



# Can the K–12 Public School System Be Leveraged as Part of the Weather-Ready Nation Initiative?

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# Outline

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- Some caveats
- Our research question
- Background
- Evidence for linkages between education and natural disaster resilience
- Challenges associated with formal involvement of the K-12 education system with WRN
- Q&A

# Caveats –

## We're not trying to suggest that...

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- there has been no involvement of the formal education system in WRN
- we are the first and only ones to propose integrating relevant weather concepts in a K-12 curriculum
- there aren't any viable meteorological educational materials available for K-12 educators to use

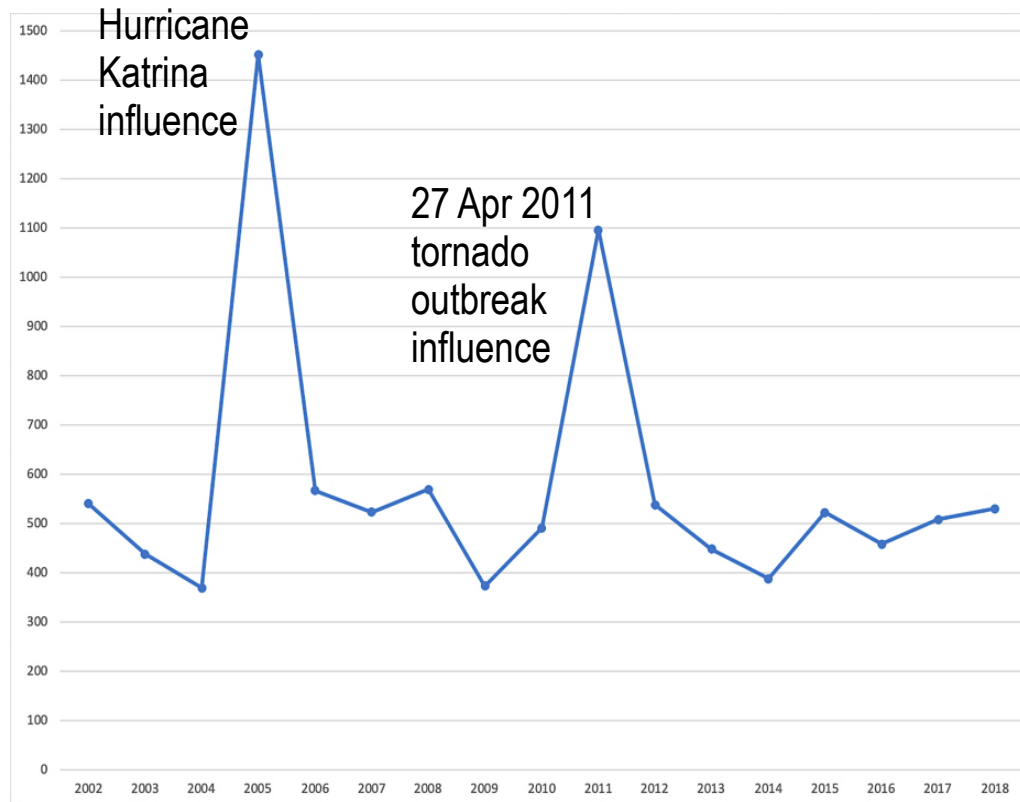
# Our Research Question

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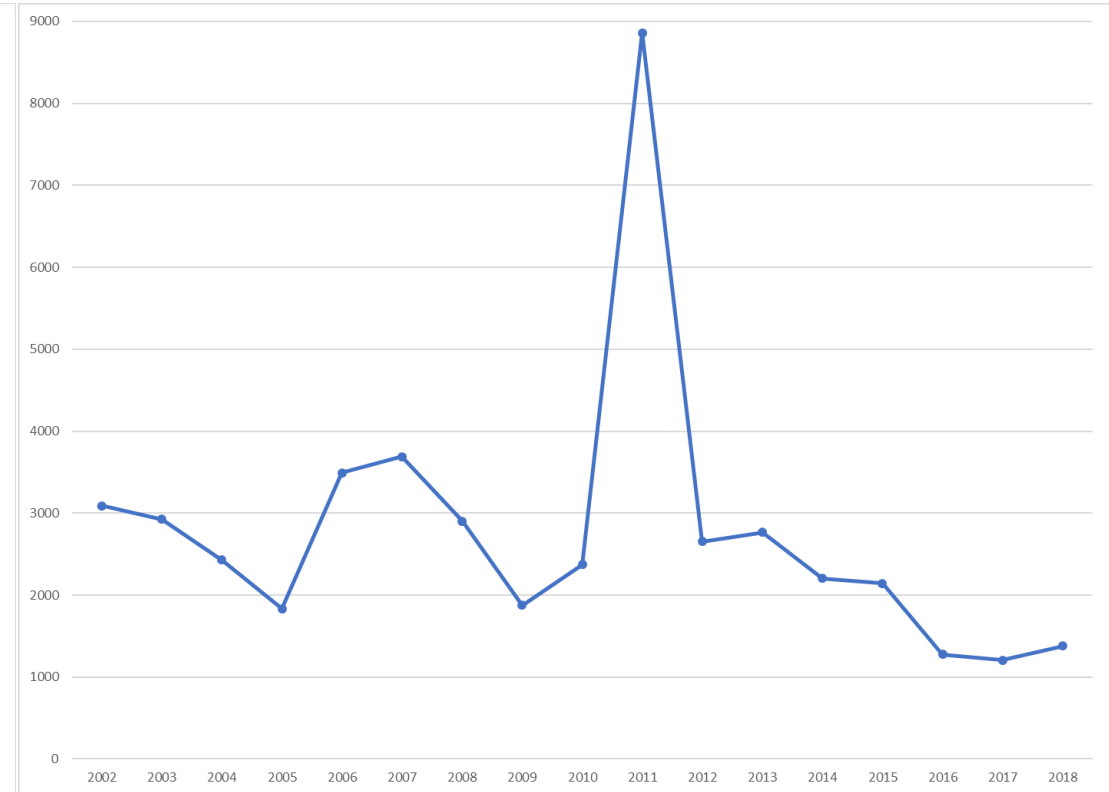
*Can appropriately integrating and linking basic atmospheric science, hazards, and safety concepts into the K-12 education standards system reach a large enough segment of the population to help ensure that appropriate, safe decisions about weather hazards are made when warning messages are transmitted by the weather enterprise to the consuming public?*

# Background:

## Weather-related fatalities and injuries



U.S. weather-related fatalities 2002-2018  
(derived from NWS, n.d.)

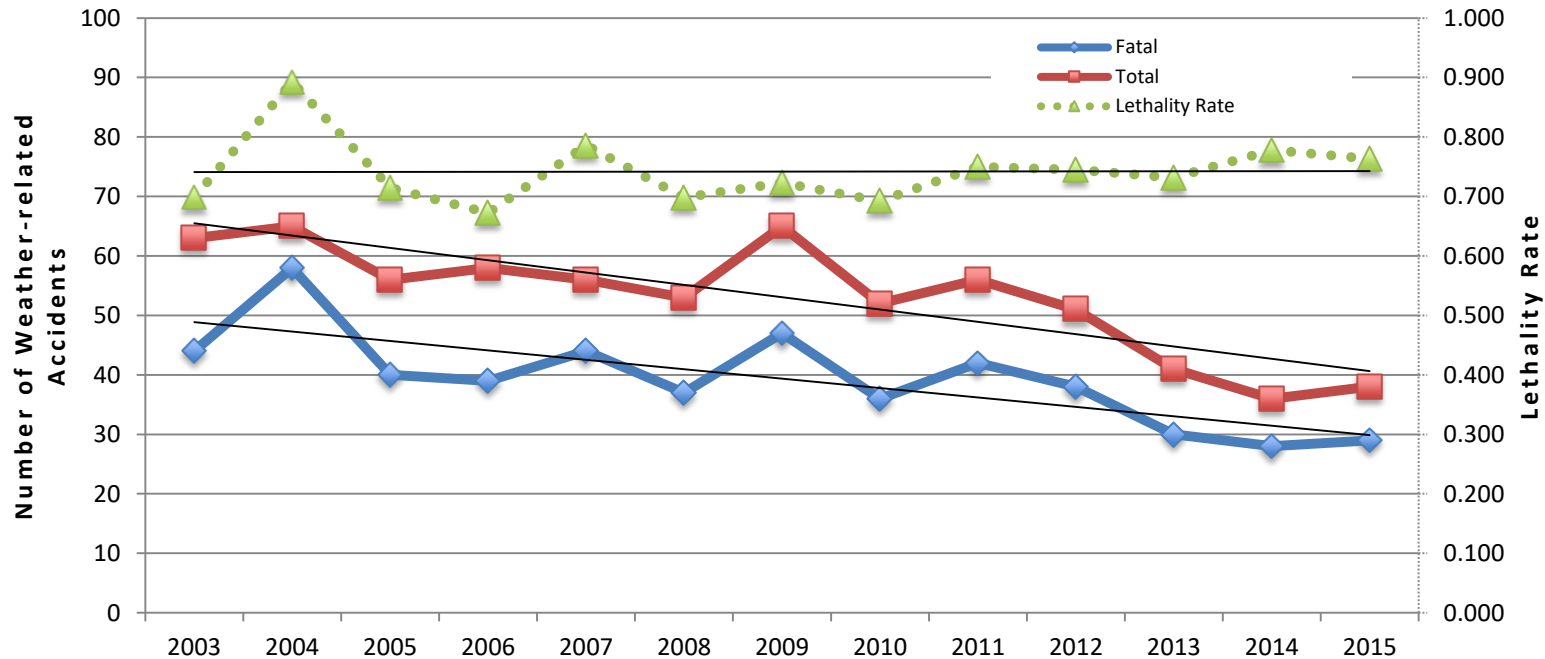


U.S. weather-related injuries 2002-2018  
(derived from NWS, n.d.)



# Background:

## GA weather-related fatalities – not a dissimilar problem



- Total numbers of GA weather-related accidents (red curve)
- Fatal weather-related accidents (blue curve)
- Lethality rate (green curve plotted against right-hand y axis)

Source: AOPA and Lanicci et al. (2020)

# Evidence for linkages between education and natural disaster resilience

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- Muttarak and Lutz (2014) suggested that education could be a key component of reducing vulnerability to natural disasters resulting from global climate change
- Brooks and Doswell (2002) speculated about linkages between hazards education and ‘school-age’ fatality gap in 1999 Moore Tornado
- Sharma et al. (2013) showed the value of nonformal (experiential) education in Indian fishermen and farmers responses to cyclone warnings

# Evidence for linkages between education and natural disaster resilience

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- Stewart et al. (2015, 2018) found that an appropriately taught natural disaster preparation curriculum was ‘brought home’ by schoolchildren and influenced their families’ natural disaster preparation actions over time

*So what might our proposal look like?*

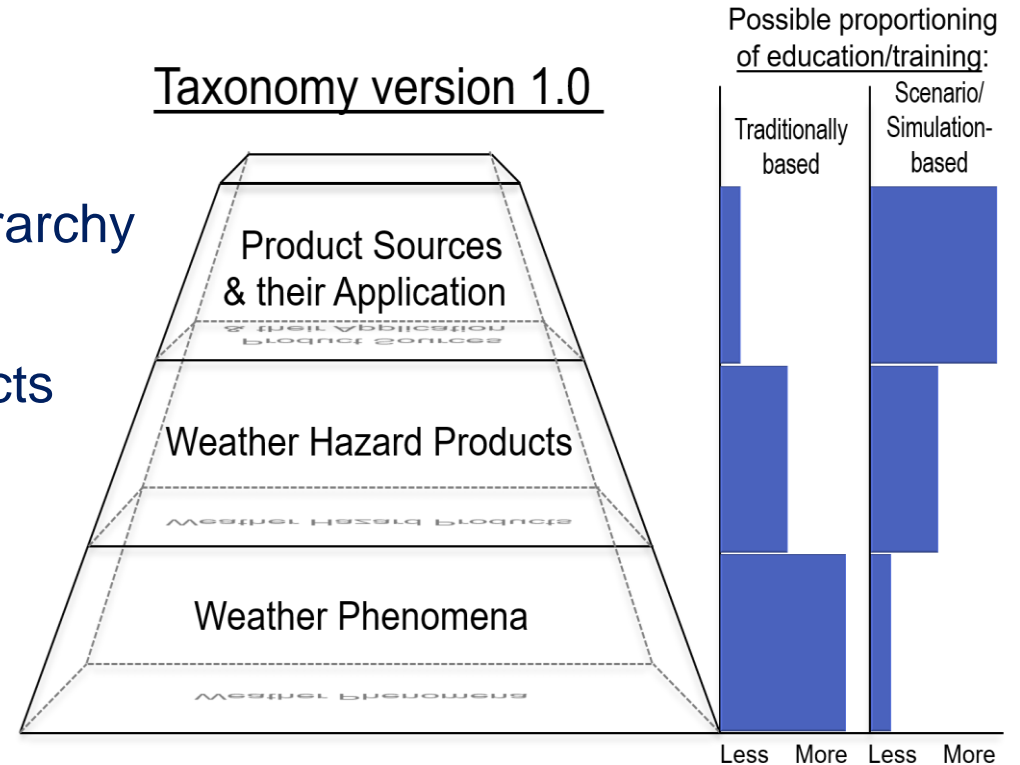


# To address this question, let's return to the general aviation weather problem for a moment...

Lanicci et al. (2020) propose a general aviation weather *taxonomy*

Organizes instructional materials into a tiered hierarchy

- Basic concepts/theory, including hazards
- Identification of aviation weather hazard products
- Proper application of appropriate data sources to make informed weather-related decisions in all phases of flight
- Traditional delivery modes supplanted by scenario/simulation-based modes as one moves towards decision-making tier (RHS of figure)



# We propose to adapt the GA Weather Taxonomy to develop and test a prototype K-12 WRN curriculum

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- Develop a phenomenon → hazards → products → decision-making curriculum appropriate for different grade levels
- Involve teachers, administrators, NWS WCMs, and EMs so we don't build a 'Field of Dreams' and nobody comes
- *Must consider education community issues in the same way that Enterprise considers social-science issues in developing products (see next slide)*

# Challenges associated with formal involvement of the K-12 education system with WRN

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- Teachers and administrators have multiple constraints on their curriculum development and implementation
  - Adhering to standards such as the NGSS, State Standards
  - Issues associated with training (i.e., how many teachers took Earth Science in their Gen Ed when they were undergraduates?)
  - Issues associated with scheduling of the Weather segment in the academic year (i.e., we think this is important, but it may only be two weeks long, and not every year)
- We want to build something that doesn't require a training workshop for every teacher in Alabama to use

# Challenges (-cont.)

## Example of NGSS Weather Standard for Kindergarten

Grade

Standard

Kindergarten

K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (ESS2.D)

K-ESS3-2: Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

- Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events (ESS3.B)

*This appears to be the only standard that actually includes verbiage about hazard preparedness and response*

# References

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