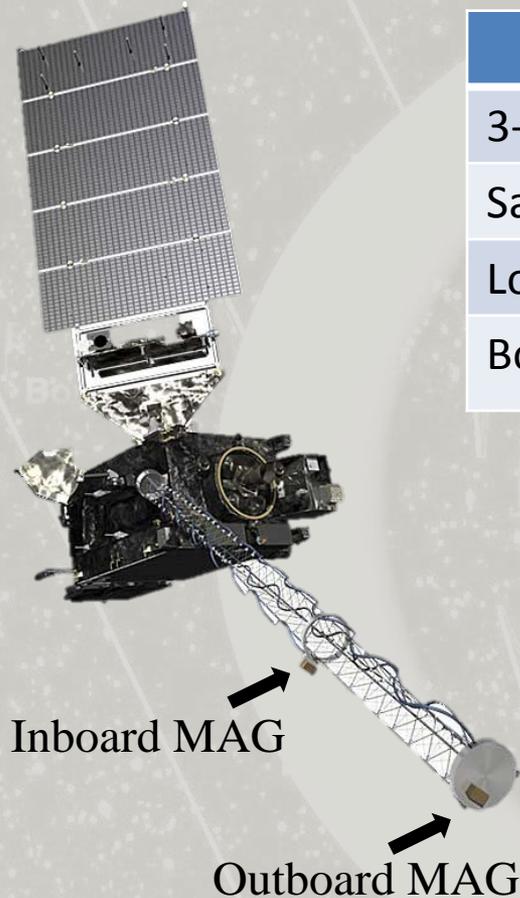
Past, Current and *Future*

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GOES Magnetometer

Past, Current and Future

	GOES 8-12	GOES 13-15	GOES R-U
3-axis fluxgates	2*	2	2
Sampling Rate	2 Hz	2 Hz	10 Hz
Low-Pass Filter Cutoff	0.5 Hz	0.5 Hz	~2.5 Hz
Boom Length	3 m	8.5 m	8.5 m



GOES R-U magnetometer description and products:

- 10 Hz samples with 3dB cutoff ~2.5 Hz
 - Gradiometric method (both MAGs) used to mitigate s/c fields.
- Field vector in Several Coordinate Frames
 - 10 Hz: instrument, ECI, EPN, ACRF, BRF
 - 1-minute: instrument, ECI, EPN, GSE, GSM, VDH, BRF
- 1 minute averages
- Magnetopause crossing identification
- Comparison to Quiet Fields
- Support SEISS pitch angle determination

GOES-R Magnetometer

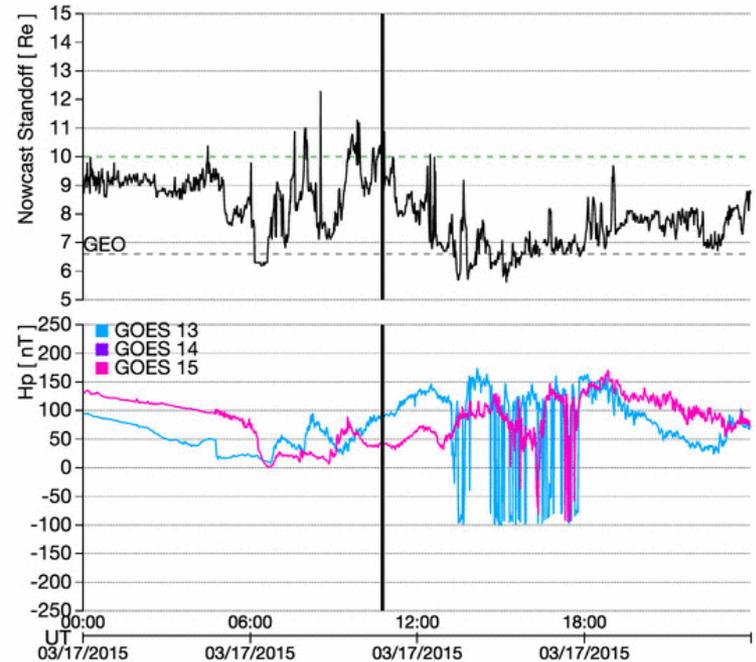
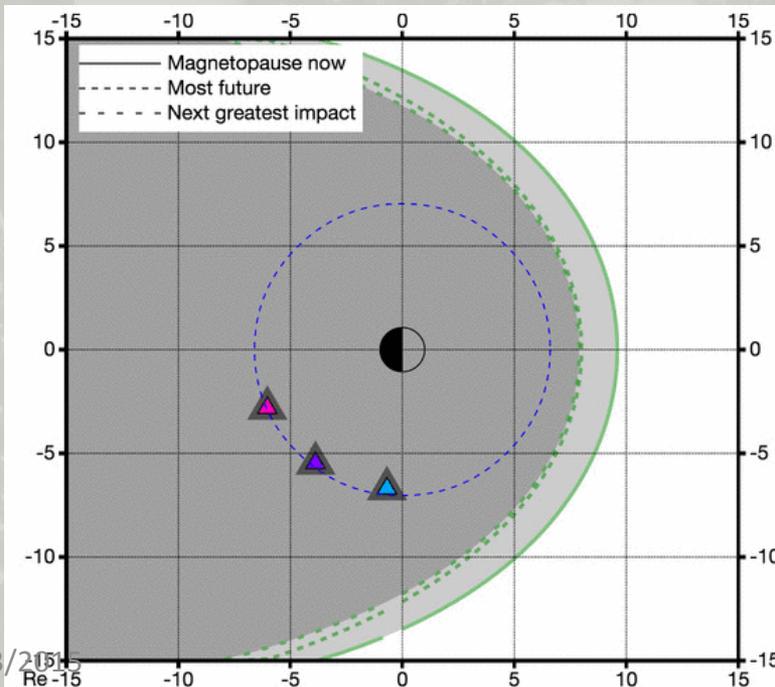
Upcoming Products

- 1-minute Averages
- Coordinate frames
 - Instrument, ECI, EPN, GSE, GSM, VDH, BRF
 - ECI – Earth Centered Inertial
 - EPN – E: earthward, P: perpendicular to orbital plane, N: ExP
 - GSE – Geocentric Solar Ecliptic
 - GSM – Geocentric Solar Magnetospheric
 - VDH – V: anti-earthward, D: eastward, H: northward along dipole
 - BRF – Body Reference Frame; orients MAG to SEISS
- Comparison to Quiet Fields (IGRF, OP77)
 - We are also looking into dynamic Tsyganenko type field models.
- Magnetopause Location and GEO Crossings
 - GOES-R, GOES-NOP and Shue et al., 1998

GOES-R Magnetometer

Product Sample: Magnetopause Location

- Activity gauge - First indicator of substantial compression & erosion
 - Indicates elevated threat levels for space and ground based systems.
 - GEO satellites may find themselves inside in the magnetosheath.
- Development Funded by NOAA GOES-R Risk Reduction and Satellite Product and Services Review Board (SPSRB) Programs
 - Real-time GOES-NOP demonstration en route to NWS/SWPC Operations
 - http://www.ngdc.noaa.gov/stp/mag_pause/



GOES VW Magnetometer

What do we need to maintain/improve/etc?

- Do the current GOES-R MAG instrument requirements meet your current and future needs?
 - Field Range: +/- 512 nT
 - Field Accuracy: 2.3 nT/axis (after calibration), 4 nT EOL
 - Orthogonality: 0.5 degrees
 - Pointing Accuracy: +/- 0.52 degrees
 - Temporal Resolution: 10 Hz
 - Filter cutoff: ~2.5 Hz
 - Note that actual on-orbit instrument performance will be assessed during post-launch calibration and validation activities.
 - References to documentation provided in notes.
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