Remote Sensing Leads to Better Understanding of Polar Regions

Fifteenth International Circumpolar Remote Sensing Symposium; Potsdam, Germany, 10–14 September 2018

This drone photo shows an ice-rich permafrost bluff on the Drew Point coast of the Alaskan Beaufort Sea in early July 2018. The collapsing bluff shows the effects of accelerating erosion, which now exceeds 20 meters per year. Airborne drone remote sensing, which fosters better understanding of permafrost coastal erosion dynamics in northern Alaska, was one among many new technological developments discussed at the 15th ICRSS. Credit: B. Jones, University of Alaska Fairbanks

By Guido Grosse and Benjamin Jones 1 hour ago

Earth's polar regions feature cold-climate environments characterized by unique landscapes, biota, and processes. The climate in these regions is driven largely by cryospheric processes that are subject to, or have the potential for, fundamental and rapid change in a warming world. Bridging spatial scales and knowledge gaps in these regions requires remote sensing observations.

Myriad Earth observation technologies provide crucial tools to understand and quantify the current state and unprecedented changes occurring in the polar regions of our planet.

Myriad Earth observation technologies provide crucial tools to understand and quantify the current state and unprecedented changes occurring in these often remote reaches of our planet. The International Circumpolar Remote Sensing Symposium (ICRSS (https://alaska.usgs.gov/science/geography/CRSS2018/)) series provides a forum for the exchange of current applied research and best practices, presentation of new technology and further innovation, and advancement of international cooperation in circumpolar regions.

The primary theme of the 15th ICRSS was "Polar Regions in Transformation—Climatic Change and Anthropogenic Pressures." High-level presentations by senior and junior researchers focused on 10 core topics of relevance to the circumpolar remote sensing community: glaciers and ice sheets, Arctic land cover, permafrost (https://eos.org/research-spotlights/arctic-permafrost-thaw-would-amplify-climate-change), polar atmosphere, floating ice, polar coasts and deltas, polar lakes, snow (https://eos.org/project-updates/how-can-we-find-out-how-much-snow-is-in-the-world), polar oceanography, and new sensors and operational services.

Nearly half of the participants were early-career researchers, highlighting the rapid growth of this research community.

More than 100 participants from 16 countries attended, demonstrating the true international character of polarcentric remote sensing and research. Nearly half of the participants were early-career researchers (up to 3 years following Ph.D. completion), highlighting the rapid growth of this research community and a sign that the future of remote sensing of polar regions is bright.

In addition to the many oral and poster presentations, five workshops provided a venue for in-depth discussions of such pressing research topics as remote sensing of Arctic vegetation dynamics and polar ocean color, as well as hands-on technical sessions focused on such rapidly evolving remote sensing methods as interferometric synthetic aperture radar subsidence measurements, point cloud data processing, and big data processing and analysis approaches.

After the conference, the conveners compiled a list of "core outcomes," summary statements that encapsulate key ideas from the various presentations, discussions, and workshops:

Remote sensing plays an essential role in detecting and quantifying substantial changes in some of Earth's most remote and inaccessible regions.
Open-access data policies and data publishing stewardship foster longer and denser time series analysis and a better understanding for short- versus long-term cryosphere dynamics.
Corroboration of remote sensing analyses with field studies is critical for data interpretation and scaling.
International collaboration—from the level of individual researchers and projects to joint major field or observation campaigns—is essential for synergizing scientific work in polar regions.
Regular communication between space agencies, such as in the Polar Space Task Group (http://www.wmo.int/pages/prog/sat/documents/SAT-GEN_PSTG-StratPlan2015-2018.pdf), can significantly enhance the availability of data for science in polar regions, but these communications should include private data providers in the future.

The proceedings from the 15th ICRSS are available online (https://doi.org/10.2312/GFZ.LIS.2018.002). The 16th ICRSS will be held at the University of Alaska Fairbanks from 1 to 5 June 2020. This upcoming symposium will continue to build on the core outcomes of the 15th ICRSS.

The 15th ICRSS was organized by the Alfred Wegener Institute in Potsdam, Germany, with support from five regional partner institutions, and multiple sponsors from various academic disciplines and industry.

—Guido Grosse (guido.grosse@awi.de (mailto:guido.grosse@awi.de)), Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Potsdam, Germany; and Benjamin Jones, University of Alaska Fairbanks

Citation: Grosse, G., and B. Jones (2018), Remote sensing leads to better understanding of polar regions, *Eos*, *99*, https://doi.org/10.1029/2018EO111159. Published on 28 December 2018.