ASA Response to NSF Dear Colleague Letter: Intent to Restructure Critical Weather Infrastructure

March 13, 2026

Prepared with the guidance of the ASA Advisory Committee on Climate Change Policy

The American Statistical Association (ASA) appreciates the opportunity to provide input on the National Science Foundation Dear Colleague Letter regarding the potential restructuring of components of the National Center for Atmospheric Research. The ASA represents the nation's statistical science community, including researchers who develop and apply statistical methods to address challenges in environmental and atmospheric science.

The importance to the United States of the research and capabilities currently carried out at the National Center for Atmospheric Research (NCAR) cannot be overstated. These activities play a central role in addressing challenges that affect agriculture, food security, public safety, and community resilience. The programs based at NCAR represent the nation's leading concentration of expertise in the research and prediction of atmospheric phenomena that affect all sectors of society, including hurricanes, tornadoes, wildfires, and other high-impact atmospheric hazards. While related work exists at other federal facilities, no other setting brings together such a deep and collaborative community of atmospheric scientists, statisticians, modelers, and computational experts. If the existing structure were dismantled without careful preservation of these functions, it would be extraordinarily difficult to maintain the same level of coordinated expertise.

The research conducted through NCAR programs is also globally recognized for its leadership in climate modeling and atmospheric prediction. These programs have pioneered widely used approaches such as ensemble prediction that are foundational to modern forecasting. This work

is apolitical in nature; it provides the scientific basis for understanding long-term atmospheric patterns and risks that are critical for informed decision-making in the United States. In addition, the computational and data-management capabilities developed in support of this research have advanced large-scale scientific computing, with important implications for data science and artificial intelligence.

Beyond the contributions of individual projects, the distinctive value of these activities lies in the integration of observational systems, numerical models, high-performance computing, and applied research conducted in collaboration with universities, federal agencies, and industry. This integrated environment enables methodological innovation, scientific discovery, and operational applications to reinforce one another. From the perspective of the statistical community, preserving this integration is essential for advancing research on complex environmental systems.

For these reasons, the American Statistical Association strongly supports the continuation of the research capabilities and collaborative functions currently carried out through NCAR and encourages that any restructuring ensure their preservation and continued development.

For the remainder of our comments, we focus on NCAR's role as a platform for statistical research and collaboration in the environmental sciences. Although operational and infrastructure considerations fall outside the primary expertise of statisticians, the statistical community has long relied on NCAR's observational data resources, community models, and collaborative research environment to develop methods for analyzing complex atmospheric and geophysical systems.

NCAR as a Hub for Statistical Collaboration in Atmospheric Science

NCAR has long served as an important hub for collaboration between statisticians and atmospheric scientists. Its open data resources, community models, and interdisciplinary research programs enable statisticians to collaborate with NCAR and other scientistics to engage directly with complex atmospheric and Earth system problems, including high-dimensional spatial and spatio-temporal data, uncertainty quantification for complex numerical models, and the integration of observational and model-generated data, high-performance computing for large-scale environmental modeling, forecast verification and evaluation, and emerging approaches in AI-driven weather prediction and trustworthy AI.

These collaborations have advanced statistical methods for spatial and spatio-temporal modeling, extreme value analysis for weather hazards, statistical downscaling, data assimilation, model calibration, and uncertainty quantification for environmental projections. These approaches are critical for understanding extreme weather events such as hurricanes, heat waves, floods, droughts, and wildfire-related conditions.

These advances are enabled not only by the availability of data and models, but also by the close interaction among researchers developing observational systems, numerical models, and statistical methodologies. The coordination of these capabilities within NCAR creates feedback

loops that accelerate innovation—for example, new statistical approaches developed using NCAR datasets often inform improvements in model evaluation, uncertainty quantification, and the interpretation of observational records.

By providing large observational datasets, long-term atmospheric records, and high-resolution model simulations, NCAR enables research on the probability and severity of rare events, uncertainty in environmental projections, the integration of observations with simulations, and the assessment of compound hazards. This work strengthens the scientific foundation for natural hazard prediction, environmental risk assessment, and resilience planning.

The Importance of NCAR Data Infrastructure

From a statistical perspective, one of NCAR's most valuable contributions is its extensive and accessible atmospheric data ecosystem. NCAR provides long-term observational records, outputs from community Earth system and weather models, and reanalysis products that combine observations with model simulations. These large and complex datasets motivate the development and testing of new statistical methodologies and provide realistic environments for validating statistical models designed to analyze large spatial and temporal environmental datasets.

The scientific value of these data resources is closely tied to the infrastructure that supports them. Observational systems, model development, high-performance computing, and data stewardship operate as an integrated ecosystem. Fragmenting these capabilities across institutions could weaken the feedback between data generation, model development, and statistical analysis that currently drives methodological innovation and improves the reliability of environmental predictions.

Interdisciplinary Collaboration and Workforce Development

The NCAR Mesa Laboratory has served as a national hub for interdisciplinary collaboration. Workshops, visiting scholar programs, and collaborative research initiatives have facilitated sustained interaction between statisticians and atmospheric scientists, allowing statisticians to engage with real scientific problems while providing atmospheric researchers with advanced statistical tools for data analysis and uncertainty quantification. Many statisticians working in earth and atmospheric science today trace their first collaborations with atmospheric researchers to programs hosted at NCAR.

NCAR also contributes to workforce development through postdoctoral fellowships, graduate training initiatives, and interdisciplinary workshops that prepare researchers with expertise spanning statistics, data science, artificial intelligence, computing, and atmospheric science. As atmospheric datasets continue to grow in scale and complexity, the need for researchers with this combined expertise will only increase.

Considerations for Maintaining NCAR's Scientific Impact

From the perspective of the statistical science community, several elements of the current NCAR ecosystem are particularly important.

First, continued open access to atmospheric datasets and community model outputs is essential for methodological development in statistics and data science. These resources provide realistic testbeds for developing methods capable of handling large spatial and temporal environmental datasets.

Second, maintaining the integration of observational systems, numerical models, computing infrastructure, and applied research is critical. Many statistical advances in environmental science arise from the interaction between these components. Dispersing these capabilities across separate institutions or agencies could slow methodological progress and weaken the collaborative environment that supports interdisciplinary innovation.

Third, support for interdisciplinary collaboration through workshops, visiting programs, and joint research initiatives remains vital. These activities enable statisticians, atmospheric scientists, and data scientists to work together on complex problems related to extreme weather, climate variability, and environmental risk.

Finally, sustained investment in training initiatives that cultivate cross-disciplinary expertise will be increasingly important as atmospheric datasets continue to grow in scale and complexity.

Maintaining these elements will help ensure that NCAR continues to serve as a national platform for methodological innovation and interdisciplinary collaboration in earth and atmospheric science.

Concluding Remarks

The American Statistical Association urges the National Science Foundation to ensure that the essential research, data, modeling, and collaborative functions currently carried out through the National Center for Atmospheric Research continue without disruption under any future organizational structure. Maintaining these integrated functions is essential for advancing the nation's capacity to understand and predict atmospheric processes that affect society.

The statistical community has benefited greatly from the research infrastructure, data resources, and collaborative environment provided by NCAR. These resources have strengthened the integration of statistical science into geophysical and atmospheric research. As NSF evaluates potential changes to weather and atmospheric research infrastructure, we encourage careful consideration of NCAR's irreplaceable role in supporting interdisciplinary collaboration and advancing research on extreme weather and natural hazards. Preserving NCAR's integrated scientific ecosystem—linking observations, modeling, computing, and interdisciplinary

research—will be essential to maintaining U.S. leadership in atmospheric and environmental science.

The ASA appreciates the opportunity to provide input and welcomes continued dialogue with NSF on the importance of NCAR's work and the role of statistical science in geophysical and atmospheric research.

Questions or comments may be directed to ASA Director of Science Policy Steve Pierson: spierson@amstat.org.