COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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My name is Christopher Fiebrich and I am the Executive Director of the Oklahoma Mesonet. I am also Adjunct Faculty in the University of Oklahoma's School of Meteorology. I want to thank Chair Fletcher, Ranking Member Lucas, and Members of the Committee for the invitation to speak to you today.

The Oklahoma Mesonet was established 25 years ago, both to address the needs of our state's citizens to have improved warnings when severe weather strikes, and to improve our ability to research and better understand the weather. It is our state's network of 120 environmental monitoring stations that transmit atmospheric and soil observations every five minutes around the clock. We have one or more stations in each of our 77 counties so that no matter where you are in Oklahoma, we have local, real-time observations within ten miles of your location. The "power" of any Mesonet is driven by the high spatial density of its observations, and the goal of our Mesonet is to provide timely and useful weather information to Oklahoma's citizens and decision makers.

The Mesonet is a unique partnership between our state's two largest Universities - the University of Oklahoma in Norman and the Oklahoma State University in Stillwater. Our operational home is at the National Weather Center on the OU campus where we share both intellectual and physical space with OU's School of Meteorology and five NOAA facilities. This gives our students the opportunity to work side-by-side with NOAA's Storm Prediction Center, the National Weather Service (NWS), and the National Severe Storms Laboratory, providing unique benefits to both the students and the NWS. Our OU School of Meteorology is the largest

program in the nation and has produced hundreds of graduates that work in the National Weather Service. Two additional OU Research Centers that stand out with regard to their engagement with the NWS are the Advanced Radar Research Center (ARRC) and the Center for the Analysis and Prediction of Storms (CAPS). The ARRC and CAPS are actively developing the prototypes for the next generation of weather radar systems and testing new weather models, forecast techniques, and forecast delivery systems in NOAA's Hazardous Weather Testbed.

My primary expertise is the Oklahoma Mesonet, which I oversee at OU. When the Mesonet began 25 years ago, we knew we'd fall short of our potential if all we did was collect weather observations. We knew we needed to synthesize the data into useful products and tools for citizens, first responders, and the state's key economic sectors.

Over the years, we've worked with over 250 K-12 schools and over 390 teachers to enhance science and math curriculum in Oklahoma schools, and we've hosted hundreds of students at meteorology summer camps. Mesonet data have been used to advance the scientific understanding of the atmosphere as detailed in over 1000 peer reviewed journal articles and over 400 theses and dissertations.

In the area of fire forecasting and preparedness, we've trained more than 1600 wildland fire managers on weather's impact on wildfire suppression, prescribed burning, and smoke management. Many aspects of wildland fire behavior can be modeled with real-time Mesonet observations. We use the Mesonet's observations to predict the likelihood a fire will ignite, how

fast it will spread if ignited, and how high the flames will be given the observed winds, temperatures, solar radiation, and moisture. Since a large fraction of the state's agriculture sector relies on prescribed burning, we help those folks burn in the safest manner given accurate observations of wind and humidity to ensure the burn is successful and effective.

Mesonet data are also used to improve production and optimize inputs for crops and livestock. The occurrence of many plant pests and diseases can be successfully predicted given observations of mesoscale weather conditions. The number of cumulative hours above a certain temperature readily predicts the prospect of alfalfa weevil, likewise the number of hours above a certain humidity can ascertain the growth of scab on pecan trees or black rot on grapes. Using the latest agricultural scientific research coupled with real-time Mesonet observations allow growers and producers to make efficient decisions on spraying for pests and diseases, as well as smart irrigation decisions to get moisture to critical root zones while at the same time conserving water resources. The cumulative economic benefits for agricultural production in Oklahoma from utilizing Mesonet information are estimated at $20 million each year[1].

While Mesonets like the one we have in Oklahoma provide significant value to numerous economic sectors such as agriculture, tourism and renewable energy, the greatest value that weather observation and prediction systems provides is for protecting lives and livelihoods.

[1] ‡ *Journal of the Science of Food and Agriculture* 98(13): 4945-4954

We've trained over 1450 emergency preparedness managers, police, fire, and public health professionals to use our products and critical tools to keep Oklahomans safe. Oklahoma, as you know, is subjected to many forms of destructive weather, most of which occur on the very short time scale of minutes to hours. These are threats that include damaging winds from tornadoes and thunderstorms, flooding rains, and crippling ice storms. The Oklahoma Mesonet has proven its worth in this role by significantly advancing the special form of forecasting known as nowcasting. Nowcasting is the prediction of critical weather details in the next 0 to 6 hours that are often difficult to resolve through numerical weather prediction models. Subtle atmospheric features revealed by the Mesonet in real-time show the location of fronts, drylines, and moisture plumes that allow forecasters to pinpoint areas most likely for convective initiation. These local, real-time data are critical for National Weather Service forecasts and warnings.

On the national scale, the Oklahoma Mesonet is part of NOAA's National Mesonet Program, comprising 30 such university/state Mesonets and additional partners. The National Mesonet Program has proven to be a successful public/private partnership model in which the federal government can leverage tens of thousands of additional real time weather observations from across the nation without having to maintain and operate them. The National Mesonet Program ensures that all observations are quality controlled and in the correct format for the NWS's Meteorological Assimilation Data Ingest System (MADIS). This allows forecasters to use these additional data to improve weather models and every community's weather forecast. Therefore, it is essential that this Congress and the Administration vigorously support and

expand funding for the National Mesonet to insure that local forecasters and the communities in which they serve have access to this highly localized weather data so they can continue to protect lives and enhance the livelihood of communities that are heavily dependent upon stewardship of our precious natural resources. The University is proud to play a role in providing scientific credibility and fundamental research on weather forecast models via these programs, and I look forward to answering any questions you have about our efforts in Oklahoma.