

# **Incoherent Scatter Radar Long Duration Experiments at Millstone Hill**

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Incoherent scatter radars provide high quality physical measurements of the ionosphere which are useful for a wide variety of investigations. Recently an emphasis has been placed on long duration observational runs which last on the order of one month. In October 2002, EISCAT Svalbard and Millstone Hill Radars conducted first ever long duration experiments for over 30 consecutive days (Zhang et al., 2005). EISCAT Svalbard and Tromso Radars performed more long-duration runs in 2003 and 2004. In response to the demand for these long term observations the ISR community then scheduled additional month long World Day operations periods for September 2005 and March 2006. These long duration ISR experiments provides a unique opportunity to study many important ionosphere-thermosphere phenomena, including the upper atmospheric climatology, variability, disturbances, long-lasting and other types of space weather events which may not be captured by a regular run. The detailed datasets cover both geomagnetically quiet and active periods under different solar activity conditions, and represent one of the very finest resources for the evaluation of current and future geospace modeling efforts. We present a number of examples from these datasets and describe how the user community may access them using the Madrigal database. We discuss results of preliminary analyses with emphasis on the 2002 experiment in terms of the day-to-day variability and oscillations of the ionosphere during periods of quiet magnetic conditions, and highlight some of the space weather events occurring during these experiments.