

THE NATIONAL ACADEMIES PRESS OPENBOOK

Memorial Tributes: Volume 21 (2017)

Chapter: EUGENE M. RASMUSSEN

Visit [NAP.edu/10766](https://www.nap.edu/10766) to get more information about this book, to buy it in print, or to download it as a free PDF.



Eugene M. Rasmussen

EUGENE M. RASMUSSON

1929–2015

Elected in 1999

“For contributions to understanding climate variability and establishing the basis for practical predictions of El Niño.”

**SUBMITTED BY MARGARET A. LEMONE,
SUMANT NIGAM, AND JOHN M. WALLACE**

EUGENE MARTIN RASMUSSON, a kind and generous man whose fundamental contributions were the collection, integration, and application of comprehensive datasets to increase understanding of the water cycle and Earth’s climate variability, died March 22, 2015, at the age of 86.

He quantified the important role of land- and ocean-surface-atmosphere interactions in weather and climate, provided convincing observational evidence for the postulated relationships involved in El Niño Southern Oscillation (ENSO), and facilitated the collection of data needed for documenting and monitoring El Niño and its impacts, beginning with the 1982–1983 event. In so doing, he fostered a strong sense of community among his peers in the geosciences: in particular, the sharing of ideas, the culture of working cooperatively for the benefit of society rather than merely for personal gain, and the cultivation of the next generation of scientists. Gene is survived by Georgene (née Sachtleben), his wife of 54 years, their four daughters Mary, Ruth Anne, Elizabeth, and Kristin, and six grandchildren.

Most of this text is excerpted or adapted from Rasmusson’s obituary published in the *Bulletin of the American Meteorological Society*, October 2015, pp. 1805–1808, by John M. Wallace and Sumant Nigam. Reprinted with the permission of the American Meteorological Society.

Gene was born February 27, 1929, on a farm 5 miles south of Lindsborg in McPherson County, Kansas, the oldest of seven children in a family descended from Norwegian and Swedish immigrants. The early years on the farm and its strenuous daily routine were, in his words, “fundamental in the development of my personality and philosophy of life.” Likewise, his vivid memories of the Dust Bowl, which peaked when he started elementary school, “were a factor in stimulating my interest in meteorology and ultimately in determining my future career.”

He also attributed the awakening of his interest in science, which transcended meteorology, to occasional programs aired on “Cavalcade of America,” sponsored by the DuPont Corporation. He listened to these on the battery-powered radio that his family acquired when he was 7 years old.

Gene’s career trajectory was not typical. After graduating from the Lindsborg high school in 1946 he enrolled at Kansas State University, where he earned a bachelor of science in civil engineering, graduating with an Air Force reserve commission in 1950. After working for 9 months as a highway surveyor, he was called to active duty. He took a 1-year basic meteorology training course at the University of Washington in Seattle, and then served as a weather forecaster in support of pilot training at Vance AFB in Enid, Oklahoma. In 1953 he got his “overseas assignment”—which turned out to be at Elmendorf AFB in what was then the Territory of Alaska.

Gene was discharged from active duty in the Air Force in May 1955 and, after a short stint as a plant engineer with Pacific Telephone and Telegraph Co. in Seattle, returned to meteorology, joining the US Weather Bureau as a river forecaster in St. Louis. The next 7 years of his work in hydrology and river forecasting proved to be a valuable asset in his future career.

Taking graduate-level night courses at St. Louis University, he completed an MS degree in engineering mechanics in May 1963. A few months later he was awarded a US Weather Bureau scholarship to study at the Massachusetts Institute of Technology, where he earned a PhD in meteorology in 1966, with Victor Starr as his mentor.

Like most of Starr’s students, Gene considered the question of how the atmospheric general circulation fulfills the balance requirements for the

conservation of mass, energy, and momentum. However, Gene's PhD thesis was unique: Drawing on his flood forecasting experience, he treated the surface and atmospheric branches of continental-scale hydrology not as independent entities but rather as interacting elements of a coupled system. His analysis of the water budget over North America, published in 1967 and 1968, came to be recognized as an important step toward an interdisciplinary approach to the climate system. It laid the groundwork for contemporary programs such as the Global Energy and Water Cycle Experiment (GEWEX) and, more generally, for the treatment of land surface processes in numerical weather prediction models and global climate models.

From 1966 to 1970 Gene worked at the Geophysical Fluid Dynamics Laboratory (GFDL). His most notable contribution during this time was a monograph on *General Circulation Statistics* in collaboration with Abraham H. Oort. Like today's model-based reanalysis products, their analysis served as a resource for numerous empirical studies and as "ground truth" against which the results of newly developed global climate models were compared.

Gene left GFDL in 1970 to lead the newly formed BOMEX Analysis Project (BOMAP), whose mission was to process, analyze, and interpret the data acquired during the 1969 Barbados Oceanographic and Meteorological Experiment (BOMEX). Under Gene's leadership, BOMAP—which combined turbulence measurements with large-scale wind, temperature, and moisture fields derived from radiosonde data to elucidate the maintenance of the marine boundary layer—took shape and the results were published in 1973. The experience and knowledge acquired in BOMEX and BOMAP were incorporated into the planning for subsequent field experiments, including the GARP (Global Atmospheric Research Programme) Atlantic Tropical Experiment (GATE), which stimulated advances in parameterizing deep convection, radiative flux divergence, ocean-atmosphere fluxes, and

boundary-layer processes in numerical weather prediction models.

In 1979 Gene was asked to organize the diagnostic branch of the newly formed NOAA Climate Analysis Center (CAC). His appointment came at a time when large-scale atmosphere-ocean interaction was being recognized as an important field of study. About a decade earlier, Jacob

Bjerknes had postulated the existence of a physical link between El Niño in the equatorial eastern Pacific Ocean and the planetary-scale Southern Oscillation in the atmospheric sea level pressure field discovered by Sir Gilbert Walker 50 years earlier.

Gene's 1982 diagnostic study with Thomas H. Carpenter, "Variations in Tropical Sea Surface Temperature and Surface Wind Fields Associated with the Southern Oscillation/El Niño," provided conclusive evidence of the relationships envisioned by Bjerknes. With over 1,600 citations to date in the Web of Science, it is by far Gene's most influential paper. It is fair to say that it inspired the use of the acronym "ENSO," which symbolizes the interdependence of El Niño and the Southern Oscillation.

Gene set to work assembling a staff and creating the datasets and analysis tools needed to monitor the global climate in near real time. Under his direction, the diagnostic branch developed the Climate Diagnostics Database to monitor atmospheric circulation, the Climate Anomaly Monitoring System for land surface temperature and rainfall, and a global sea surface temperature (SST) analysis. By 1982 Gene and his staff had put in place an operational ENSO monitoring and diagnostic system that enabled the CAC to disseminate, in near real time, information on the evolving anomalies and impacts of the remarkably intense 1982–1983 El Niño, bringing world-wide recognition to the CAC.

In 1983 Gene was awarded the NOAA Administrator's Award for this work. He was widely quoted in national and international newspaper and news magazine stories, interviewed on numerous radio and television programs, and featured in articles on El Niño in *Readers Digest* (1983) and *National*

Geographic (1984). And in 1986 he was part of a small scientific delegation that was granted a personal audience with Pope John Paul, who was interested in the human impacts of El Niño events.

Gene retired from NOAA in 1986 to become a research scientist at the University of Maryland, where he continued his research and participation in international programs on climate variability and global/regional hydrology.

He was also active in the work of the National Research Council. He chaired the advisory panel that oversaw the design of an exhibit devoted to

global warming at the Koshland Science Museum, as well as the Climate Research Committee and the Committee on the Future of Rainfall Measuring Missions. In the 1980s and 1990s he served on the Board on Atmospheric Sciences and Climate, the Global-Ocean-Atmosphere-Land System Panel, the Panel on Model-Assimilated Data Sets for Atmospheric and Oceanic Research, and the Advisory Panel for the Tropical Ocean/Global Atmosphere (TOGA) Program.

Gene received the Jule G. Charney Award from the American Meteorological Society (AMS) in 1989, and he delivered the Victor Starr Memorial Lecture at MIT in 1992 and the AMS Robert E. Horton Lecture in Hydrology in 1994. He was elected a fellow of the American Geophysical Union in 1997 and a member of the National Academy of Engineering in 1999. As AMS president in 1998, he was instrumental in adding the *Journal of Hydrometeorology* to the portfolio of AMS publications. In 2002 he received the AMS Charles Franklin Brooks Award, and in 2007 he was honored at a one-day named symposium at the AMS annual meeting in San Antonio. In 2010 he was elected to honorary membership in the AMS.

Gene and Georgene established the Eugene Rasmusson Endowed Fellowship awarded annually to an outstanding graduate student who has advanced to candidacy in doctoral research in atmospheric and oceanic science at the University of Maryland. And in 2011 the university's Department of Atmospheric and Oceanic Science launched the Eugene Rasmusson Lectures to honor its distinguished faculty member.

Air Force Lt. Col. (ret'd.) Eugene Martin Rasmusson was laid to rest at Arlington National Cemetery with full military honors (including a 21-gun salute) the afternoon of July 22, 2015, under blue skies, surrounded by immediate family and several dozen friends and colleagues.

This page intentionally left blank.



