Geophysical Research Abstracts
Vol. 19, EGU2017-5080, 2017
EGU General Assembly 2017

PMSE and wind profiles from observations above EISCAT Tromsø site

Ingrid Mann (1), Satonori Nozawa (2), Ingemar Haeggstroem (3), Anders Tjulin (3), Peter Dalin (4), Chris Hall (5), Charles Anyairo (6), and Sina Rostami (6)

(1) UiT the Arctic University of Norway, Department of Physics and Technology, Tromsø, Norway (ingrid.b.mann@uit.no), (2) Solar-Terrestrial Environment Laboratory, Nagoya University, Nagoya, Japan, (3) EISCAT Scientific Association, Kiruna, Sweden, (4) Swedish Institute of Space Physics, IRF, Kiruna, Sweden, (5) UiT the Arctic University of Norway, Tromsø Geophysical Observatory, Tromsø, Norway, (6) Space Technology Division, Luleå University of Technology, Luleå, Sweden

One of the processes that are linked to the entry of cosmic dust in atmosphere is the formation of Polar Mesospheric Summer Echoes (PMSE). PMSE are strong radar echoes that are observed in the polar summer mesosphere. They are caused by spatial variations in the plasma refractive index which arise in the presence of electrically charged ice particles. The ice particles that are linked to PMSE are often below the optically observable size range and are assumed to form by water ice condensing onto meteoric smoke particles at around 80 to 90 km altitude. The atmosphere at PMSE altitude is influenced by solar radiative forcing from above and gravity waves from below, and while ionization is small, it is highly variable due to a number of different processes. A straightforward quantitative description of the physics leading to PMSE formation is at present still missing. With one of the first tri-static PMSE observations with the EISCAT VHF radar we found signs of wind shear in PMSE. The observations suggest that the PMSE contains sublayers that move in different directions horizontally, and this points to Kelvin-Helmholtz instability possibly playing a role in PMSE process. We compare the EISCAT observations to wind observations carried with other radar at the same location and discuss implications for future observations. We acknowledge Chris Meek and Alan Manson who provided MF radar data. EISCAT is an international association supported by research organizations in Norway (NFR), Sweden (VR), Finland (SA), Japan (NIPR and STEL), China (CRIPR), and the United Kingdom (NERC); data are available under http://www.eiscat.se/madrigal/.