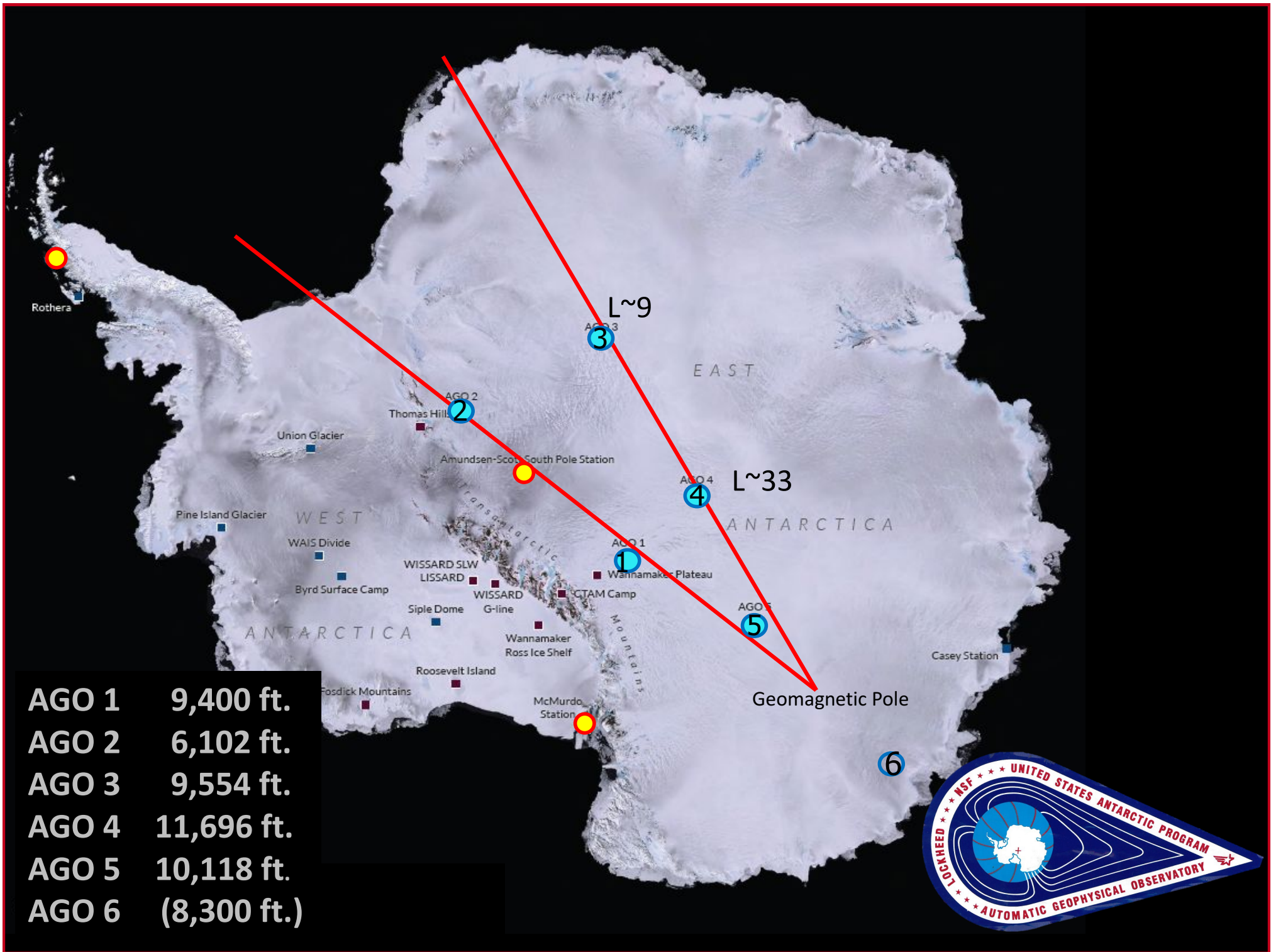


PEDC instruments across the Antarctic: Status updates from SPA, MCM, Palmer, and the AGOs

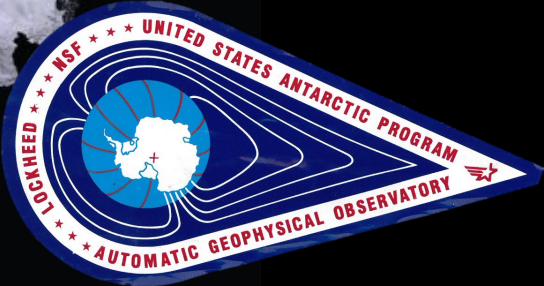
Andrew Gerrard

NJIT-Center for Solar-Terrestrial Research





AGO 1	9,400 ft.
AGO 2	6,102 ft.
AGO 3	9,554 ft.
AGO 4	11,696 ft.
AGO 5	10,118 ft.
AGO 6	(8,300 ft.)

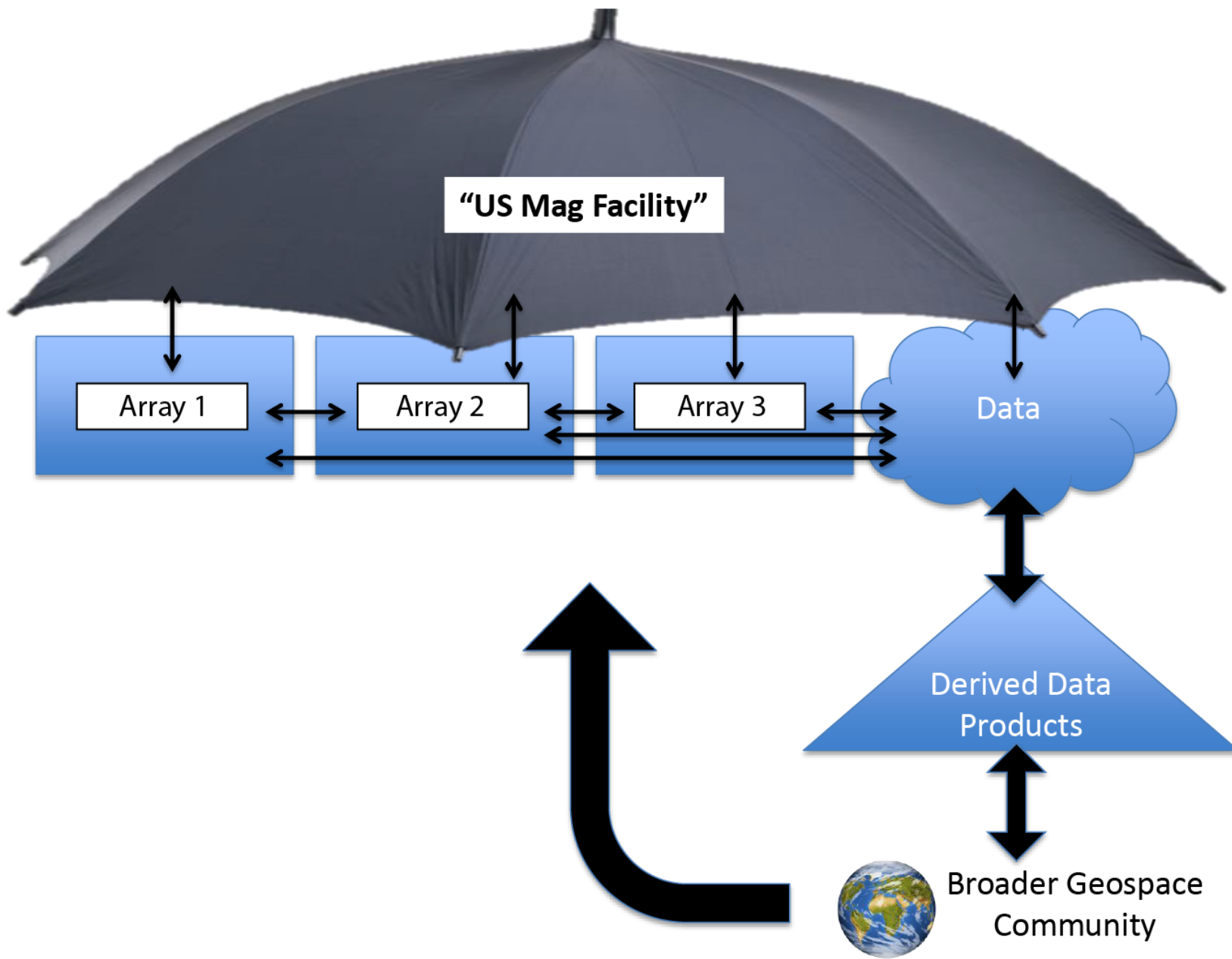


The Future of Ground Magnetometer Arrays in Support of Space Weather Monitoring and Research

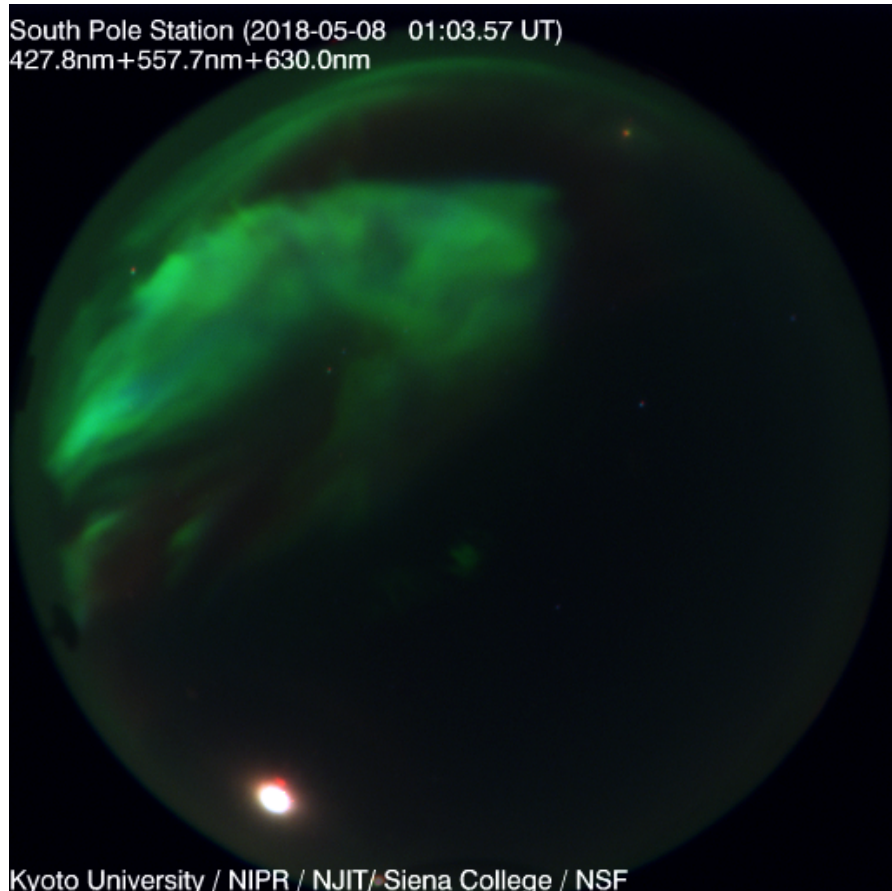
Mark Engebretson and Eftyhia Zesta

2018 GEM Workshop Santa Fe June 18, 2018





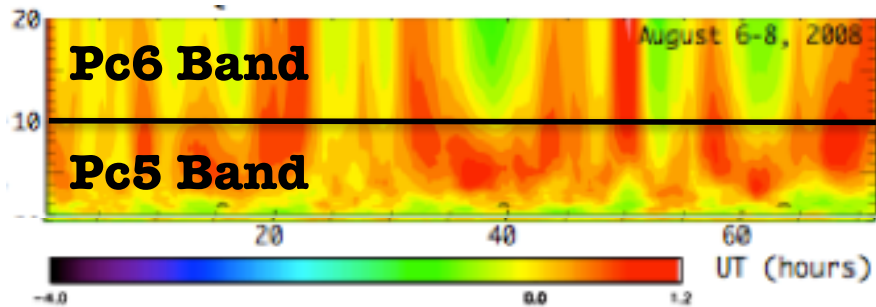
Instrumentation



SPA/MCM/Palmer	
Instrument	Instrument PI
Fluxgate Magnetometers at SPA and MCM	Andrew Gerrard [NJIT]
Fluxgate magnetometer at Palmer	Mark Moldwin [Univ. of Michigan] and Eftyhia Zesta [NASA]
Searchcoil at SPA and MCM	Marc Lessard [Univ. of New Hampshire] and Hyomin Kim [NJIT]
Photometers at SPA and MCM	Andrew Gerrard [NJIT]
Riometers at SPA and MCM	Allan Weatherwax [Merrimack College]
Proton Magnetometer at SPA	Andrew Gerrard [NJIT]
GPS receiver at MCM	Allan Weatherwax [Merrimack College]
4 GPS receivers at SPA	Gary Bust [JHU-APL], Andrew Gerrard [NJIT], and Allan Weatherwax [Merrimack College]
HF receiver at SPA	Jim LaBelle [Dartmouth College]
VLF receivers at MCM and Palmer	Robert Moore [Univ. of Florida]
Auroral all-sky imagers at SPA and MCM	Yusuke Ebihara [RISH-Kyoto]
AGOs	
Fluxgate Magnetometer	Andrew Gerrard [NJIT]
Searchcoil Magnetometer	Marc Lessard [Univ. of New Hampshire] and Hyomin Kim [NJIT]
HF receiver	Jim LaBelle [Dartmouth College]

1. Tracking the Open/Closed Field Line Boundary (OCB)

To automate open/closed field line determinations, we looked at band integrations over the Pc5 and Pc6 frequencies at each site, using the distribution at the highest-latitude site to define the open/closed threshold in each band.

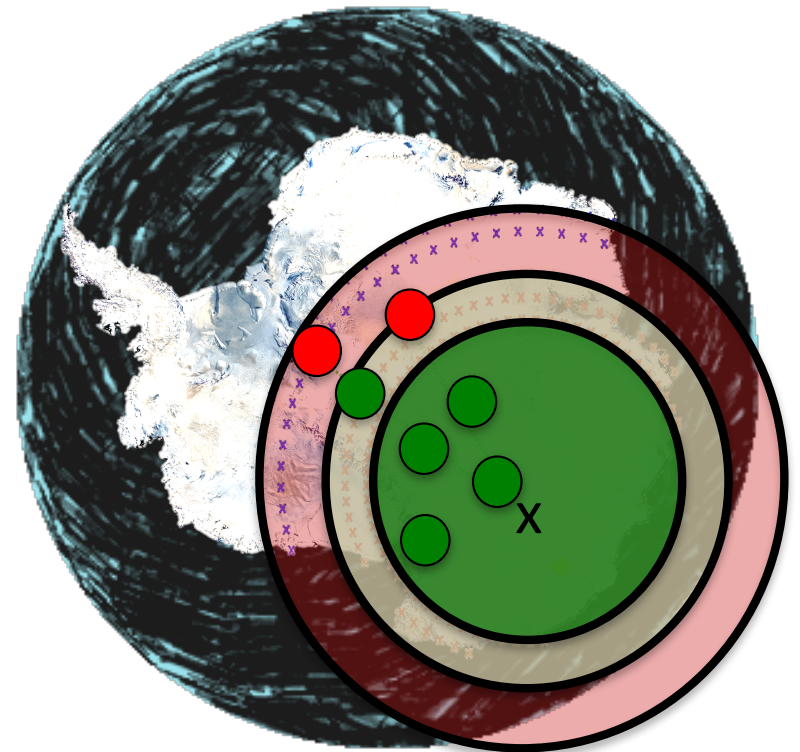


Open or Closed: Does wave power exceed threshold in both bands?

Pc6	Yes	No	Yes	No	Yes	No	Yes
	OPEN		CLOSED				
Pc5	Yes	No	Yes	No	Yes	No	Yes

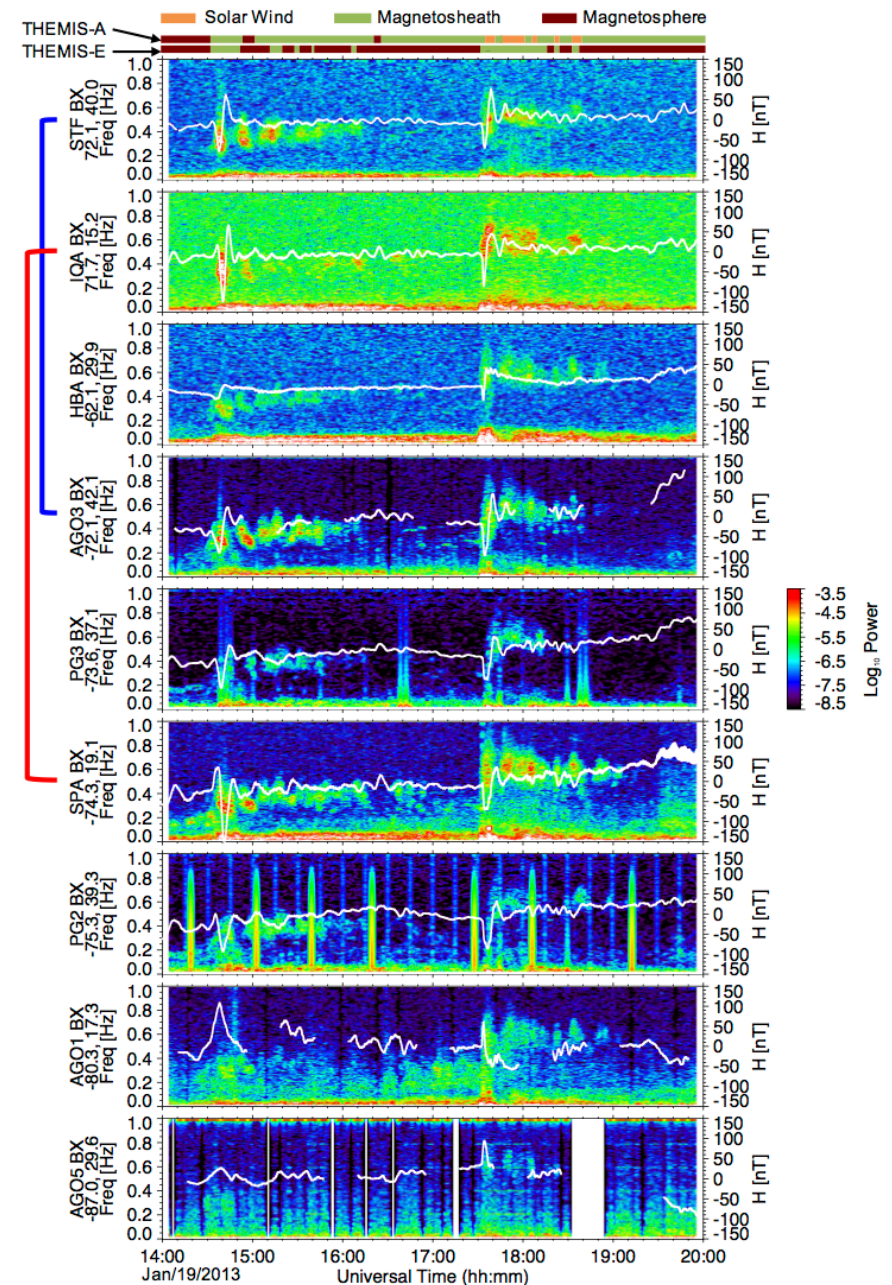
AGOS + SPA + MCM ARE CURRENTLY REPORTING SYNOPSIS FLUXGATE DATA!!!

Urban, K. D., A. J. Gerrard, Y. Bhattacharya, A. J. Ridley, L. J. Lanzerotti, and A. T. Weatherwax (2011), Quiet time observations of the open-closed boundary prior to the CIR-induced storm of 9 August 2008, *Space Weather*, 9, S11001, doi:10.1029/2011SW000688.



2. Interhemispheric Conjugate Observations of EMIC Waves Associated with TCV events

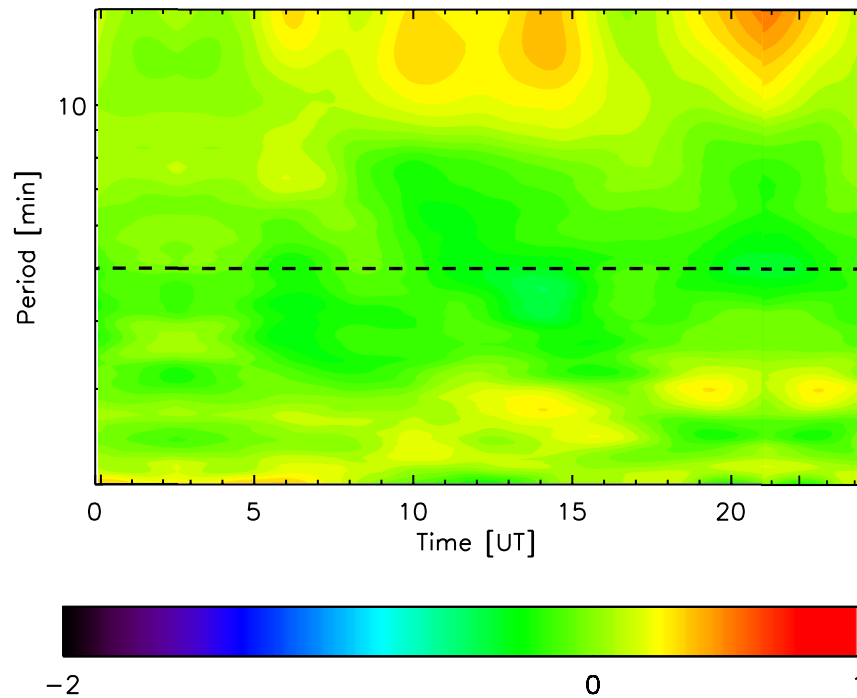
- Interplanetary shock-associated transient events were observed by the THEMIS spacecraft that were positioned near the magnetopause.
- Travelling Convection Vortices (TCVs) were observed by high-latitude interhemispheric ground magnetometer network (fluxgate + induction) during the events [Kim *et al.* 2015].
- The network also detected electromagnetic ion cyclotron (EMIC) waves associated with the TCV events: Wave source region is estimated to be near STF/IQA and SPA.
- The confluence of space-borne and ground instruments including the interhemispheric, high-latitude, fluxgate/induction coil magnetometer array allows us to constrain the EMIC source region while also confirming the relationship between EMIC waves and the TCV current system.



Kim, H., C. R. Clauer, A. J. Gerrard, M. J. Engebretson, M. D. Hartinger, M. R. Lessard, J. Matzka, D. G. Sibeck, H. J. Singer, C. Stolle, D. R. Weimer, and Z. Xu (2017), Conjugate observations of electromagnetic ion cyclotron waves associated with traveling convection vortex events, *J. Geophys. Res. Space Physics*, 122, 7336–7352, doi:10.1002/2017JA024108.

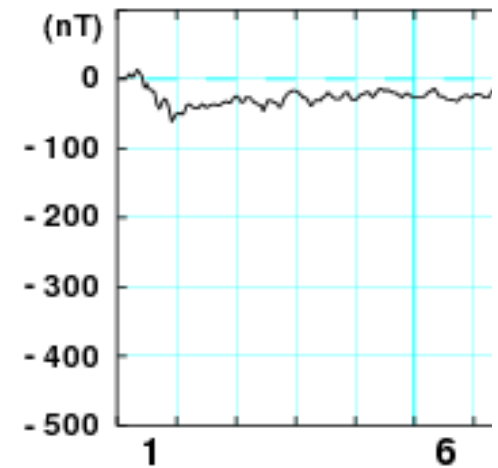
3. Solar Wind ULF Coupling Into the Polar Cap

AGO5 March Climatology

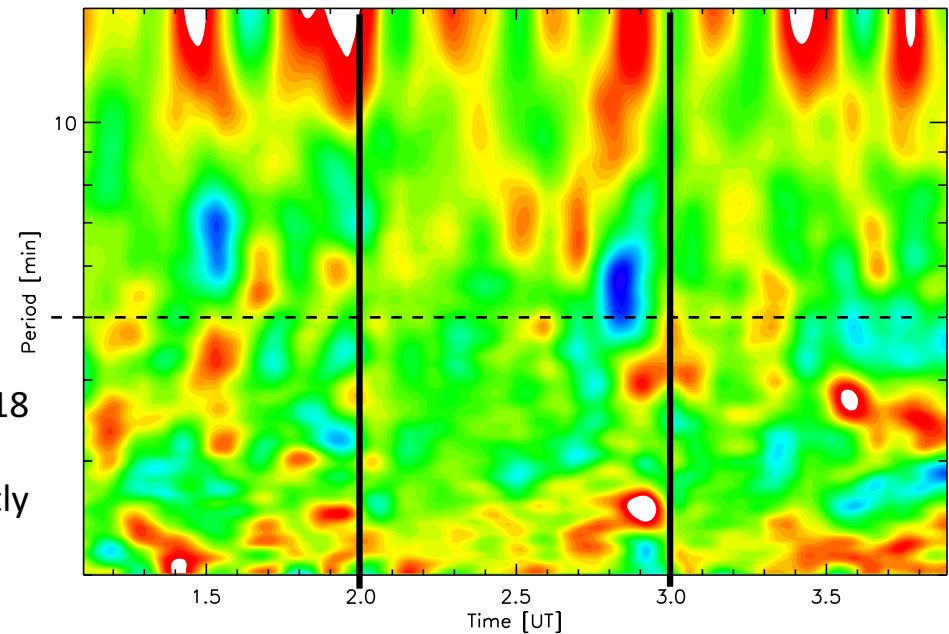


- Climatologies demonstrated in Frissell et al., 2018 GEM-CEDAR posters
- ULF features seen on March 1 at AGO5 are directly related to solar wind ULFs (e.g., Urban et al. [2016])

March 2017



AGO5 March Synoptics



“Direct solar wind ULF influence”