Understanding How Geoengineering Can Offset Climate Change

Sixth Meeting of the Geoengineering Model Intercomparison Project
Oslo, Norway, 21–22 June 2016

WinkelmannPhotography

Cirrus clouds distort a view of the Sun. Participants at a meeting in Oslo, Norway, presented new developments in modeling and simulating climate engineering approaches, including stratospheric aerosols, marine cloud brightening, cirrus thinning, and land and ocean brightening.

Climate intervention, also called geoengineering or climate engineering, is an emerging, important area of climate science research. This research focuses on deliberate climate modification to offset some of the effects of anthropogenic greenhouse gas emissions. The Geoengineering Model Intercomparison Project (GeoMIP) was formed to better understand climate intervention through simulations conducted by multiple climate models.

GeoMIP held its sixth annual meeting at the University of Oslo in June 2016. The meeting was held in conjunction with the Norwegian project Exploring the Potential and Side Effects of Climate Engineering (EXPECT; http://bit.ly/EXPECT-project), which seeks to understand the implications of climate intervention and to stimulate interdisciplinary collaboration among scientists in the natural and social sciences.

Participants from a variety of natural science backgrounds presented modeling results from multiple climate intervention methods, including stratospheric aerosols, marine cloud brightening, cirrus thinning, and land and ocean brightening. The first results from multimodel sea spray climate intervention simulations showed strong features of commonality among the responses of different models.

GeoMIP continues to incorporate expertise from new areas. For example, this meeting was the first to present analyses of the modeled response of the ocean to GeoMIP simulations. Several scientists from social science disciplines attended the meeting, and they provided broader perspectives on the societal implications of the climate modeling results.

Of the approximately 35 participants, more than one third were attending a GeoMIP meeting for the first time, in keeping with the project's interest in expanding its scope and providing a forum for new ideas. Several new modeling and simulation concepts were presented to the GeoMIP Testbed, which is a forum for proposing new ideas to GeoMIP for possible adoption. These new concepts include land albedo modification in ways that are readily standardized across models, a proposal for idealized stratospheric aerosols, and simulations of localized ocean albedo modification.

Descriptions of these new areas of research are being added to the GeoMIP website (http://bit.ly/GeoMIP), which is the most up-to-date source of information on past, present, and future simulation designs. Also on the site are a timeline of start dates for the new simulations for Coupled Model Intercomparison Project Phase 6 (CMIP6; http://bit.ly/CMIP-phase-6) and a current list of Testbed experiments.

After the conclusion of the 1.5-day GeoMIP meeting, EXPECT held an open forum in which natural and social science experts on climate intervention presented to the general public the current thinking of the research community. There were approximately 50 participants, including GeoMIP attendees, other natural and social scientists, the media, and members of the general public.

In the future, GeoMIP will continue its mission of providing knowledge about key uncertainties in climate intervention research, particularly as an officially endorsed project under CMIP6. As new important areas of research emerge in this field, GeoMIP will continue to provide a scientific focus for addressing important unknowns and a forum for consideration of the full range of approaches to climate intervention.

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One of our authors, Jón Egill Kristjánsson, tragically passed away in a hiking accident on 14 August 2016. We dedicate this article to his memory and to his immense body of insightful, influential work on cloud modeling, aerosol-cloud interactions, and, most recently, cirrus thinning. His legacy of scientific contributions is indisputable, and those of us who had the privilege of working with him will miss him greatly.

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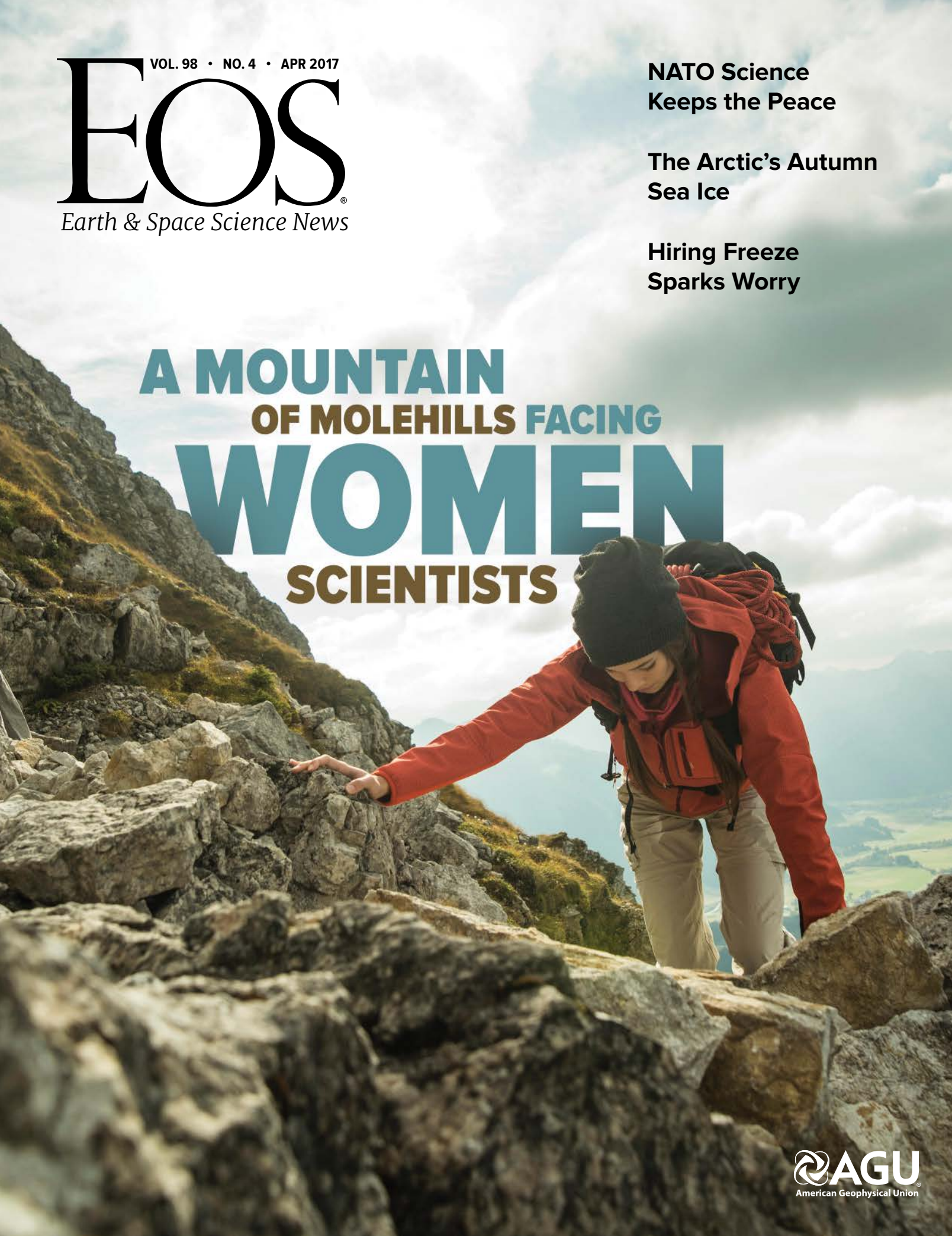

A MOUNTAIN OF MOLEHILLS FACING WOMEN SCIENTISTS

AGU
American Geophysical Union