DOC / NOAA / OAR

National Severe Storms Laboratory

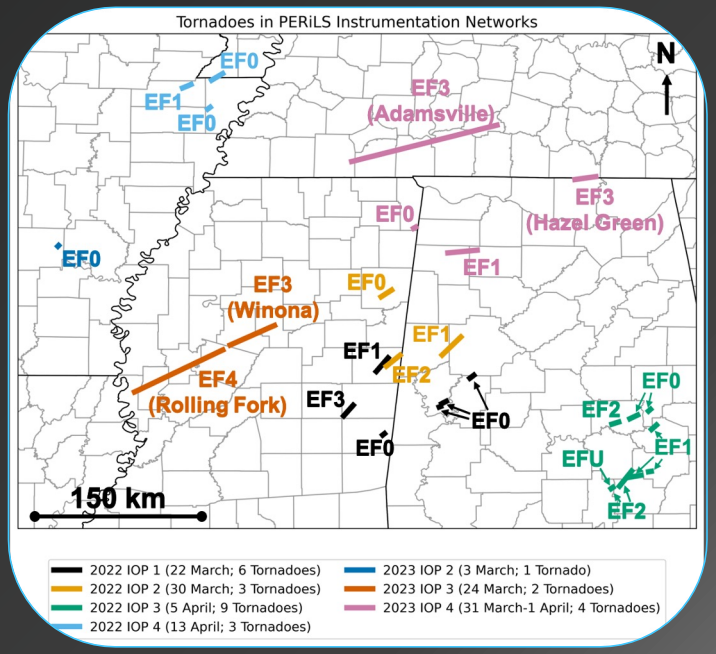
Coordinating physical & social science data collections for the 24 March 2023 Rolling Fork–Winona– Amory, MS, tornado event

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PERiLS Field Campaign

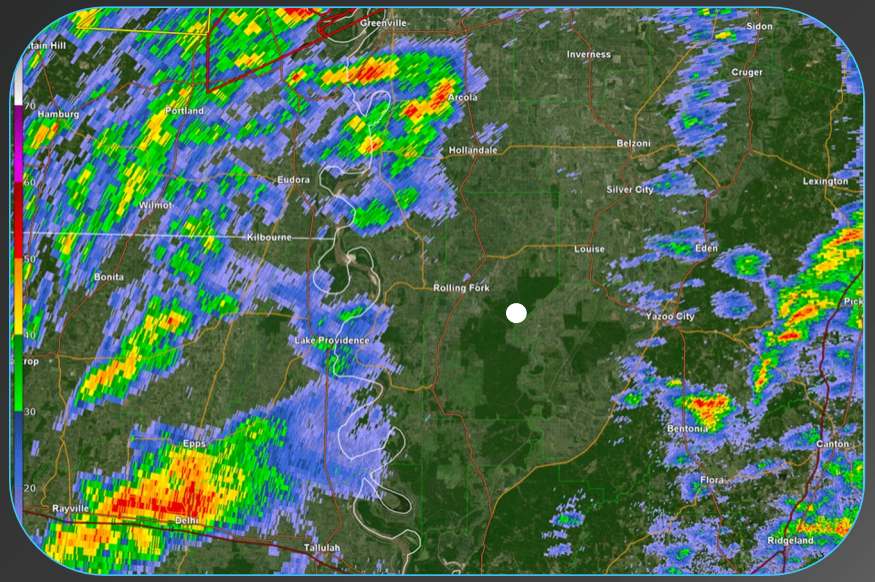
Propagation, Evolution, and Rotation in Linear Storms

- NSSL & federal/academic partners deployed in-situ and ground-based platforms
- Characterize the near-storm environments & internal storm processes associated with tornado-producing QLCSs & other non-classical tornadic storms
- Collected data on 28 tornadoes across 9 observing periods, including 24 March 2023
- After the event: Coordinated with NWS on 25 March to assist with the damage survey



PERiLS : Rolling Fork, MS Event

- 7:45 PM CT: Tornado Warning for the Rolling Fork storm covered formation of the tornado with 12 min lead time
- 7:53 PM CT: Tornado Warning issued 12 min before estimated time of the first fatality
- 8:04 PM CT: Tornado Warning upgraded to Tornado Emergency
- 8:06 PM CT: Tornado entered central Rolling Fork, Mississippi



PERiLS : Rolling Fork, MS Event

- 3 tornadoes struck Rolling Fork/Silver City, Black Hawk/Winona, and Wren/Amory, MS
- 22 deaths and 225 injuries
- 17 of the 22 fatalities were from the Rolling Fork/Silver City EF4 tornado
- 16 of the 22 fatalities were sheltered in MMHs
- 15 of the 22 fatalities were POC

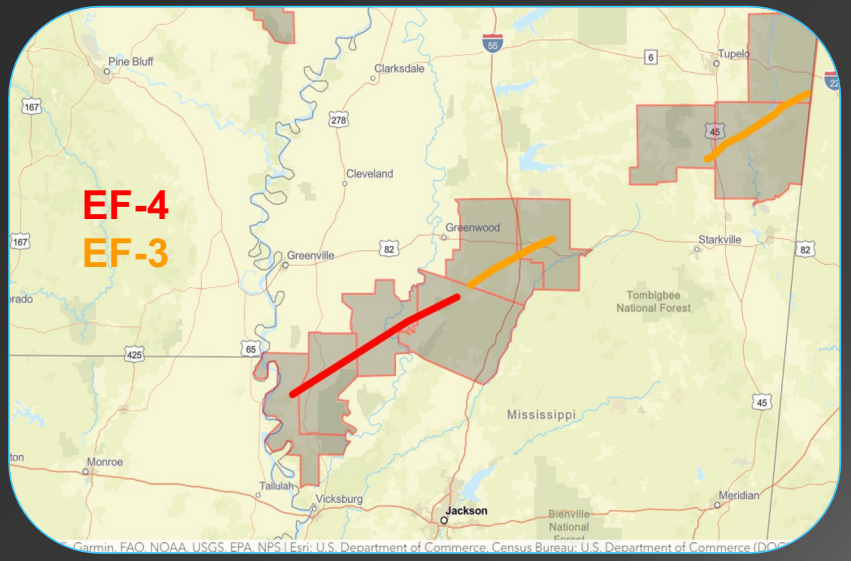


Image Source: NWS Jackson

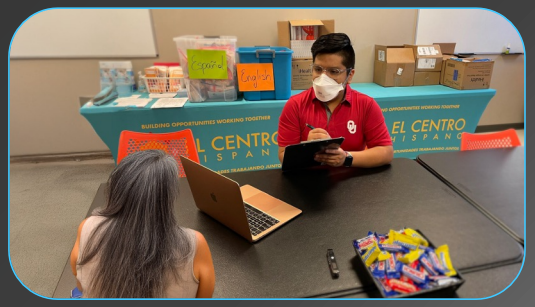
MOTIVATION

When the PERiLS team returned from Rolling Fork after helping NWS Jackson with the damage assessment and hearing stories from those impacted, NSSL wanted the social-behavioral aspects of this high-impact event captured as well

Rolling Fork Post-event SBS Fieldwork

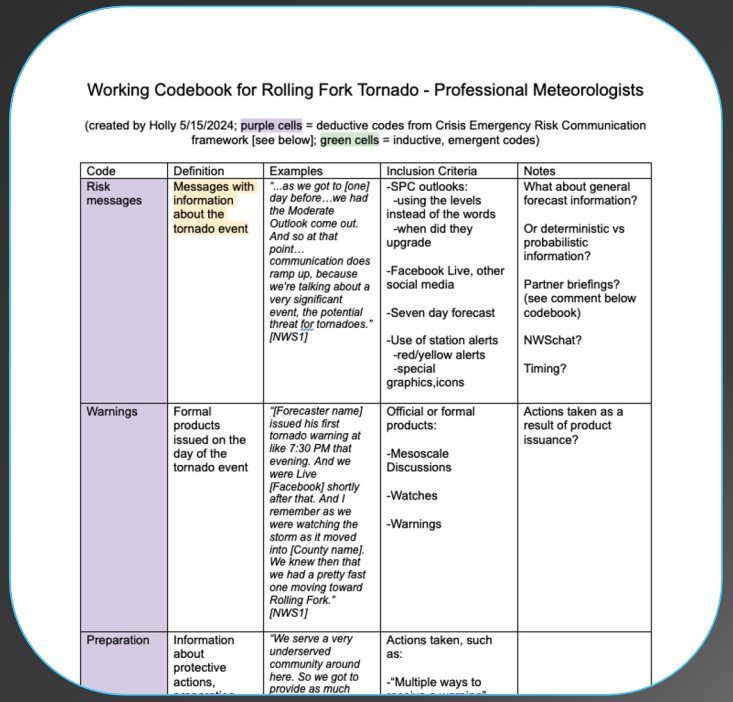
- Interview team of 8 researchers from CIWRO, NSSL & MS/AL Sea Grant
- Interviewed 11 NWS forecasters, 8 broadcast meteorologists, 13 emergency managers, & 26 members of the public
- Semi-structured interviews focused on information received/shared & decisions made during the days/hours/minutes leading up to the tornado event
- Deployed for 1 week in May 2023





Qualitative Analysis of Interview Data

- Interviews were transcribed, quality controlled & de-identified
- Coding in 2 teams of 2
  - Professional meteorologists (NWS & broadcast)
  - Emergency managers
  - Public interviews were analyzed separately
- Hybrid coding approach
  - Primarily deductive coding, but also inductive codes



Working Codebook for Rolling Fork Tornado - Professional Meteorologists

(created by Holly 5/15/2024; purple cells = deductive codes from Crisis Emergency Risk Communication framework [see below]; green cells = inductive, emergent codes)

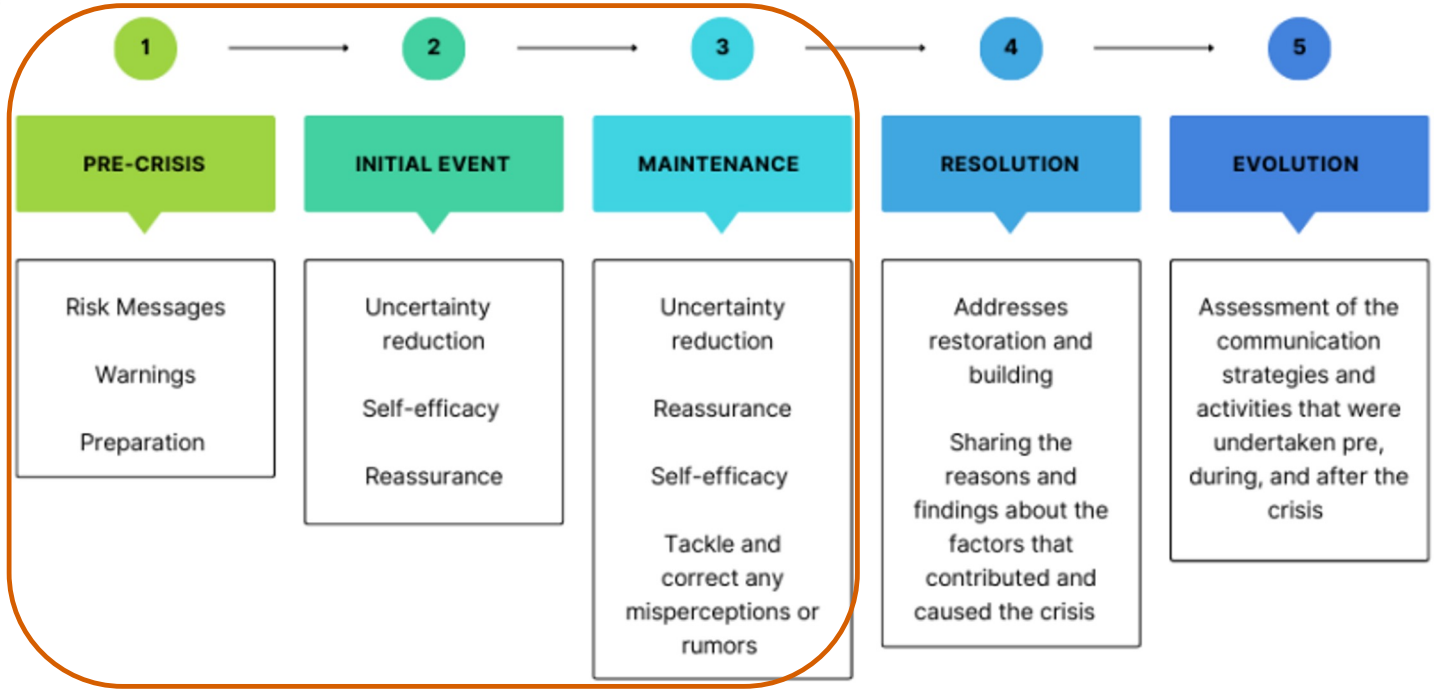
Code	Definition	Examples	Inclusion Criteria	Notes
Risk messages	Messages with information about the tornado event	*"...as we got to [one] day before...we had the Moderate Outlook come out. And so at that point… communication does ramp up, because we're talking about a very significant event, the potential threat for tornadoes." [NWS1]*	-SPC outlooks: -using the levels instead of the words -when did they upgrade -Facebook Live, other social media -Seven day forecast -Use of station alerts -red/yellow alerts -special graphics,icons	What about general forecast information? Or deterministic vs probabilistic information? Partner briefings? (see comment below codebook) NWSchat? Timing?
Warnings	Formal products issued on the day of the tornado event	*"[Forecaster name] issued his first tornado warning at like 7:30 PM that evening. And we were Live [Facebook] shortly after that. And I remember as we were watching the storm as it moved into [County name]. We knew then that we had a pretty fast one moving toward Rolling Fork." [NWS1]*	Official or formal products: -Mesoscale Discussions -Watches -Warnings	Actions taken as a result of product issuance?
Preparation	Information about protective actions,	*"We serve a very underserved community around here. So we got to provide as much*	Actions taken, such as: -"Multiple ways to	

Qualitative Analysis of Interview Data

Crisis and Emergency Risk Communication (CERC; Reynolds & Seeger 2005) model for deductive codes

- From the health communication field
- Involves experts who provide information, allowing individuals or an entire community to make the best possible decisions about their well-being
- Communicators must also help people accept the imperfect nature of choices during the crisis
- Differs from pure risk communication in that a decision must be made within a narrow time constraint

Advised CERC Communication Strategy:



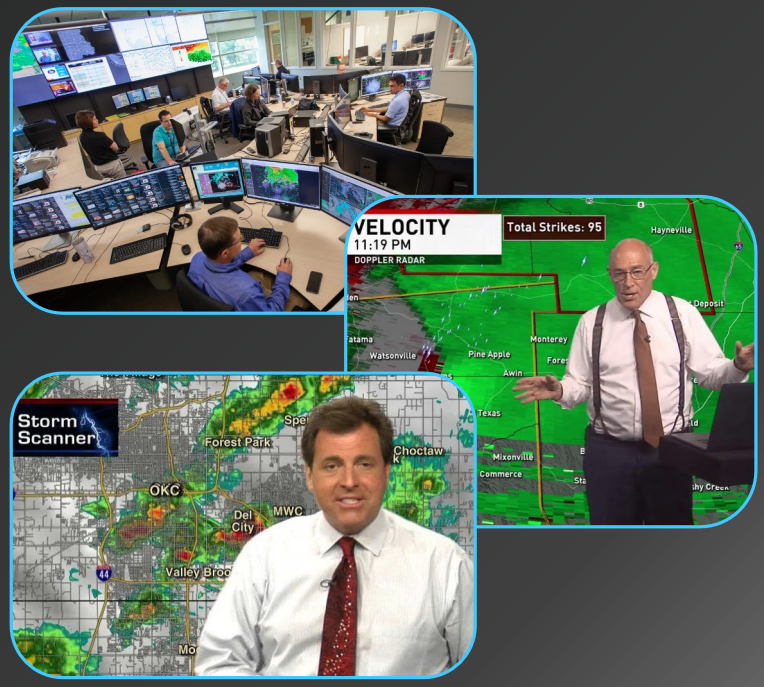
Reynolds, B., & Seeger, M. W. (2005). Crisis and emergency risk communication as an integrative model. Journal of Health Communication, 10, 43–55.

Preliminary Results

Professional Meteorologists

This event was predicted days before it occurred

- Led to increased staffing for both NWS and media
- Broadcast meteorologists known for having a particular style of clothing during severe weather alerted viewers that storms would be bad even if they were not wearing that particular style that day



Preliminary Results

Professional Meteorologists

As confidence increased, meteorologists were looking for a "next level" or a way to indicate that this event was particularly concerning to them

> "… our wording was more intense than usual … we recommended helmets and hard soled shoes…"
>
> "… hey, if you're watching from North Dakota and you have somebody who lives here … call them"



Preliminary Results

Emergency Managers

- They looked for cues that the event was "out of the ordinary"
  - Upgraded SPC Convective Outlook, wording/tone used during NWS briefings & personalized communication (phone calls)
- As soon as their jurisdiction was in the clear, they dove into mutual aid mode
  - Other towns' resources were rushed to the tornado path, neighbor helping neighbor system, through NWSChat
- Huge disparities in resources between neighboring communities



Preliminary Results

Members of the public

- Most were aware of severe weather/tornado watch the day of the event
- Friday night, relaxing/watching Netflix & gathering with family and friends
- The storm intensified quickly as it approached Rolling Fork
  - Many residents reported not making it to their preferred shelter location
- Residents reported getting warning information from their social networks
  - Helped them personalize the risk
  - Those with less information heavily relied on environmental cues



Next Steps

Short-term:

- Child coding for Professional Meteorologists
- Write up results for publication

Long-term:

- Develop an interdisciplinary (e.g., both physical and social science data collection) field work deployment protocol

Questions?