Geophysical Research Abstracts
Vol. 19, EGU2017-13454, 2017
EGU General Assembly 2017

The Worldwide Interplanetary Scintillation (IPS) Stations (WIPSS) Network in support of Space-Weather Science and Forecasting

Mario Mark Bisi (1), J. Americo Gonzalez-Esparza (2), Bernard Jackson (3), Ernesto Aguilar-Rodriguez (2), Munetoshi Tokumaru (4), Igor Chashei (5), Sergey Tyul'bashev (5), Periasamy Manoharan (6), Richard Fallows (7), Oyuki Chang (8), Hsiu-Shan Yu (3), Ken'ichi Fujiki (4), Vladimir Shishov (5), and David Barnes (1)

(1) Science & Technology Facilities Council, RAL Space, Harwell Oxford, UK (mario.bisi@stfc.ac.uk), (2) SCiESMEX/MEXART, Instituto de Geofisica, Unidad Michoacan, Universidad Nacional Autonoma de Mexico, Morelia, Mexico, (3) Center for Astrophysics and Space Sciences, University of California, San Diego, La Jolla, CA, USA, (4) Institute for Space-Earth Environmental, Nagoya University, Nagoya, Japan, (5) Lebedev Physics Institute, Pushchino Radio Astronomy Observatory, Pushchino, Russia, (6) Radio Astronomy Centre, National Centre for Radio Astrophysics, Tata Institute of Fundamental Research, Udhagamandalam (Ooty), India, (7) ASTRON, the Netherlands Institute for Radio Astronomy, Dwingeloo, The Netherlands, (8) Posgrado en Ciencias de la Tierra, Instituto de Geofisica, Universidad Nacional Autonoma de Mexico, Morelia, Mexico

The phenomenon of space weather – analogous to terrestrial weather which describes the changing low-altitude atmospheric conditions on Earth – is essentially a description of the changes in the plasma environment at and near the Earth. Some key parameters for space-weather purposes driving space weather at the Earth include velocity, density, magnetic field, high-energy particles, and radiation coming into and within the near-Earth space environment. Interplanetary scintillation (IPS) can be used to provide a global measure of velocity and density as well as indications of changes in the plasma and magnetic-field rotations along each observational line of sight. If the observations are formally inverted into a three-dimensional (3-D) tomographic reconstruction (such as using the University of California, San Diego – UCSD – kinematic model and reconstruction technique), then source-surface magnetic fields can also be propagated out to the Earth (and beyond) as well as in-situ data also being incorporated into the reconstruction. Currently, this has been done using IPS data only from the Institute for Space-Earth Environmental (ISEE) and has been scientifically since the 1990s, and in a forecast mode since around 2000. There is now a defined (and updated) IPS Common Data Format (IPSCDFv1.1) which is being implemented by the majority of the IPS community (this also feeds into the UCSD tomography). The Worldwide IPS Stations (WIPSS) Network aims to bring together, using IPSCDFv1.1, the worldwide real-time capable IPS observatories with well-developed and tested analyses techniques being unified across all single-site systems (such as MEXART, Pushchino, and Ooty) and cross-calibrated to the multi-site ISEE system (as well as learning from the scientific-based systems such as EISCAT, LOFAR, and the MWA), into the UCSD 3-D tomography to improve the accuracy, spatial and temporal data coverage, and both the spatial and temporal resolution for improved space-weather science and forecast capabilities.