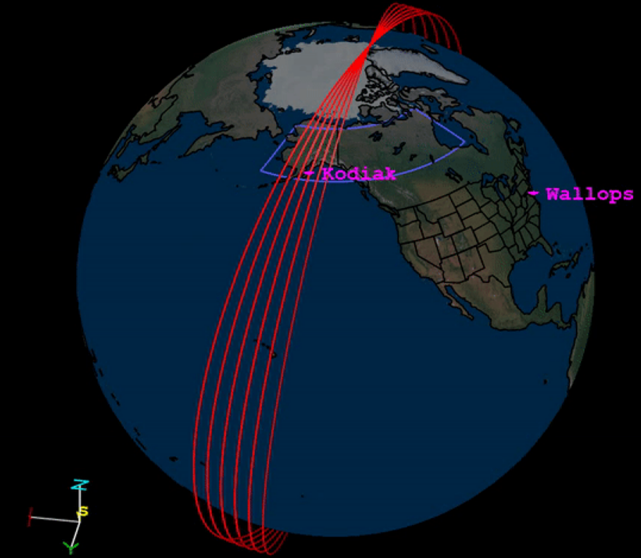


Connecting the dots: multipoint in situ ionospheric data assisted by imagery: Isinglass and ARCS

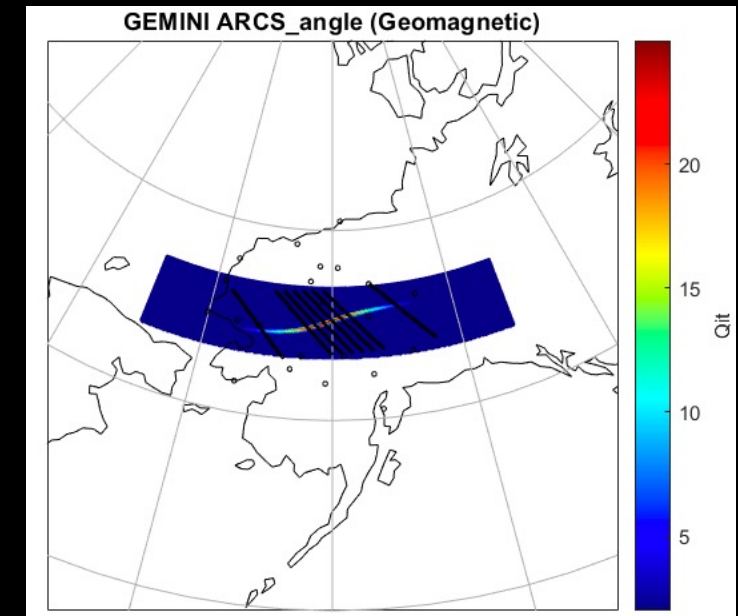


*question: can we make
distributed, but high-fidelity,
maps of the auroral ionosphere?*

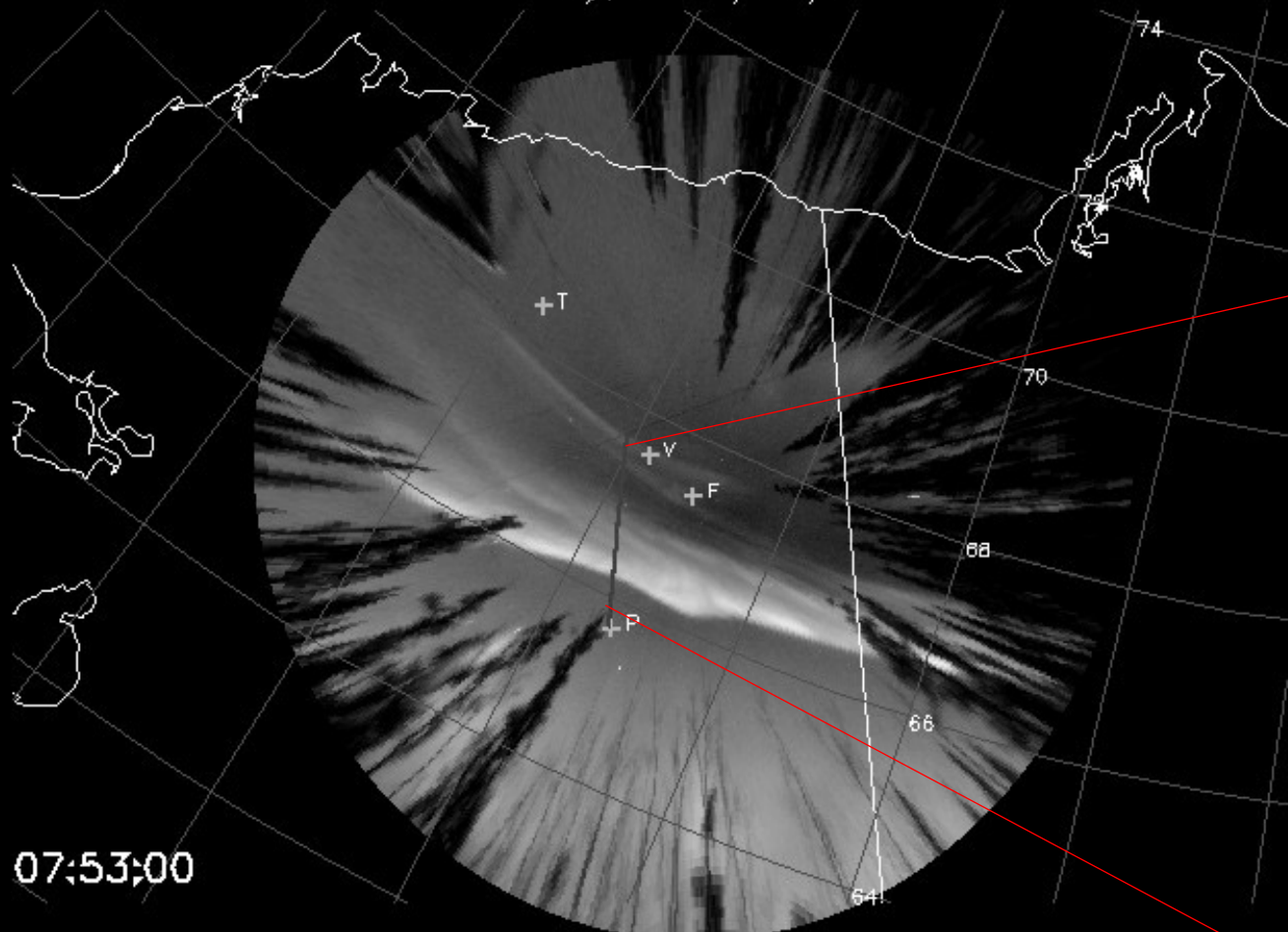
Kristina Lynch, Dartmouth Physics

Tucker Evans, Evan Thomas, Matt Zettergren, Meghan Burleigh

ARCS Team



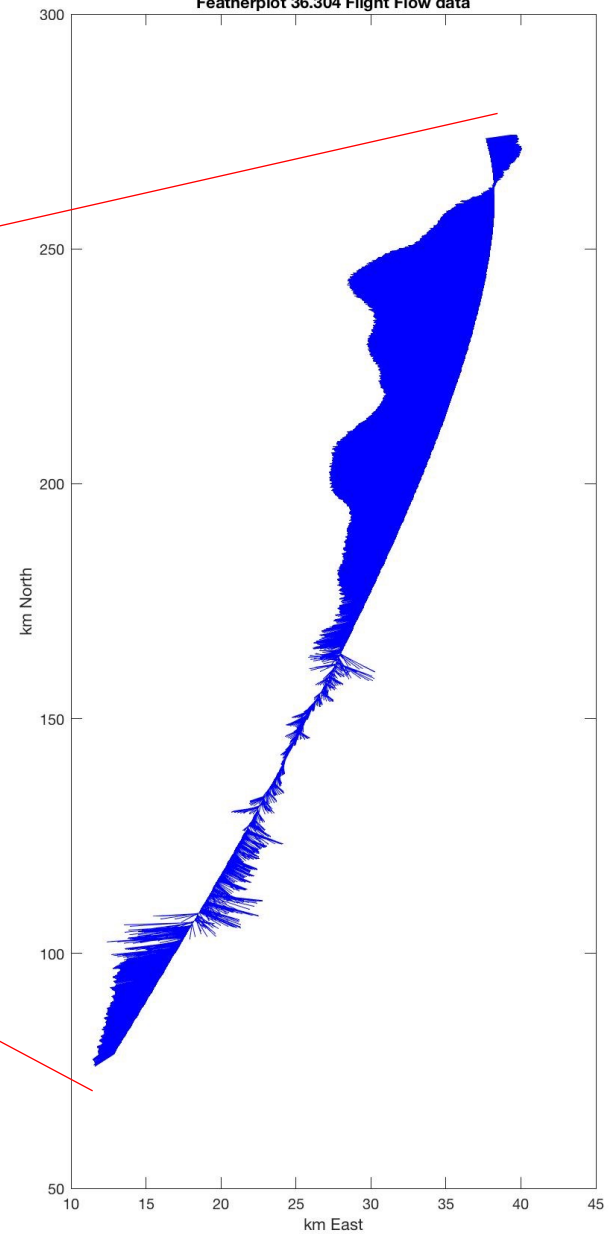
VEE Allsky, 2017/03/02

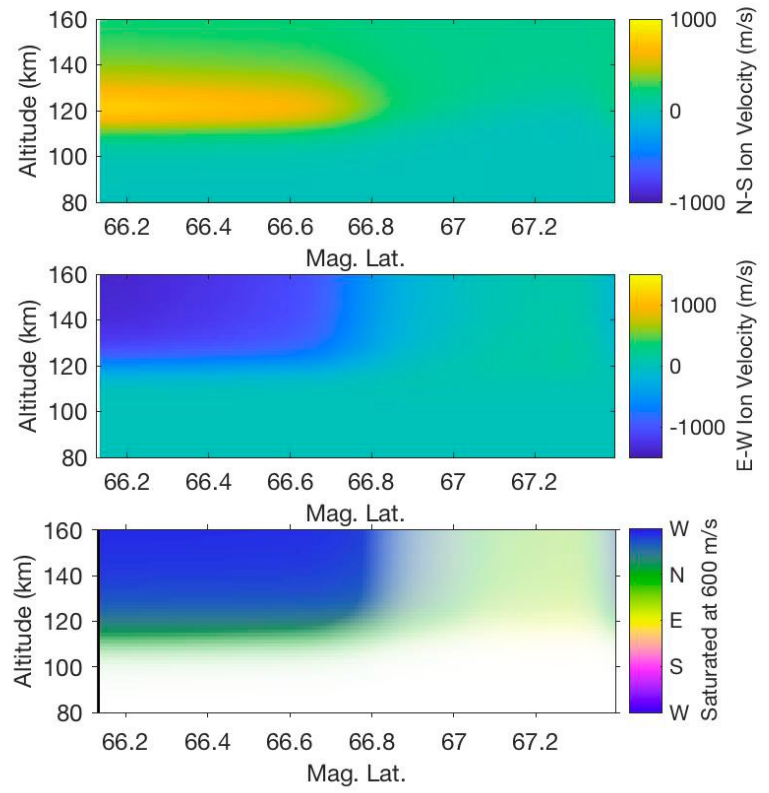


07:53:00

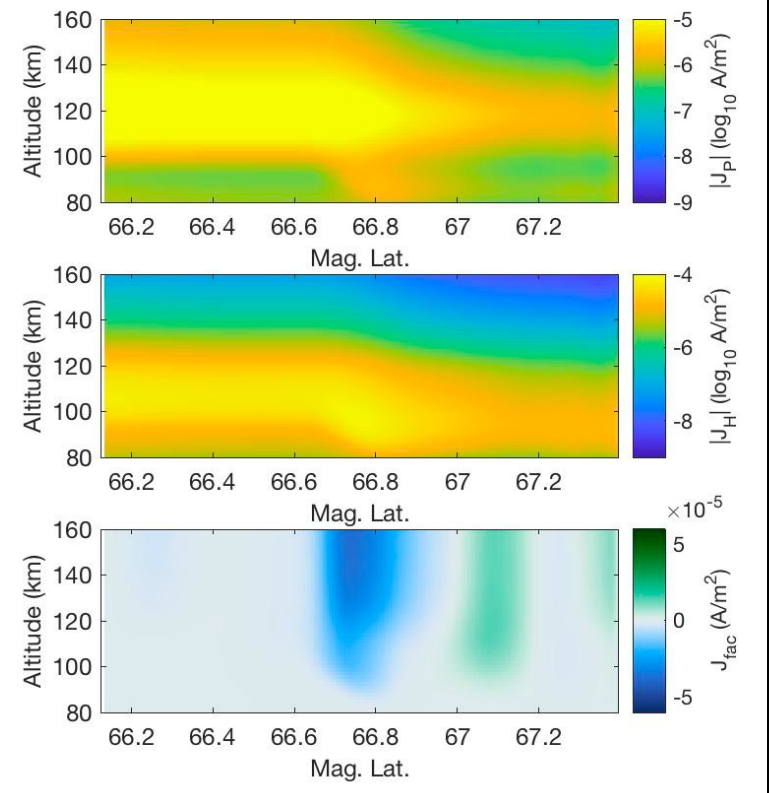
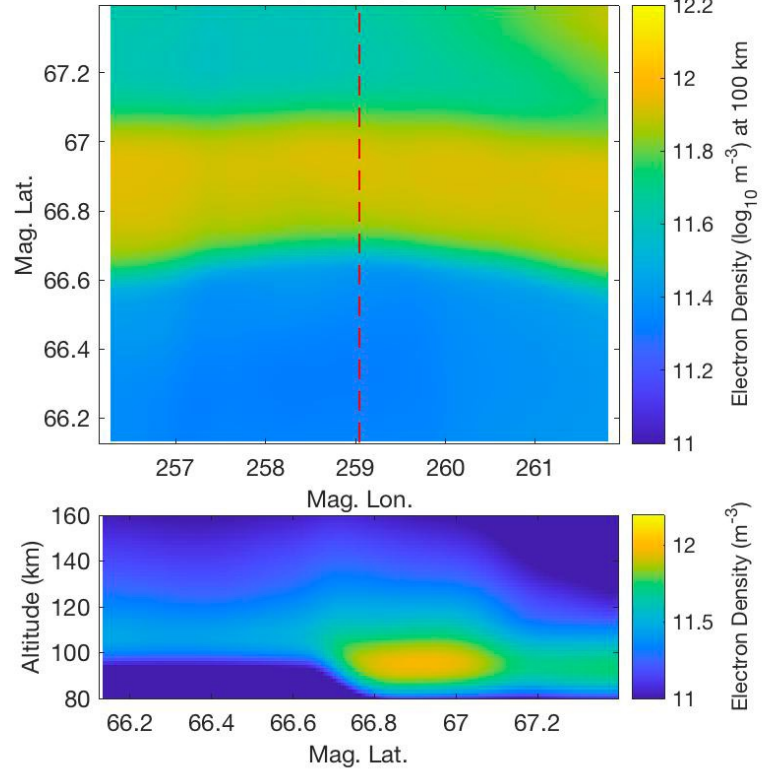
Ref, Isinglass team

Featherplot 36.304 Flight Flow data



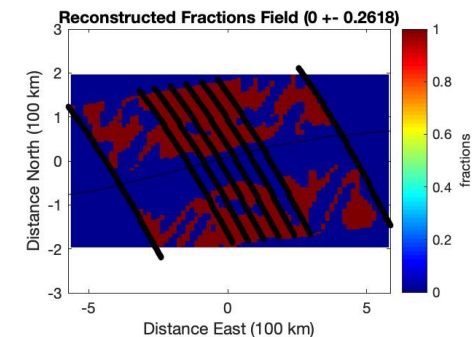
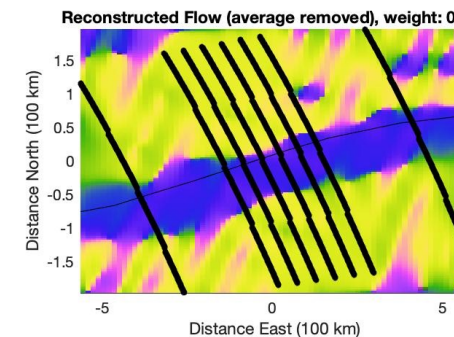
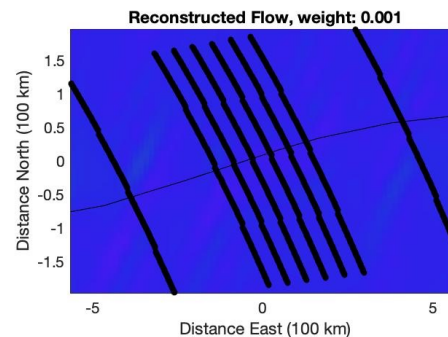
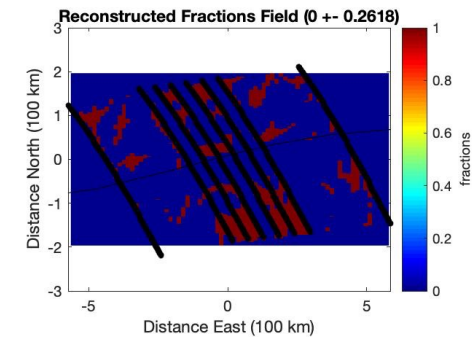
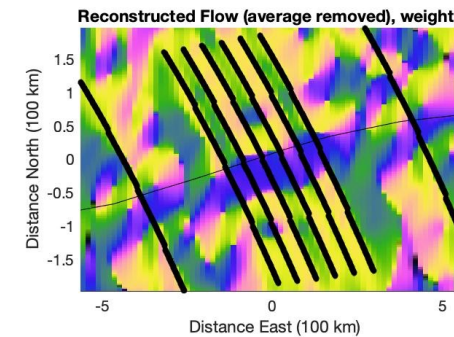
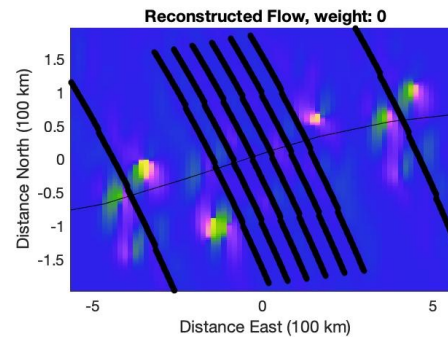
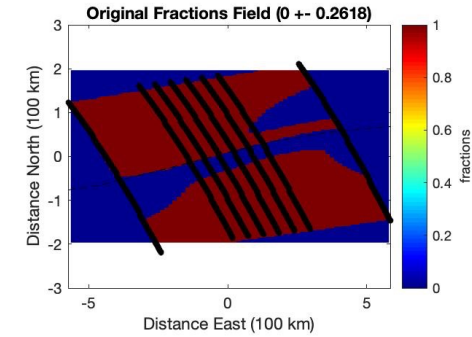
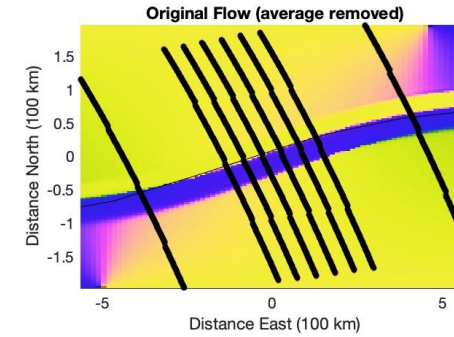
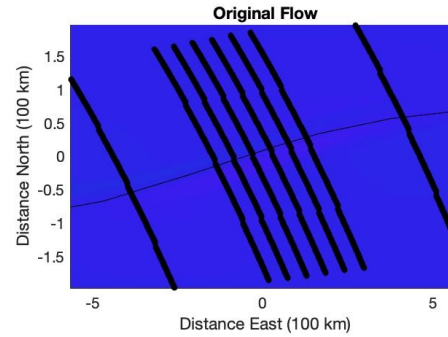


02-Mar-2017
07:04:00 UT



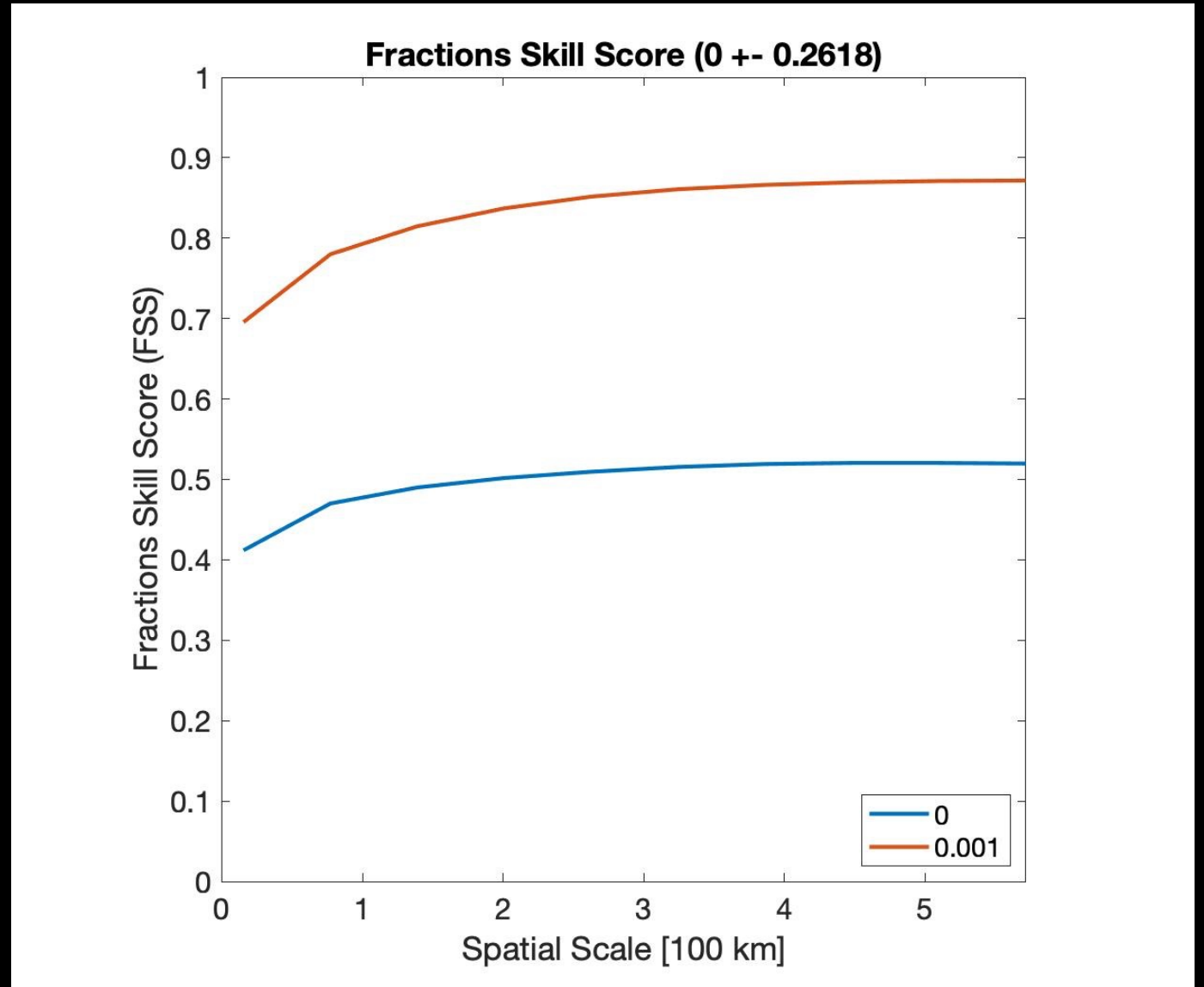
How to reconstruct the 2d flow field from observation points?

- Straight interpolation very poor on scales of arcs
- Divergence-minimization poorly constrained
- Add a constraint minimizing variation along length of arc, defined by imagery or TEC tomography

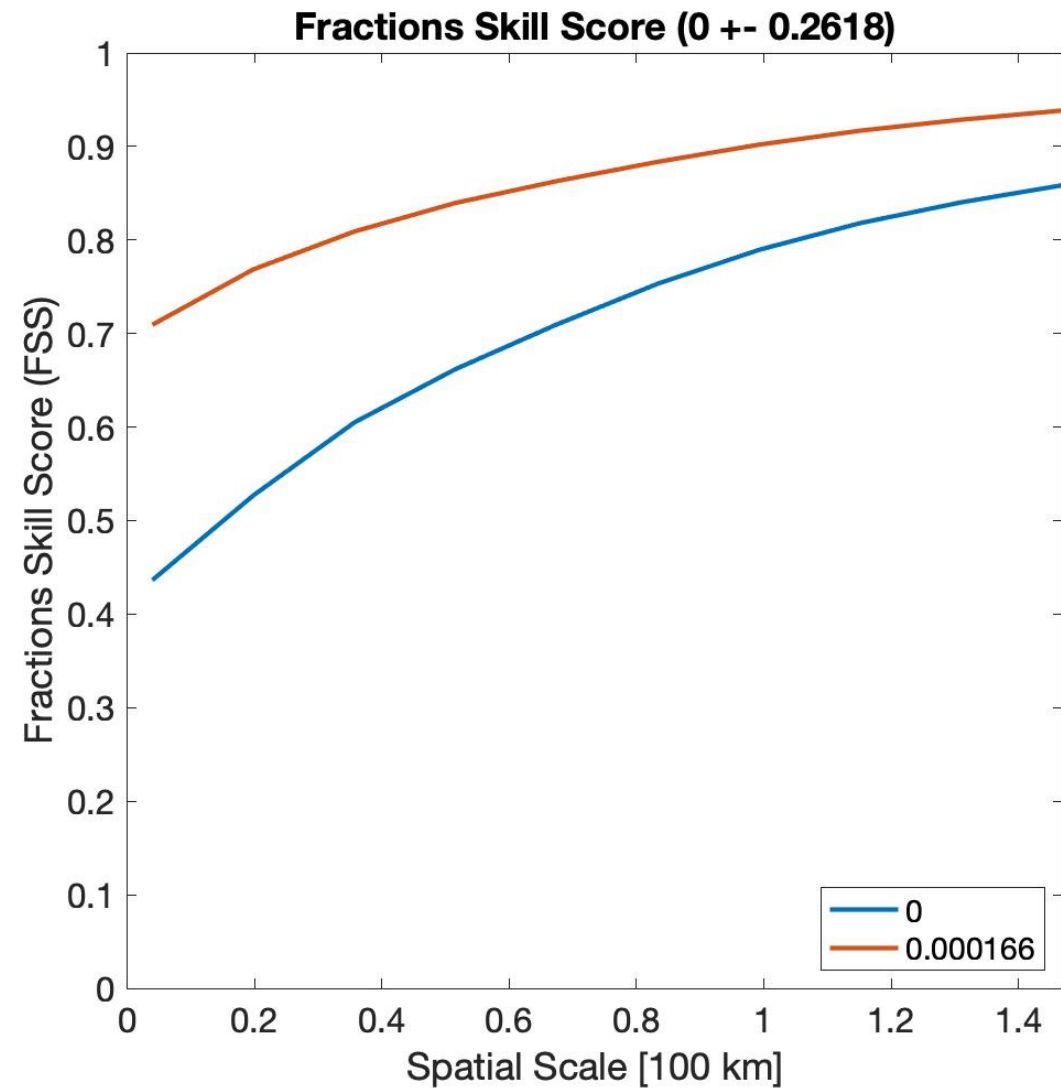
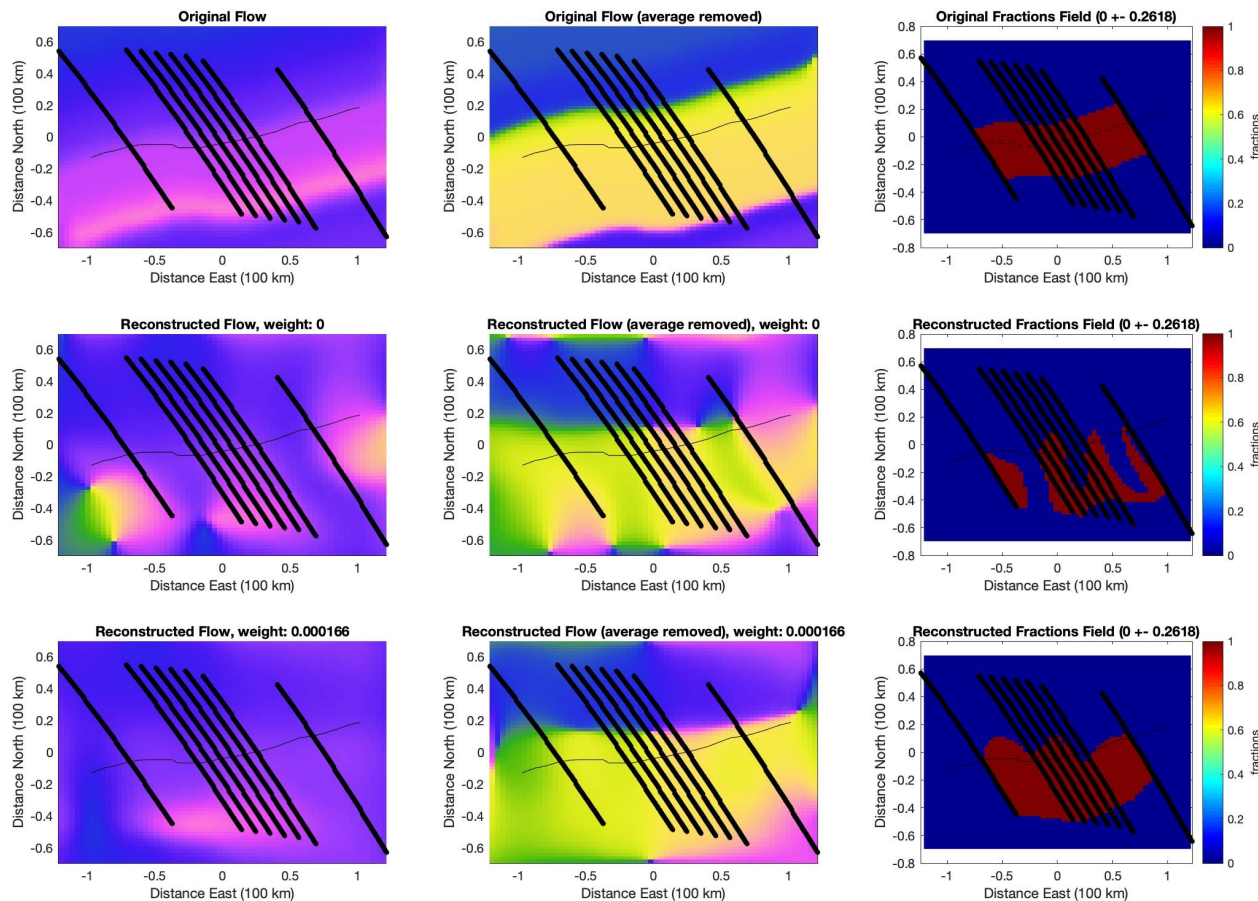


How to quantify the goodness of the reconstruction?

- Fractions Skill Score (FSS) [ref here] from meteorology
- Tells us at what scale the reconstruction is a good representation
- Requires deciding (a) what feature to reconstruct, and (b) on what metric to judge – direction? magnitude?

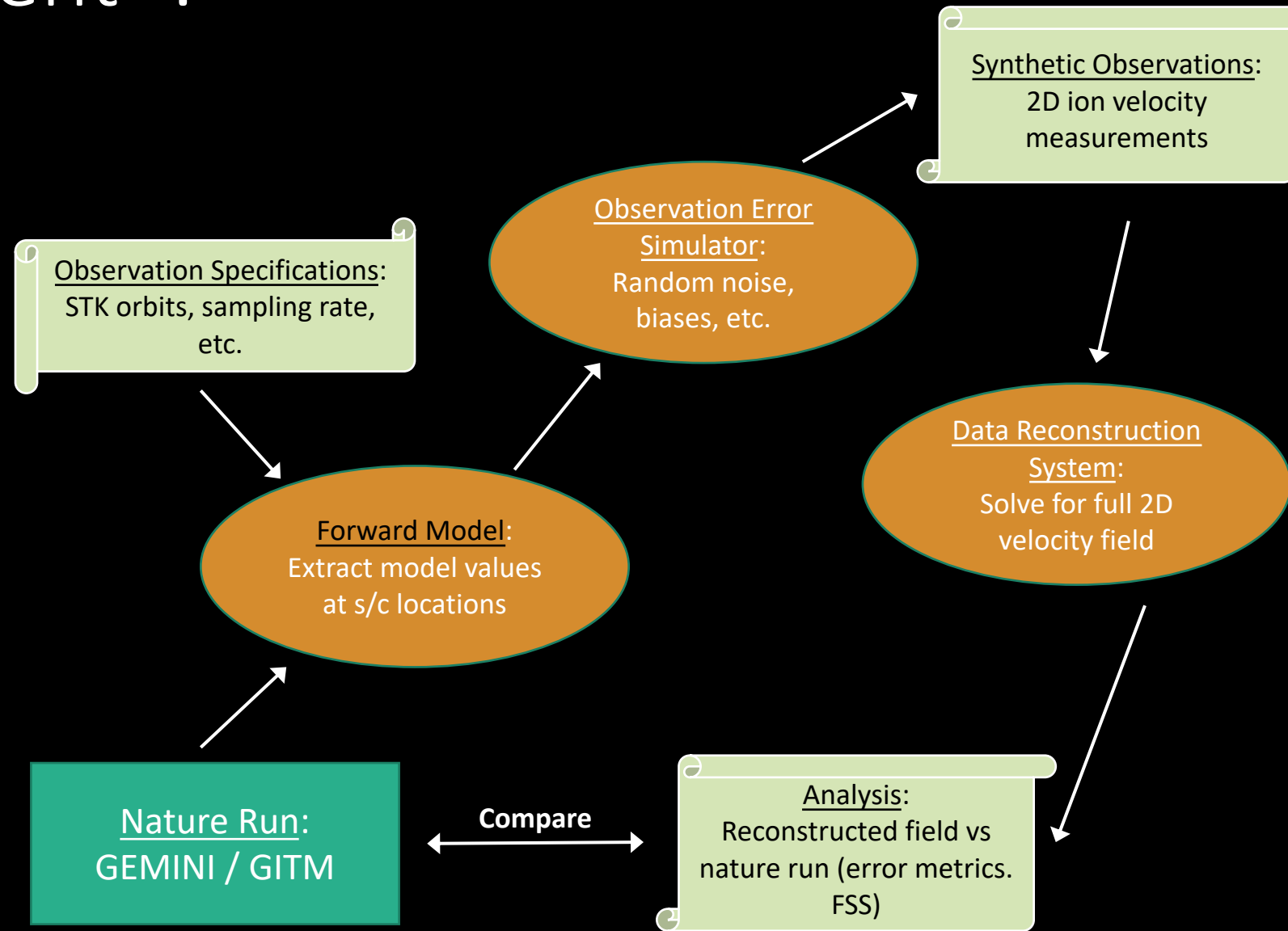


How to quantify the goodness of the reconstruction?



Use for an OSSE: “observing system simulation experiment”?

- Given a tool for deciding goodness of a reconstruction, move on to quantifying costs/benefits of size/number of spacecraft swarm array
- Effects of resolution or timing
- Effects of spatial resolution and scale
- OSSE: i.e., Blackwell, Q J R Meteorol Soc. 2018;1–12, 2017



Connecting the dots:?

- How to reconstruct a field from distributed (and varied) measurements
- How to quantify the goodness of the reconstruction: FSS metric, and choices thereof
- Use an OSSE to optimize choices for designing the array of distributed measurements
- Adding dimensions to your observations is rich but quantifying them is subject to many decisions

