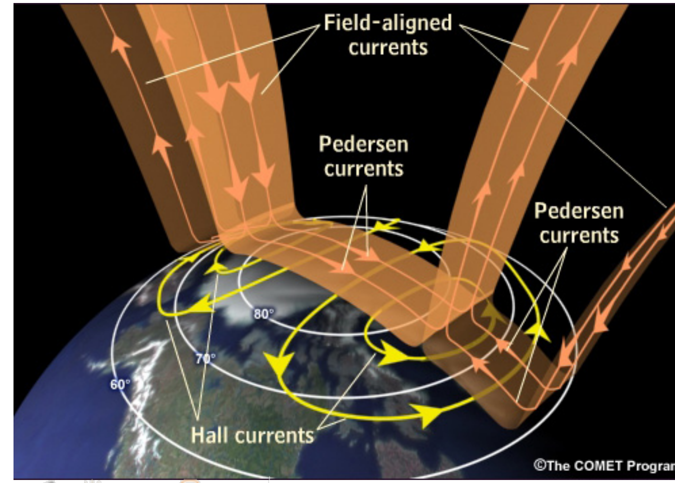
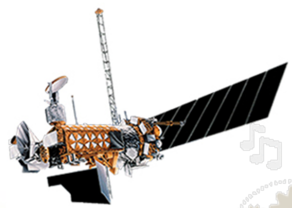
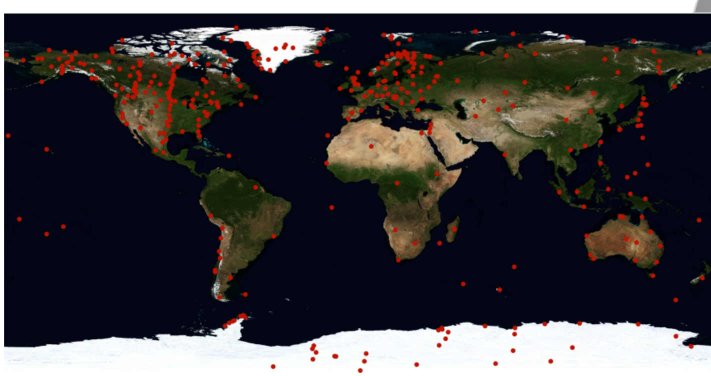
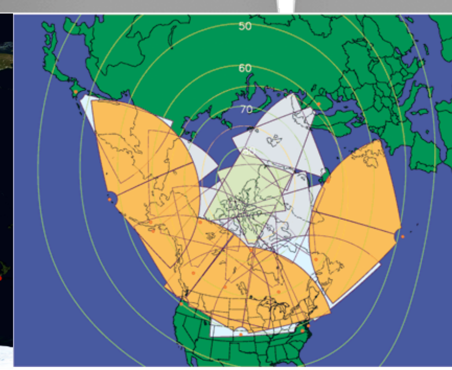
Roles of the Conductance in Making Sense of High-latitude Geospace Observations









Tomoko Matsuo (CU-Boulder) and AMIE Nexgen Collaborators

Assimilative Mapping of Ionospheric Electrodynamics

[Richmond and Kamide, 1988]

Inverse procedure to infer maps of

$$\vec{E}, \Phi, \underline{\underline{\Sigma}}, \vec{J}_{||}, \vec{J}_{\perp}, \Delta\vec{B}$$

From observations of

SuperDARN plasma drifts
Iridium/AMPERE magnetic fields
Ground-based magnetic fields
DMSP auroral particle precipitations

linear relationship (for a given $\underline{\underline{\Sigma}}$)

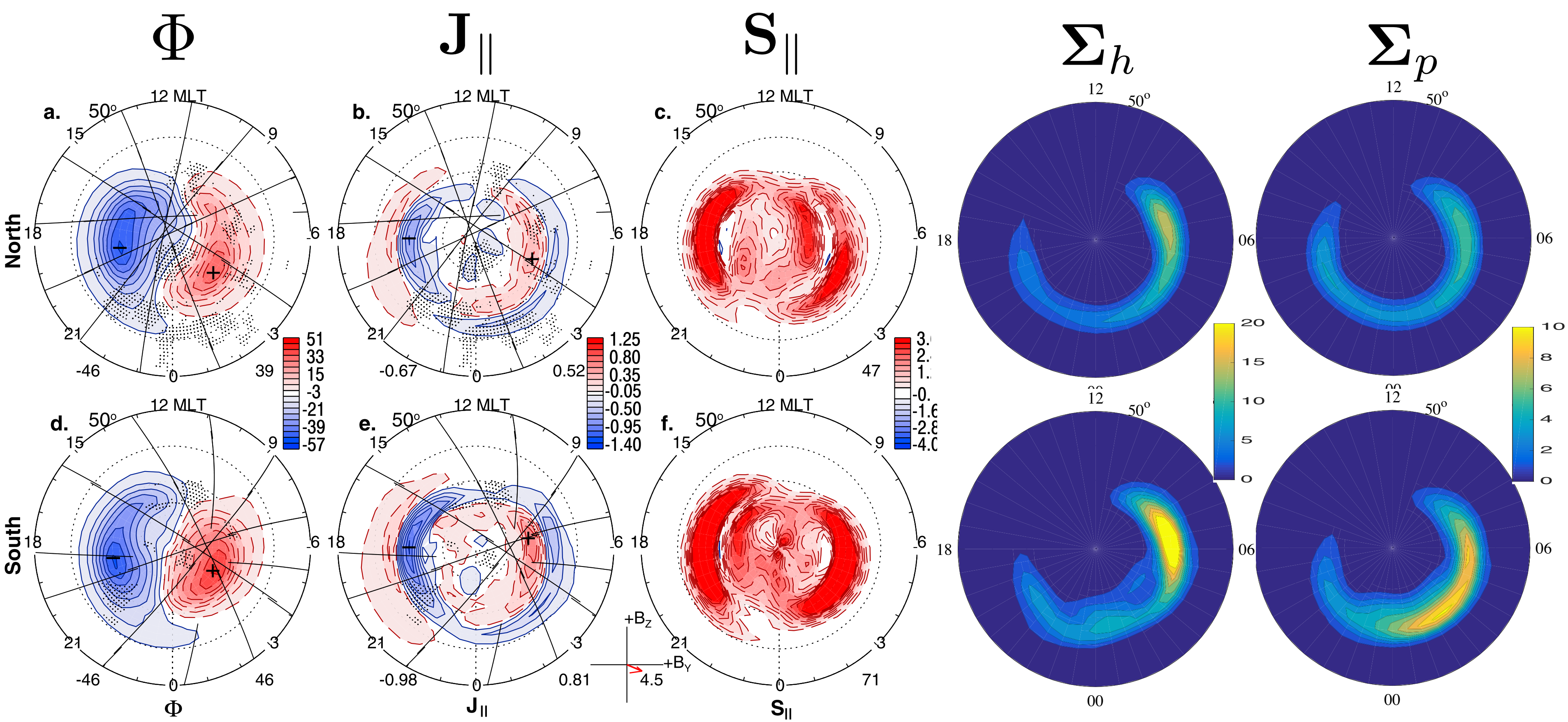
$$\boxed{\vec{E}} = -\nabla \Phi$$

$$\boxed{\vec{J}_{||}} = \nabla \cdot \vec{J}_{\perp}$$

$$= \nabla \cdot (\underline{\underline{\Sigma}} \cdot \boxed{\vec{E}})$$

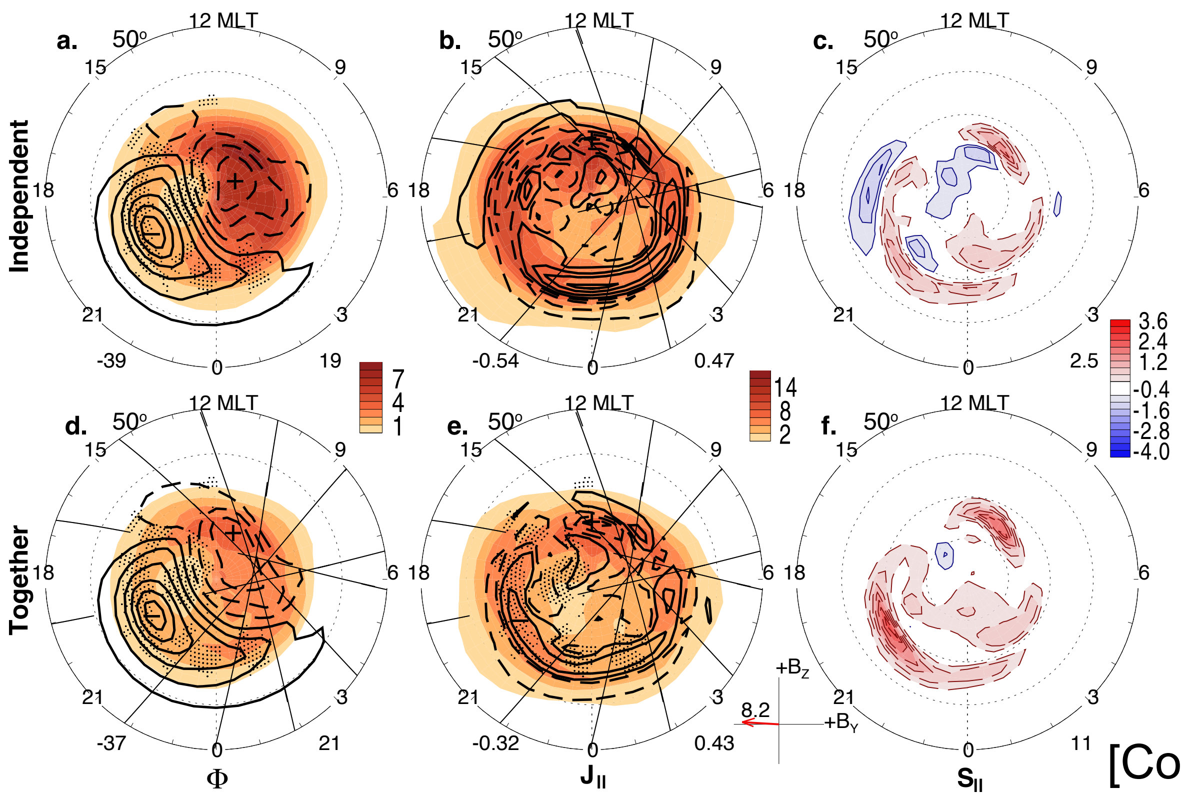
$$\nabla \times \Delta\vec{B} = \mu_o \vec{J}$$

AMIE Nextgen - SuperDARN, Iridium/AMPERE & DMSP data

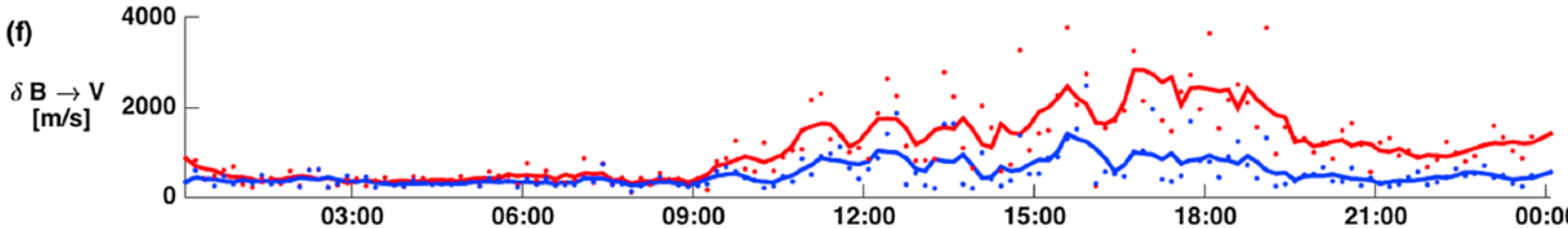


[Matsuo et al., 2015; Cousins et al., 2015; Mcgranaghan et al., 2016]

Assessing AMIE Nextgen Improvement



[Cousins et al., 2015]



[Mcgranaghan et al., 2016]