

U.S. CEDAR Program – Coupling, Energetics and Dynamics of Atmospheric Regions

Chair of the CEDAR Science Steering Committee
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Minister Helge Sander
Danish Ministry of Science, Technology, and Innovation
Bredgade 43
DK-1260 Copenhagen,
DENMARK

Dear Minister Sander:

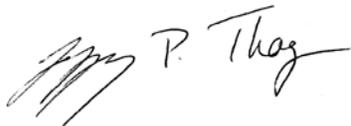
The members of the U.S. National Science Foundation's (NSF) Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) science steering committee express our deep concern regarding news of the Danish Meteorological Institute's plan to discontinue the operation of the Greenland magnetic measurement stations and to no longer maintain the data archive accumulated over the many years. This data resource is a critical asset for many researchers around the globe and is essential for continuing advancement of understanding solar-terrestrial interactions.

The CEDAR program funded by NSF is an element of the U.S. Global Change Program which started in 1986 to undertake coordinated collaborative studies of the Earth's upper atmosphere. Its primary objective is to understand the energetic and dynamic processes that determine the composition and structure of the atmosphere above 60 km, particularly how energy, momentum, and chemical processes from the magnetosphere, and those originating in the lower atmosphere, couple to and affect the mesosphere, thermosphere and ionosphere. CEDAR scientific efforts involve researchers, students and technicians, from many countries studying aspects of the upper atmosphere and ionosphere through modeling, data analysis and ground based observations. The CEDAR program has reached the level of icon status and is recognized around the world as the leading forum for upper atmosphere research.

In this role, the CEDAR community is gravely concerned with the potential loss of the Greenland magnetometer chain and its data. The Greenland array of magnetometers is uniquely located and provides unmatched continuity and temporal resolution of currents flowing in the polar ionosphere and magnetosphere. Current flow in the ionosphere is a manifestation of energy transfer from the solar wind to the earth's upper atmosphere and is a major contributor to heating the upper atmosphere. This contribution is amplified during geomagnetic storms. The time-varying nature in the current leads to magnetic perturbations on the ground that can induce currents in conducting materials compromising power grids, cause corrosion of pipelines, and disrupt communications. These consequences constitute societal impacts of space weather. Though societal and economic impacts of space weather events are not well understood, estimates show that the economic cost of a severe geomagnetic storm could reach US\$1-2 trillion during the first year alone, with recovery times of 4-10 years.

On behalf of the CEDAR community, we urge your ministry to consider alternatives to closing the Greenland magnetometer stations and urge the continuance to maintain the excellent data base that has been accumulated over several solar cycles. There is much research still to be accomplished and the Greenland magnetometer stations are among the most important ground-based resources needed to further develop our scientific understanding of the Sun-Earth system. The absence of the Greenland data will leave an enormous observational gap in a critical region of geospace. The Greenland infrastructure presently in place would also be difficult to reinstate once support is discontinued. The continued operation of the Greenland stations will directly contribute to the ongoing Danish satellite programs to investigate the Earth's magnetic field, whose remarkable results have earned strong international recognition.

Sincerely,



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Concurring Committee Members:

Dr. Bill Bristow, Geophysical Institute, Alaska; **Mr. Jonathon Fentzke**, University of Colorado, **Dr. Larisa Goncharenko** MIT, Haystack Observatory; **Dr. Joseph Huba**, Naval Research Laboratory; **Dr. Diego Janches**, Colorado Research Associates; **Dr. Hanli Liu**, NCAR; **Mr. Marco Milla**, Univ. Illinois Urbana-Champaign; **Dr. John Noto**, Scientific Solutions Incorporated; **Dr. Meers Oppenheim**, Boston University; **Dr. John Plane**; University of Leeds, England; **Dr. Mike Ruohoniemi**, Virginia Tech; **Dr. Susan Skone**, University of Calgary, Canada; **Dr. Lara Waldrop**, Univ. of Illinois Urbana-Champaign