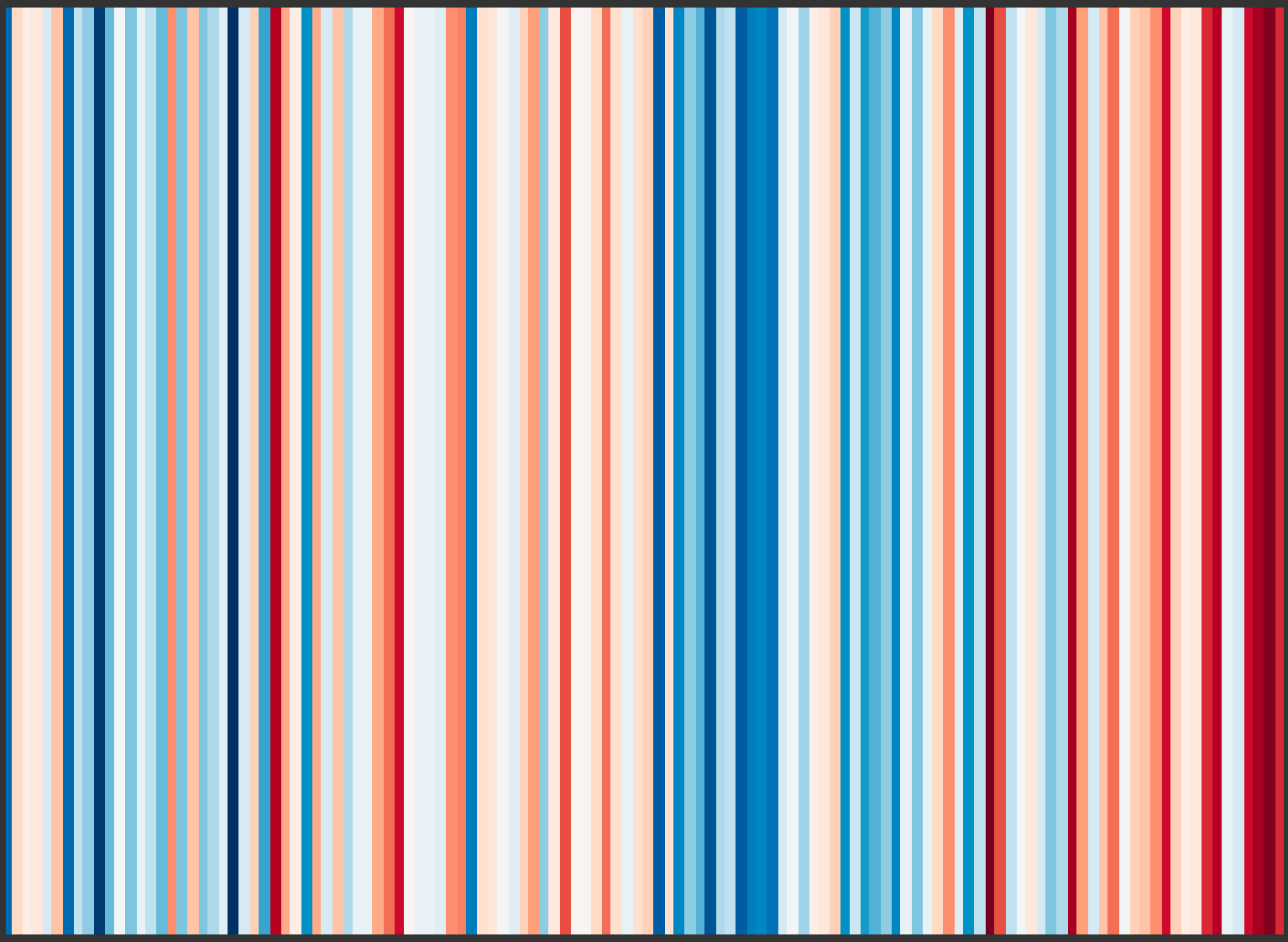
TRENDS

October 2019 Inspire. Advance. Engage.



Climate Change in North Carolina

Enhancing NOAA NCEI Datasets

Introducing CISESS

Reviving Asheville's AMS Chapter

NCICS
North Carolina Institute for Climate Studies
NC STATE UNIVERSITY

TRENDS

October 2019 Inspire. Advance. Engage.

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ON THE COVER

Warming Stripes for the state of North Carolina.

Inspired by the original warming stripes visualizations created by Ed Hawkins, NCICS scientist Jared Rennie worked with NOAA's Climate.gov on an ESRI Story Map that generates warming stripes for U.S. states and counties using NOAA NCEI's nClimGrid dataset.

Each stripe represents the statewide average temperature for one year, from 1895 through 2018. Red shades indicate years that were warmer than the twentieth-century average, while blue shades indicate years that were cooler than that average.

Production Team

Tom Maycock – lead writer/editor
Andrea McCarrick – editor
Jessicca Griffin – graphic design
Erika Wagner – copyeditor

Thanks to the many members of the NCICS staff who provided content and reviewed material.

Who We Are

Hosted by North Carolina State University, the North Carolina Institute for Climate Studies (NCICS) is a unique center of excellence showcasing a partnership between universities, the private sector, non-profit organizations, community groups, and the federal government.

NCICS's primary activity is the operation of the North Carolina location of the Cooperative Institute for Satellite Earth System Studies (CISESS).

CISESS is a multidisciplinary team of experts who collaborate in climate and satellite research to support NOAA NCEI's research to operations strategy.

Our Vision

- NCICS **inspires** cutting-edge research and collaboration.
- NCICS **advances** understanding of the current and future state of the climate.
- NCICS **engages** with business, academia, government, and the public to enhance decision-making.

Research Themes

Satellite Services

Earth System Observations and Services

Earth System Research

Task Streams

Access and Services Development

Assessments

Information Technology Services

Science and Services

Workforce Development

Consortium Projects

NOTE FROM THE DIRECTOR

– Otis Brown, NCICS Director
info@ncics.org

Hello from the North Carolina campus of the Cooperative Institute for Satellite Earth System Studies (CISESS NC)! We are pleased to announce that NOAA selected the joint proposal from the University of Maryland and North Carolina State University to operate CISESS—the successor to the Cooperative Institute for Climate and Satellites (CICS).

Following the award of the five-year, $175M cooperative agreement, we have been putting together the work plan for CISESS NC's first year. These activities include submitting task requests, initiating postings for new positions, and preparing for the next five years of this new partnership with the University of Maryland and NOAA. I am happy to report that NOAA has provided all of the requested first-year support.

CISESS NC activities over the next five years are grouped under three themes: Satellite Services, Earth System Observations and Services, and Earth System Research. Task streams have been revised to group science activities under a single Science and Services task and to add a specific focus on Information Technology Services, along with continued efforts in Access and Services Development, Assessments, Workforce Development, and Administration.

We are currently working to fill six staff positions and are looking forward to posting several more to support these new foci and continuing efforts. Fulfillment of these current searches should bring our staff to a total of approximately 35 people. See our Jobs page for information on working with us and a link to details on open positions.

As you will see from the contents of this issue, we are continuing our work in a diverse set of areas. We are also broadening efforts in engagement and outreach, cloud migration, and technical support of the National Climate Assessment process. New projects include support of the North Carolina Climate Science Report in response to Governor Cooper's Executive Order 80 (see page 5), various cloud pilot projects, and the transition of NOAA's Big Data Project (BDP) to Phase 2, which is the beginning of long-term operations for this activity.

In other news, the local chapter of the American Meteorological Society (AMS), led by Jared Rennie, was selected by the AMS this year for their Chapter of the Year Award. See page 11 for an interview with Jared on this accomplishment and plans for the chapter's future.

Also, the Big Data Project has been chosen as a 2019 Government Innovation Awards winner in the Public Sector Innovations category. The award, given by Public Sector 360, is wonderful recognition of the federal–contractor–cooperative institute team that made the NOAA BDP a success.

A lot is going on: we hope you enjoy this edition of Trends!

Best, Otis

LAUNCHING CISESS—A NEW NOAA COOPERATIVE INSTITUTE

The spring of 2019 was a time of anxious anticipation for the staff of the North Carolina Institute for Climate Studies (NCICS). With the 10-year funding agreement supporting NOAA's Cooperative Institute for Climate and Satellites (CICS) set to expire at the end of June, we once again partnered with the University of Maryland on a proposal to co-host a follow-on NOAA cooperative institute. We submitted that proposal on January 31 and awaited a decision from NOAA.

Finally, on May 31, NOAA announced that the consortium led by UMD and NCSU had been selected to host the new Cooperative Institute for Satellite Earth System Studies (CISESS). The celebration was brief, as Institute leadership immediately began working with our partners at NOAA's National Centers for Environmental Information (NCEI) to finalize the task requests that would define our first year of work under the CISESS banner.

Although our portfolio of funding and projects has expanded over the last decade, NCICS was founded specifically to host the North Carolina location of CICS, and CICS has continued to be both our primary focus and the engine driving our rapid growth from an idea into a mature research institute of more than 30 staff members in just ten years. Along the way, we made major contributions to many innovative NOAA products and services, produced hundreds of peer-reviewed research papers, helped produce several landmark climate assessments, and participated in engagement and outreach efforts at local, regional, national, and international scales.

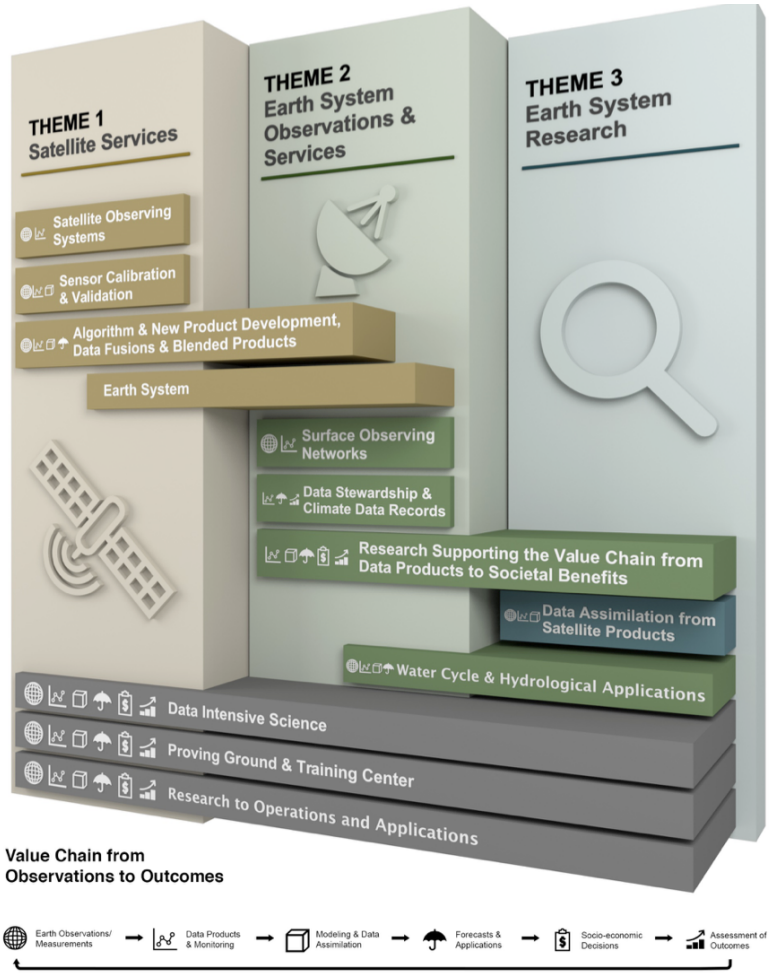
So it was with a bit of nostalgia that we bade farewell to our decade-long identity as host of CICS-NC this summer, but those feelings were tempered by the excitement of transitioning into our new role as home to the North Carolina location of CISESS.

So what changes, and what stays the same?

First and foremost, our team of scientists, technical experts, and other professionals continues intact as we move into the CISESS era. That team will be growing, though, as we are in the process of adding six new staff members this year with more to come in the future.

Also unchanged are the Institute's core vision and objectives, as these objectives and our overarching goal—enhancing our collective interdisciplinary understanding of the state and evolution of the full Earth System—fit perfectly with the grand scientific challenge identified in the CISESS proposal: "to enhance the understanding of how the natural atmosphere–ocean–land–biosphere components of Earth interact with human activities as a coupled system."

Aside from the obvious transitions from CICS to CISESS where applicable, you won't see many changes in our web presence and other aspects of our institutional identity. Starting with the rollout of our new website almost three years ago, most of our communications materials (including this newsletter) have come under the umbrella of NCICS rather than CICS-NC in order to reflect our broader efforts as an NC State research institute.



This figure shows representative focus areas of planned CISESS activities. It provides an end-to-end view of CISESS science, where observations are collected and processed, products are co-produced with end users, and the evolving needs of end users drive the generation of new products and enhancements to existing products. Source: CISESS Proposal.

We have also changed our Institute email addresses from @cicsnc.org to @ncics.org (although the older @cicsnc.org addresses still work), but other contact information remains unchanged. We are still co-located with NCEI's headquarters in the Veach-Baley Federal Building in downtown Asheville, North Carolina.

While we will continue to work on a variety of ongoing projects, there will be some substantive additions to our activities as we transition to the broader scope of the CISESS mission. As reported in the Note from the Director, CISESS activities will be grouped broadly under three research themes—Satellite Services, Earth System Observations and Services, and Earth System Research—and we will be actively engaged in all three areas here at the North Carolina location.

As with CICS-NC, our support for NCEI will be organized under several task streams. Research and development on a variety of scientific fronts will now be organized under a new Science and Services task, and we now have a dedicated Information Technology Services stream, which will enhance our efforts to support the NOAA Big Data Project, help NCEI transition to cloud-based data access, and facilitate climate research using artificial intelligence, machine learning, and other big-data computing techniques.

We are excited to embark on our second decade as a research institute and host of a NOAA Cooperative Institute, and we look forward to providing updates on the activities and outcomes of CISESS in the months and years ahead.

Social Media: Same Accounts, New Names

You may have noticed that our Facebook and Twitter names have changed from CICSNC to NCStateNCICS and NCState_NCICS, respectively. The accounts themselves haven't changed, only the names. So if you "liked" or "followed" us before, you are probably still liking and following. We are also using our NCICS logo and official NC State color schemes on our Facebook and Twitter pages. Here's where you can find us:

https://www.facebook.com/NCStateNCICS/
https://twitter.com/NCState_NCICS

ASSESSMENTS

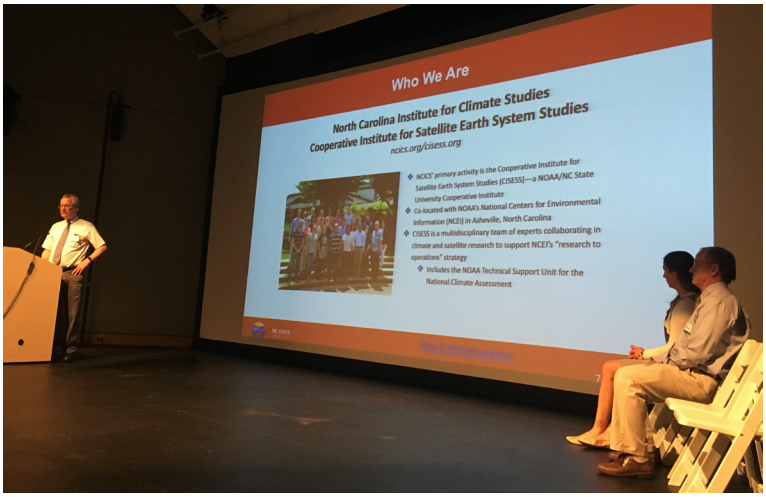
Producing a North Carolina Climate Science Report

On October 29, 2018, North Carolina Governor Roy Cooper issued Executive Order 80, entitled "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy." The order specifies a number of emissions-reduction and clean-energy goals, establishes an interagency council on climate change, and calls for a range of other specific actions across the state government.

One of those provisions directed the Department of Environmental Quality to develop a "North Carolina Climate Risk Assessment and Resiliency Plan." As part of the response to that directive, NCICS is leading the development of a North Carolina Climate Science Report, which will serve as a key component of the overall assessment.

The Climate Science Report will also serve to inform many of the other responses to the Executive Order by providing decision-makers with detailed information on observed and projected climate changes here in North Carolina.

Kenneth Kunkel, NCICS Lead Scientist for Assessments and NCSU Research Professor, is heading up the project. Dr. Kunkel, along with Sarah Champion and Jenny Dissen, spent much of the summer laying the groundwork for the statewide, multi-disciplinary effort required to develop a robust scientific report.



Dr. Kunkel (left) introduces NCICS and the Assessments TSU at a meeting of the North Carolina Climate Change Interagency Council in July 2019. Sarah Champion and NOAA NCEI's David Easterling (right) also gave presentations at the meeting.

Initial steps included setting up a Climate Science Advisory Panel of experts from across the state, identifying and recruiting authors, and participating in various planning meetings and briefings. Authors from NCICS and other universities and organizations around the state are currently working to develop figures and text for the report, with the first complete draft expected in early October. The report will draw heavily from the North Carolina State Climate Summary, which was originally developed largely by NCICS staff and was recently updated to include data through 2018.

The report will provide an overview of key climate science concepts and describe observed and projected changes in temperature, precipitation, storms, and other variables at the regional and statewide scales. Other sections will provide more localized information for each of the state's three major regions: the coastal plain, the Piedmont, and the western mountains. Additional topics likely to be covered include sea level rise, inland flooding, wildfires, air quality, and infrastructure design standards.

The author team comprises NCICS scientists, climate scientists from several North Carolina universities, and two federal climate scientists. Although some authors (including those from NCICS) are employed by state universities, the report is being prepared independently from the North Carolina state government. State agencies and elected officials will not be involved in the writing or review and will not have any influence on the content of the report.

Over the next three months, the report will go through several rounds of review and revision, with the final product expected to be ready by the end of 2019. After the release of the report, NCICS will develop other supporting products, including a website providing access to figures, metadata describing underlying data sources and methodologies, and a complete collection of the derived datasets used to generate figures and other findings in the report.

The entire NCICS assessments team will be supporting the effort, and scientists and communications experts from NOAA NCEI will also be contributing to the project. The full Climate Risk Assessment and Resiliency Plan is scheduled to be delivered to the governor in March 2020.

RESEARCH HIGHLIGHTS—ENHANCING NCEI DATASETS

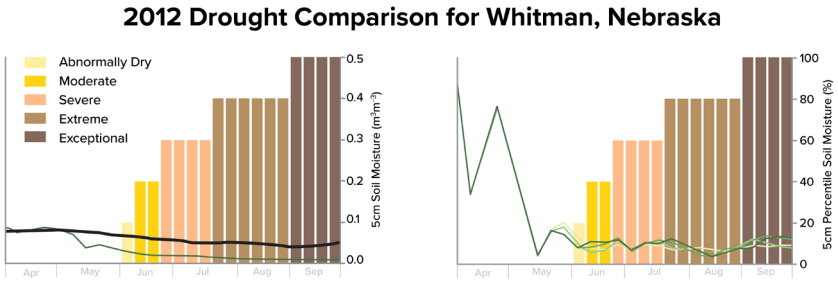
With more than 30 papers published so far this year, 2019 has already been a productive year for research efforts at NCICS. We highlight two key papers below. For more on our extensive portfolio of research activities, check out our 2018–2019 NCICS Highlights report at http://bit.ly/ncicshighlights2019

Standardized Soil Moisture Data

Scientists from NCICS and NCEI are collaborating to develop more useful soil moisture datasets. The challenge is that raw volumetric observations of soil moisture provide only a limited perspective on current conditions and on how those conditions are changing.

To give decision-makers better information, Ronnie Leeper, Jesse Bell (formerly of NCICS, now with the University of Nebraska Medical Center), and Michael Palecki (NCEI) have developed new standardized soil moisture datasets that transform raw data into either percentiles or differences from normal to better reveal how current conditions compare to historical conditions at a given time and place.

NCEI expects to release operational products in the fall of 2019. Learn more at: https://www.ncei.noaa.gov/news/new-understanding-soil-moisture.



The vertical bars here show the increasing intensity of drought in Whitman, NE, in 2012. The lines in the left panel show raw volumetric soil moisture data, which don't provide much indication of an emerging drought. The standardized percentiles on the right provide much clearer and earlier indication of the rapidly drying conditions that led to exceptional drought levels. Source: adapted from Leeper et al. 2019.

Leeper, R. D., J. E. Bell, and M. A. Palecki, 2019: A description and evaluation of U.S. Climate Reference Network standardized soil moisture dataset. *Journal of Applied Meteorology and Climatology*, **58**, 1417–1428. http://dx.doi.org/10.1175/JAMC-D-18-0269.1

Accounting for the El Niño–Southern Oscillation in Climate Normals

Data on average climate conditions, known as climate normals, are critical for a range of decision-making and planning. Anand Inamdar and Carl Schreck of NCICS and three colleagues from NCEI have developed a new methodology that incorporates the important effects of the El Niño–Southern Oscillation (ENSO) into a suite of new climate normal datasets.

Climate normals are computed from observations taken over long periods—typically 30 years—in order to provide a good estimate of typical conditions for a particular location. Information such as the average high temperature for a particular date or annual average precipitation can be useful for everything from planning an outdoor wedding to projecting seasonal energy demand. But 30-year normals are less reliable in a changing climate, particularly for long-term decisions, such as designing infrastructure intended to last for decades.

To deal with that problem, scientists at NOAA NCEI recently developed a set of supplementary normals that account for the effects of a warming climate. However, these supplemental normals do not consider large-scale interannual climate patterns such as ENSO, which can have significant effects on local conditions over timescales of weeks, months, and years. Thanks to his expertise in tropical meteorology and the impacts of ENSO, Schreck recognized an opportunity to provide stakeholders with better information.

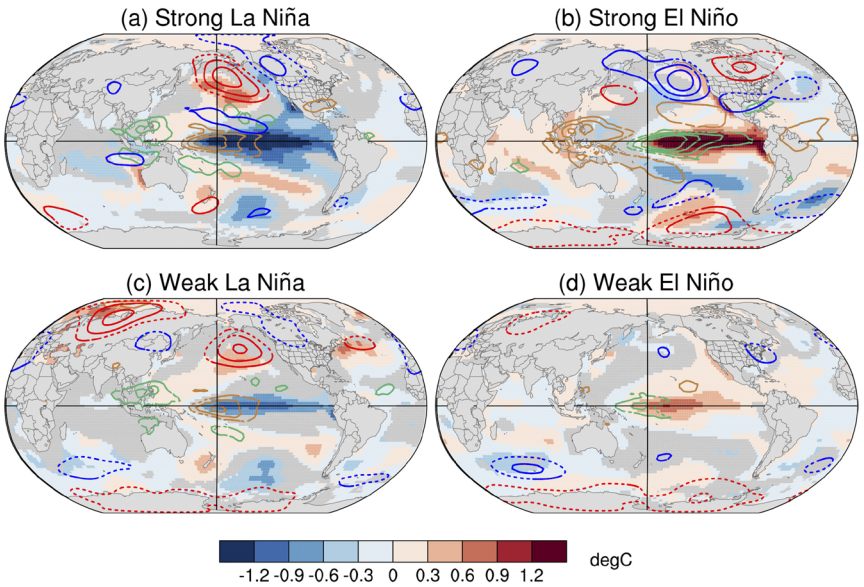
Schreck, Inamdar, and NCEI's Anthony Arguez, Michael Palecki, and Alisa Young set out to develop a set of ENSO climate normals. They reported their results in a recent paper in the *Journal of Applied Meteorology and Climatology*. Schreck developed several key figures for the paper, while Inamdar did an extensive literature search and performed validation testing, and Arguez served as lead author.

The team implemented a three-step process that starts with an optimal climate normal (OCN) developed to account for climate change. The OCN values are subtracted as a running average from the raw data (using an 11-year average for temperature and a 15-year average for precipitation).

Next, individual years are parsed based on five ENSO phases: Strong La Niña, Weak La Niña, Neutral, Weak El Niño, and Strong El Niño. Finally, statistics are calculated for each phase, and these anomaly statistics are added back to the current OCN to produce adjusted normals for each of the five ENSO phases. Users can then reference the ENSO normal for whichever ENSO phase is relevant for their needs.

The paper describing the ENSO normals is now available online, and you can read more about the ENSO normals on the NCEI web site.

Work is currently underway to develop the complete suite of ENSO normals, with a beta-test release expected in early 2020.



Composite anomalies for December–February ENSO events of sea surface temperature (ERSSTv5, shading), monthly outgoing longwave radiation (OLR, green/brown contours), and NCEP–NCAR reanalysis 500-hPa geopotential heights (blue/red contours). OLR is contoured every 10 W m^{-2} with negative (cloudy) values in green and positive (clear) values in brown. Geopotential height is contoured every 20 m with positive values in red and negative in blue. Statistical significance is evaluated at the 90% level using a two-tailed Monte Carlo method following Schreck et al. (2013). Insignificant ERSST values are masked in gray, while insignificant values for the other variables are dashed. Source: Arguez et al. 2019.

Arguez, A., A. Inamdar, M. A. Palecki, C. J. Schreck, and A. H. Young, 2019: ENSO normals: A new U.S. climate normals product conditioned by ENSO phase and intensity and accounting for secular trends. *Journal of Applied Meteorology and Climatology*, **58**, 1381–1397. http://dx.doi.org/10.1175/JAMC-D-18-0252.1

ENGAGEMENT AND OUTREACH

NCICS staff regularly participate in a variety of outreach activities aimed at advancing climate literacy, engaging with students and educators, and providing data and information to decision-makers. We have been busy addressing all three of those goals in recent months:

NCEI Users' Conference

Over the last several months, NCICS has continued to accelerate NCEI's goals of developing user-inspired science, data, and information to serve various sectors of the U.S. economy and society. Most recently, NCICS supported NCEI and its contracting partner Global Science & Technology, Inc., in hosting the 2019 NCEI Users' Conference at The Collider, an innovative center for climate discussions in Asheville. The conference targeted participants from 14 industry sectors, government, and academia to share experiences and feedback on the use of NCEI environmental information.

Several key themes emerged, including innovation in blending observations for integrated data products, targeted and specific data resolution types, improved access through both the cloud and NCEI servers, establishment of a forum for robust discussions, and innovative techniques in data analytics.

More information on the conference is available on the NCEI website and will be shared at the 2020 American Meteorological Society conference Town Hall entitled "2019 NCEI Users' Conference—Debrief and Path Forward."

(left) Stephen Volz, NOAA's Assistant Administrator for Satellite and Information Services, addresses the NCEI Users' Conference. (right) Attendees participated in two daylong sessions to learn about new products and services and to provide their input on needs and requirements. Photos: NOAA NCEI.

Climate Change and Climate Assessments

Outreach efforts related to the Fourth National Climate Assessment (NCA4) continued over the spring and summer of 2019. In late March, Sarah Champion gave a presentation on the importance of data transparency and reproducibility as part of the Asheville Museum of Science's "Science Pub" series. These free events are geared towards the general public and are hosted at The Collider in downtown Asheville.

Using several analogies, including the necessity of having a good recipe and the right ingredients to make a good cake, Champion walked the audience through the importance of collecting and sharing metadata—the data about your data—and then demonstrated the tools and approaches the Assessments Technical Support Unit has devised to make metadata available to users of NCA4 and other assessment products.

(right) Sarah Champion explains the importance of metadata, transparency, and reproducibility in the National Climate Assessment process.

In August, Tom Maycock drew on information from NCA4 and the recently updated North Carolina State Climate Summary for a presentation at the Get Off the Grid Fest—a sustainability and solar power expo held at Warren Wilson College, located just east of Asheville.

Maycock's talk was part of a session entitled "Climate Change and Justice in North Carolina." He provided an overview of observed and projected climate changes in North Carolina. That talk was followed by presentations from Dr. Liesl Erb of Warren Wilson on ecosystems changes, Will Heegaard of the Footprint Project on resilient disaster recovery, and Dr. Anne Richardson from the Climate Psychiatry Alliance on the emerging challenges of climate grief. Following the presentations, the presenters and attendees engaged in a lively question-and-answer session on topics ranging from mitigation options to local-scale impacts to the intersection between climate policy and environmental justice issues.

Tom Maycock provides an overview of climate change in North Carolina at the 2019 Get Off the Grid Fest.

In September, Kenneth Kunkel and Laura Stevens both gave presentations at the annual meeting of the Association of Environmental & Engineering Geologists (AEG), which was held here in Asheville. Stevens presented highlights from NCA4, while Kunkel gave a talk on the effects of human-caused warming on the risks of extreme rainfall events and flooding.

(left) Kenneth Kunkel and (right) Laura Stevens present at the AEG meeting held in Asheville this September.

Our New Climate Simulator Pachinko Board

If you follow us on social media or have read our 2018–2019 Highlights report, you may have already heard about our new "climate simulator" board. Building on Scott Stevens's idea of collecting simple statistics at outreach events to demonstrate how probability distributions emerge from samples of observed data, Carl Schreck suggested using a pachinko board with two holes at the top as a simple way to explain how climate change alters the probabilities of certain types of events.

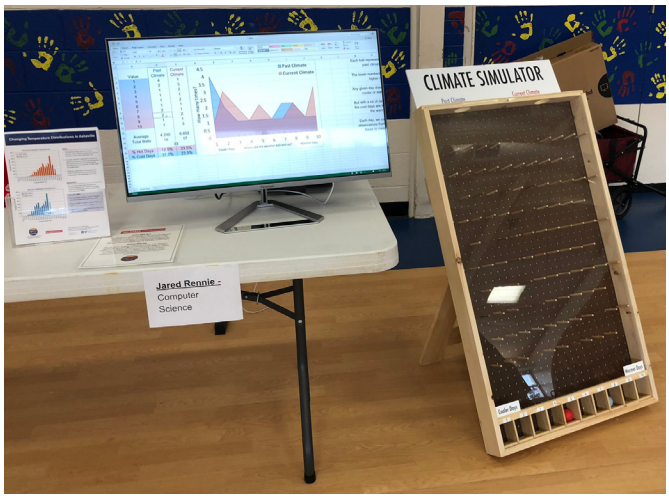
Following a lot of discussion and input from several NCICS staff, Scott Wilkins took on the task of building our climate simulator from scratch. The simulator made its debut in late spring, received upgrades over the summer, and started the 2019–2020 school year off with an appearance at a career day at Ira B. Jones Elementary here in Asheville.

The idea is simple: attendees can drop a ping-pong ball representing a daily temperature observation (or climate variable of your choice) in the hole on the left, representing our previous, cooler climate, or they can drop the ball in the hole on the right, which corresponds to our current, warmer climate. The slots on the bottom range from cooler days on the left to warmer days on the right.

While a ball dropped in either hole at the top can end up in any of the slots at the bottom, balls dropped in the cooler-climate hole tend to end up in cooler slots at the bottom, and balls dropped in the warmer-climate hole tend to land in the warmer slots at the bottom.

Shortly before leaving NCICS for a new position with the University of Edinburgh, Andrew Ballinger built a software tool that allows us to generate hundreds of simulations using a digital emulation of the same board and display the resulting probability distributions. The results demonstrate how climate change increases the odds of having a warm day and reduces the odds of having a cool day.

For more information about the climate simulator, please email us at ncics-outreach@ncics.org.



(top) Our climate simulator in action at the 2019 Mountain Science Expo at the North Carolina Arboretum and (above and at left) at a career day event at Ira B. Jones Elementary in Asheville, where Smokey the Bear was a special guest.

Interview: Jared Rennie and Asheville's Award-Winning AMS Chapter

In July, the American Meteorological Society (AMS) selected the Asheville chapter of the AMS as the winner of the Local Chapter of the Year award for 2020. Several NCICS staff members, including current chapter president Jared Rennie, have played key roles in helping reestablish and develop the chapter, which had been dormant for several years until being revived in early 2014. We spoke with Jared about building and maintaining a successful local AMS chapter, his experiences as the chair for the AMS Board for Early Career Professionals (BECP), and expanding his own horizons.

Tell us a bit about restarting and building the Asheville AMS chapter. What got things started? And what's been the biggest challenge along the way?

A few years ago, there was interest to revive the chapter, as it was a unique way to bring together all of the organizations that focus on weather and climate in the Western North Carolina area. The main organization is NOAA's National Centers for Environmental Information (NCEI), but various organizations in multiple sectors of meteorology exist in the area, including the Air Force's 14th Weather Squadron, NCICS, and the University of North Carolina at Asheville. Ryan Harris, who at the time was part of the 14th Weather Squadron, took the initiative to revive the chapter, and we have been active since 2014.

AMS100
ADVANCING SCIENCE, SERVING SOCIETY SINCE 1919

2020 Awards and Honors Recipients

LOCAL CHAPTER OF THE YEAR AWARD

Asheville, North Carolina
For excellent outreach and support to students, providing effective networking opportunities, and notable interactions with the national Society

One of the challenges the chapter has faced is constantly coming up with fresh ideas for meetings. We did not want to have the same topics in the same location, as it could lead to a lack of interest and lower attendance. As a result, we usually try and have our meetings at different locations (NCEI, UNC Asheville, local restaurants), as well as bring in people from outside of Asheville. In 2015, we invited Dr. Marshall Shepherd from the University of Georgia to visit for a day. In addition to science talks, we also host social gatherings and participate in community service activities.

Congratulations on the Asheville chapter being selected as Local Chapter of the Year. Were there particular initiatives and activities this year that led to that recognition?

One of our focuses was on the students at UNC Asheville. While they have their own student chapter, we wanted to expose the workforce to them, as there are numerous weather and climate opportunities in the Western North Carolina region. We usually try to have two meetings a year on the UNC Asheville campus. The first is typically an introduction, discussing the benefits of AMS and how it can help one's career. The other is a more interactive session with members of the field in the springtime. This is typically either a panel discussion or a speed-networking event. We also award a scholarship to a student each year, which can help alleviate the cost of college expenses, such as tuition and books.

What's next for the Asheville chapter—what do you hope to see it accomplish in the next year or two?

We want to continue our efforts to bring in people from all facets of science, not just weather and climate. There are numerous science centers in the area, including the Asheville Museum of Science, the Pisgah Astronomical Research Institute, and the Forest Service Southern Research Station. By leveraging these organizations and others, we can help promote science to all ages.

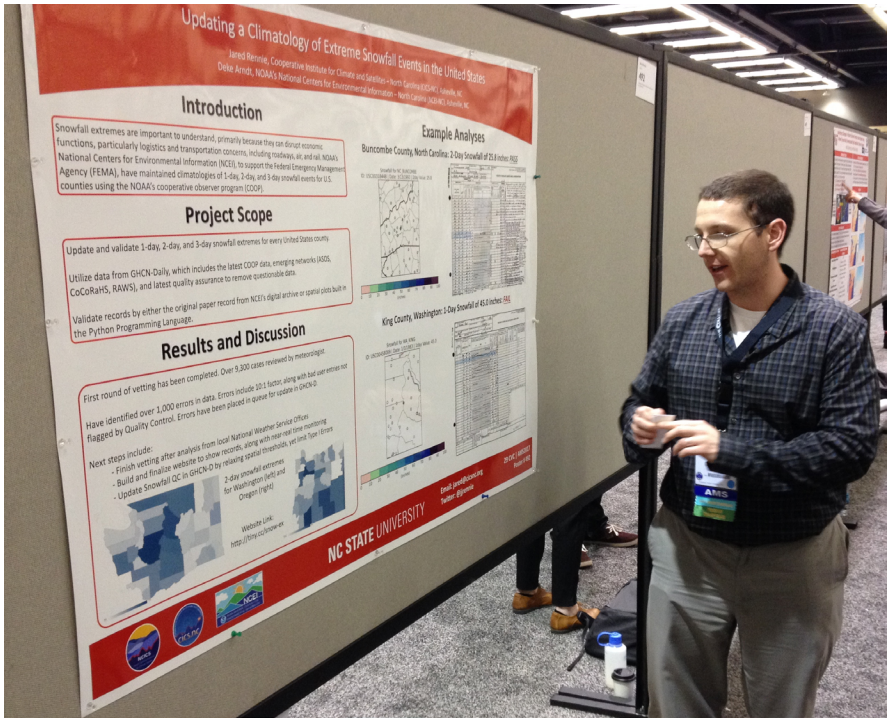
You've been very active with the AMS Board for Early Career Professionals, which supports young professionals just starting out in meteorology and related fields. What motivated you to get involved with that group, and are there particular accomplishments you are most proud of during your term as chair?

AMS has seen a notable gap in membership for young professionals in the weather, water, and climate enterprise. There are many student and mid-career members who pay their dues and attend the annual meeting, but once they land their first job, they don't come back to AMS. I know this because I was part of that statistic; I left the organization for a couple of years.

In 2013, I heard about the first conference for early career professionals, sponsored by the newly created Board for Early Career Professionals by AMS. This piqued my interest and motivated me to travel to the annual meeting, held in Austin, Texas. While there, I met numerous professionals who were at the same career level as I was, and I learned about triumphs and struggles they were facing. I also got

to meet very prominent members of AMS, including fellows and past presidents. This motivated me to stay involved with AMS, and I worked to join the Board for Early Career Professionals in 2014. For the first few years, I was active on their social media account and helped out with subsequent conferences at the annual meeting.

In 2018, I became chair of the Board, and was excited to start my tenure. One of the things I worked on was more activity during the year, not just the annual meeting. We began working on a webinar that was released in April of that year, and we also have worked to have social events at regional conferences AMS hosts, along with other meetings not sponsored at AMS (including the National Weather Association and the American Geophysical Union). I was also able to craft the 7th Annual Conference for Early Career Professionals in Phoenix, with a general theme of "thinking outside the box."



Jared Rennie presenting a poster on extreme snowfall climatology at the 2017 annual meeting of the American Meteorological Society.

Social media has been a key part of the Early Career Professionals activities during your tenure. What value do you think it brings to an effort like this?
Social media has its pros and cons. I am of the opinion that the pros outweigh the cons. I have been able to meet with so many people in the science field and to have genuine conversations that can't be matched via telephone or email. The Board for Early Career Professionals twitter account has been an excellent source to reach out to all members of the weather, water, and climate society to gauge their feelings on numerous perspectives. Every week, we host a #ShareYourStory, where we pose a question and get a vast array of responses from members. The type of people who respond include college students, as well as the current AMS president. By hearing stories from people in different levels of their career, people are able to relate, learn, and grow from these responses.

For more information, see the links below.

Asheville AMS Chapter
Website: https://sites.google.com/site/ashevilleams/
Facebook: https://www.facebook.com/ashevilleams

AMS Board for Early Career Professionals
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