Session Notes

Gytis Blinstrubas

- Hypothesis testing of scintillation layer with PFISR and ASI
- 74% agree between the two systems agree
- If aurora is present, scintillation is most likely to occur in E region
- Same event, two different data products

Hayley Clevenger

- LOMPE - 2D maps taking in a variety of data and output electrostatic maps
- Future development: incorporate neutrals, and move incorporation of Poker DASC inversion maps/sigmaP/sigmaH flow-down into Lompe to replace Hardy/Robinson background
- Don't need all data inputs, but the more the better
- Different techniques and comparison methods with output
- Conductance maps - input, but also estimated by model
- Source of conductivity - Kp, imagery inversion, global, TRex
- Drive GEMINI with LOMPE output
- Can LOMPE ingest wind data? Not yet, but probably important
- Auroral characteristic energy - no, but it DOES take in conductances (potential ability to change things around in terms of what Lompe ingests, aka can we make it so Lompe reads in and uses sigmaP, sigmaH, AND Q, AND E0?)
- In principle, adding more quantities is possible
- Consider preconditioning process for neutrals, prior to inversion run for plasma frame (flows, mags)
- Consider incorporation of FPI data, characteristic energy

Andrew Pepper

- Rapid HF sounders - install around Poker Flat
- Digisonde Ionosonde
- SDR - 10 s sweep?
- Pseudo-random sounding

Cameron Westerlund

- Electron transport code - GLOW
- Integrate intensities along a single field line

- Invert electron energetics from optical brightness
- Oblique views are a problem
- Geometric impact due to varied altitudes of emission lines
- Using 8446 (pythagoras cam/poker dasc) improves this problem because it is peaked and closer to the altitude of the other emission lines
- Need to learn how to make associated error maps

Mark Conde

- Merging Inhomogeneous Data
- SDI and ASI data
- Intensity, temperature, and wind all derived from a single image
- Compair with all-sky and merge data
- Combined data maps of Poker Flat
- Graphical product - data saved in database, but no joint analysis right now
- Realtime, output saved
- Right now can't rerun on post-processed data, but hopeful that will be an option soon
- For a product like this to work in real time, need to make sure it doesn't break because one data source provides bad data or fails to give you data
- GOES west-coast magnetic field might be a useful addition for rocket launches
- Make exactly which plots show up configurable in future?
- Historical data are available for 2017 onward
- Surface of neutral wind velocities, but at some places it is a higher or lower altitudes
- Impose surface of information on a varying altitude on a volumetric model

Matthew Cooper/John Meriwether

- Application of SWIR imager
- 8 position filter wheel
- Gaussian curves are bandpass
- Skymap of rotational temperature of the nitrogen, then back out precipitation spectra
- Auroral generation methods (observation of precipitation processes vs in-situ alfvenic processes)
- Removing OH contamination essentially by also collecting with OH imager, then correcting by removing OH with actual measured OH

Matt Zettergren

- Meso-scale Ion-Neutral Coupling in Aurora
- Using these data products in models
- What do models need? Small-scale particle input and electric fields
- A lot of these measurements are incredibly sparse
- AMR version of GEMINI - capture both high resolution effects and evaluate larger-scale implications
- Need both background specifications and small-scale perturbations
- Also need uncertainty to constrain the parameter space
- Only way to currently deal with uncertainty is do multiple runs covering the range of uncertainty - doesn't propagate uncertainty to model output, but can get a sense of how the model may vary
- Need to determine the most sensitive parameters
- what inferred parameters from isr's will help: superdarn hi res maps, pfisr maps, merged to give flow field, best guess of certainty. want high level product incorp all isr things. understand high labor requirement

Alex Mule

- Hall and Pedersen Conductance from Imagery
- Current closure
- Filered 3-color imagery
- Height-integrated current continuity equation -> current closure terms
- When along-arc symmetry obeyed, several terms can be neglected
- Resulting function is slowly varying - can use local linear fits
- Manual inspection of swarm flows prior to folding in
- Possible example of high Cowling effect. evidence in optical data?

Meghan Burleigh

- RENU2
- GEMINI-TIA - calculate temperature anisotropies
- 2.5D model - well suited for sounding rocket datasets
- Highly dynamic PMAFs - build up hysteresis of forcing from above
- Realistic description of variability of PMAFs over entire multi-hour period
- Sub-arc structure, northward motion, background convection
- how long to precondition: 24 hrs followed by sanity check. do ICs match data from pfisr

Xian Lu

- Different scales of auroral assimilation product
- Different scales of grid
- Can reduce error significantly
- Observations to better constrain the data - localized variations in ion drift
- Drive TIE-GCM
- More realistic driving forces result in more realist IT reponse
- first run is without data assimilation, second is with. compare with GNSS see assimilation matches better.
- TIE-GCM that incorporates error is a good example to learn from

Bill Bristow

- SuperDARN data availability
- G-LDFF solution vs SEC solution - differences most likely related to regularization
- SuperDARN data policy - statement for whenever SuperDARN data are used
- Informal agreement - if you're using data in a way that the individual radars are masked, the general statement is fine; if you're using data in a way where you can actually see particular radars (ie, RTI plots), talk to the PI
- Everyone has slightly different feelings.
- Contact individuals responsible for each dataset (often very helpful in redirecting you to get the resources you need too)
- Developing data support costs money and takes people - who supports this?
- VT website has data acknowledgement tool
- Contacting PIs - good for the longevity of the instrument and good to make sure you're not misusing data

Emma Spanswick/Bea Gallardo-Lacourt

- THEMIS ASI is now TREx
- THEMIS ASI - 20 years old; white light
- REGO - redline images (2014 - present)
- TREx - mix of RGB, infrared, redline, spectrograph
- SMILE-ASI, GDC-Ground (in development)
- GDC-G - 136 instruments (variety)
- Can't do everything, but will try to do something to accommodate everyone
- all data u calgary are available in aurora x. training session for the trex data at gem. at gem, joint session with geostorm: how to provide data products to better provide data to modelers.

- csa funding is likely not contingent on GDC funding

Tai-Yin Huang

- NSF perspective on data infrastructure needs
- Data Users, Data Providers, Federal Funders - many areas overlap
- Record keeping is very important
- Moving towards de-personed data - ideally want the data to be well-enough documented that the data is useful WITHOUT an expert explaining it
- Data citation - evidence and credit for providing data. helps extend funding
- Long-term data storage
- Funders want to make sure the community is actually using data
- Heterogeneous datasets are important for systems approach
- Open data access is important
- Need community to work on this and advocate for this
- Earth science community is several steps ahead of us
- machine learning can be exploitative. providing machine readable data could be an issue. you have good tools, can be used in good or bad way. machine readable
- Agencies are improving, but still hard to get good credit for documenting

Leslie Lamarche

- SOP23 campaign and dataset
- Tying in last year's session (crowd-sourced SoP23 contributions) - currently have this incredible data set, now trying to figure out exactly what to do with it
- Main instruments used during campaign: swarm (TIIs, mags), ASIs, PFISR, HF radar (SD), SDI, GNSS receivers, ground mags
- How do you share ALL of this data? How do you share the high-level data products, and how do we credit them? Share code, link back to original data? Just share outputs? Make "common product" almost as a means to share the actual process to enforce more use for broadening the actual science?
- every instrument has their own parameters, resolutions, etc, but you can combine them all and create conductivity maps, and many other things to use with numerical models. also can have an observational study.
- we are combining datasets, and figuring out how to fit all these instruments together.
- how do you credit a heterogenesous data set? DOIs useful
- uploading to zenodo is good for a single paper, but could lead to redundant copies of the same data over and over.

Last 5 min Discussion

- What funding exists that will allow for us to store our large data sets so they can be used by more than just whoever has access to someone's harddrive with limited space
- Data to enable science - proposal still has science questions but the goal is to generate data for addressing these questions.