GROUND-BASED MAGNETOSEISMOLOGY OBSERVATIONS FOR THE NEXT DECADE. P. J. Chi[1], [1]Department of Earth, Planetary and Space Sciences, University of California, Los Angeles (Box 951567, Los Angeles, CA 90095, pchi@igpp.ucla.edu).

Magnetoseismology is a unique and well-demonstrated method to investigate the plasma structures and dynamics of the magnetosphere. The normal-mode method examines the widespread field line resonance (FLR) in the magnetosphere to estimate the plasma mass density that is difficult to infer through other measurements. The travel-time method tracks impulse propagation in the magnetosphere and has enabled new capability of remotely monitoring sudden impulses and substorm onsets that are rarely measured on-site. The two methods of magnetoseismology bear substantial resemblance to the techniques used in terrestrial seismology and helioseismology that have advanced our understanding of the interior of the Earth and the Sun.

Figure 1 shows an example of ground-based network observations using the normal-mode magnetoseismic method. Each snapshot of the equatorial plasma mass density can be estimated by ~20 minutes of simultaneous ground-based magnetometer observations where FLR signatures are present. Implementation of additional ground-based magnetometer stations to form dense magnetometer chains in American, European, and Asian sectors can enable global monitoring of the plasma mass density in the inner magnetosphere.

Travel-time magnetoseismology was originally developed for understanding the propagation of sudden impulses in the dayside magnetosphere, and was soon expanded into investigations in the magnetotail where the initiation of substorms is an important source of impulsive signals. We have demonstrated that ground observations of the arrival of substorm-triggered perturbations can infer the start time and location of substorm initiation in the magnetotail [1], complementing satellite observations for investigating substorm onset mechanisms. Continuous operation of existing ground-based magnetometer networks is vital to ensuring the simultaneous observations required by this research methodology.

Reference: [1] Chi P. J. et al. (2008) *GRL, 36,* L08107, doi:10.1029/2008GL036574.

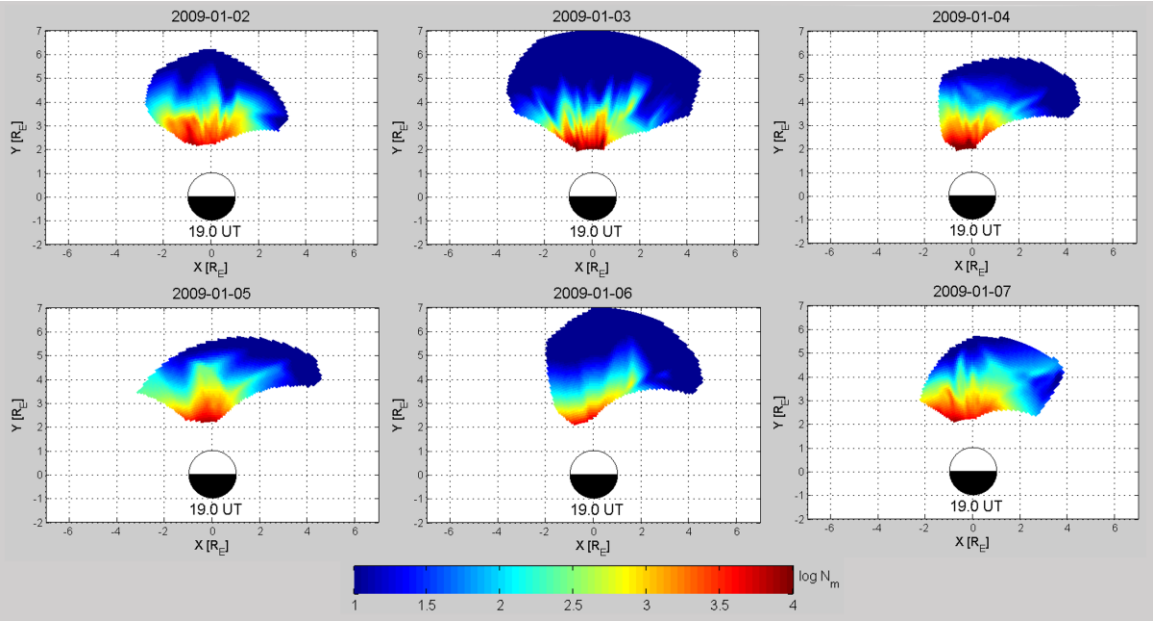

Figure 1. Longitudinal structure of plasmasphere monitored by normal-mode magnetoseismology with magnetometer arrays in North America.