

IPY-ICESTAR: Interhemispheric Conjugacy Effects in Solar-Terrestrial and Aeronomy Research

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Project Summary

This is a joint proposal from the Norwegian participants in the ICESTAR/IHY-program. It is an integrated part of the international ICESTAR program and will take full advantage of the ICESTAR Virtual Data Port, which will make data available from a large ground based network covering the northern and southern hemispheres. The effort of this proposal will contribute to the ICESTAR/IHY- program by making continuous measurements with the EISCAT Svalbard Radar (and potentially additional, on-demand, observations with the EISCAT radars at Ramfjordmoen if additional funding can be secured) covering more than a calendar year. Through inter-hemispherical studies the main science goals are to assess the relative role of the various constituents of the magnetosphere-ionosphere system for the formation of geomagnetic disturbances, how these interact with the polar atmospheres and affects its electric circuits and chemistry. The relative timing and location of auroral brightening (substorm onset) in the two hemispheres will be determined. Conjugacy of theta aurora (arcs that extend across the polar cap) and magnetic reconnection rates (energy transfer) will be studied to clarify the structure of the closed magnetosphere and the energy/mass exchange with the solar wind. Knowledge about the coupling between magnetosphere and ionosphere will be derived from observation of ion outflow, conductance, convection patterns, polar cap potentials and field aligned currents in the two hemispheres. Impact by energetic particle precipitation (EPP) on the minor constituents of the middle atmosphere will be assessed by use of satellite and ground-based observations to further develop models of the EPP-induced chemical changes. Finally, the proposal has an ambitious public outreach element which aims at creating a stronger relation between the scientific and communication community.