

Career Accomplishments

Jeffrey R. Key

OVERALL

Developed innovative methods to observe the polar regions from space, increased our knowledge of polar climates, and fostered the expansion of polar observations internationally.

FIRSTS, DISCOVERIES & DEVELOPMENTS




- Led research that resulted in **discoveries about Arctic and Antarctic climate**, including decreasing Arctic winter cloud cover; year-round warming effect of Antarctic clouds; impact of winter clouds on summer sea ice; and the relative importance of ice-albedo and snow-albedo feedbacks.
- Developed **one of the first applications of neural networks** for satellite image classification (1989), and possibly **the first application of neural networks for radiative transfer** (1998).
- Developed the **first automated, satellite-derived polar winds product**, used in operational numerical weather prediction in nine countries.
- Pioneered improvements in **polar cloud detection**.
- Led the development of **innovative snow and ice satellite products** for five satellite missions, including ice surface temperature, cloudy-sky surface albedo, sea ice thickness, and others. **Created new probabilistic characterizations** of sea ice leads and clouds measured in different ways.
- Created a multi-variable, satellite-based **climate data record for the polar regions** that is used worldwide and has led to numerous findings about polar climate.
- Developed a **radiative transfer modeling tool** that continues to be used in research and education.
- Led the Integrated Global Observing Strategy (IGOS) Cryosphere Theme, **the first comprehensive assessment of the cryospheric observing system**.
- Co-led the development of the WMO Global Cryosphere Watch, **the first international framework for coordinating and expanding observations of the global cryosphere**.

RESEARCH & TEACHING METRICS

- **Awards:** NOAA Silver Sherman Award, NOAA Distinguished Career Award for Scientific Achievement, Department of Commerce Silver Medal, three DOC Bronze Medals, NOAA Administrator's Award, two NASA group awards.
 - **Publications:** Author/co-author on 134 journal papers and other peer-reviewed publications, 7 book chapters. (h-index: 60, i10-index: 120, citations: 12K+, Mar 2024, [Google Scholar](#))
 - **NOAA operational products:** 2 multi-variable climate data records, polar winds from 9 satellites, 6 sea ice and 5 snow products from 5 satellites.
 - **Grants:** PI, Co-PI, or Co-I on 77 grants totaling \$42M (\$23M as PI) since 1991.
 - **Fieldwork:** 7 Arctic (2 aircraft), 1 Antarctic (McMurdo), two Great Lakes, 1-4 weeks each.
 - **Teaching:** Taught 15 different courses in remote sensing, meteorology, climatology, statistics, geography, and computer science at 4 universities. Research advisor for 13 PhD and Master's students.
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MANAGEMENT & SERVICE

- **Advisory:** Served on high-level panels for the World Meteorological Organization, World Climate Research Programme, NOAA, NASA, DOE, ECCC.
 - **Teams:** Led teams of federal and university scientists in product development, applications, and scientific analysis for five satellite systems. NOAA Branch Chief for 20 years.
 - **Projects:** Served as PI on 7-10 projects annually.
 - **Cooperative Institutes:** Oversaw processing of more than 130 grants per year for ~\$50M at three NOAA cooperative institutes (CI), as well as three successful CI competitions.
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