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Multipoint Observations of Oval-aligned Transpolar Arc Formation using ST5 and DMSP

J. A. Cumnock (1), G. Le (2), Y. Zhang (3), and J. A. Slavin (4)

(1) University of Texas at Dallas, Center for Space Sciences, Richardson, TX, USA, (2) NASA Goddard Space Flight Center, Heliophysics Science Division, Greenbelt, MD, USA, (3) Johns Hopkins University, Applied Physics Laboratory, Laurel, MD, USA, (4) University of Michigan, AOSS, Ann Arbor, MI, USA

We analyze changes in field-aligned currents associated with auroral oval-aligned transpolar arc formation during quiet times on time scales of a few minutes. This is accomplished using observations from the highly accurate multipoint magnetic field measurements provided by the Space Technology 5 mission which consists of three micro-satellites in low Earth orbit. Simultaneous measurements of precipitating particles are provided by three DMSP satellites. In two events we analyze field-aligned currents associated with the dusk oval. For the first time we observe the field-aligned currents associated with the formation of an oval-aligned transpolar arc poleward of the auroral oval which in one case are large compared with the field-aligned currents associated with the auroral oval measured 10 minutes earlier. These events clearly illustrate the dynamic nature of oval-aligned transpolar arc formation.