Mixed Precipitation Events in Forensic Meteorology

WINTRE-MIX Workshop: May 22, 2023

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stm WEATHER

STM Weather

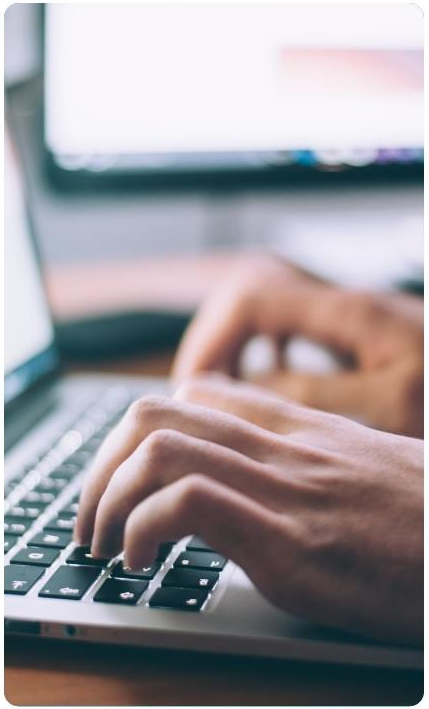
About us

- **Founded in 2004 as a forensics firm**
  Meteorological reconstruction of past weather events for litigation purposes
- **Value-based, purpose-driven firm**
  Integrity, kindness, dependability
- **Primary customers: law firms, insurance agencies, private companies, and individuals**
  All types of weather phenomena

What does a forensic meteorologist do?

Research

Brief clients

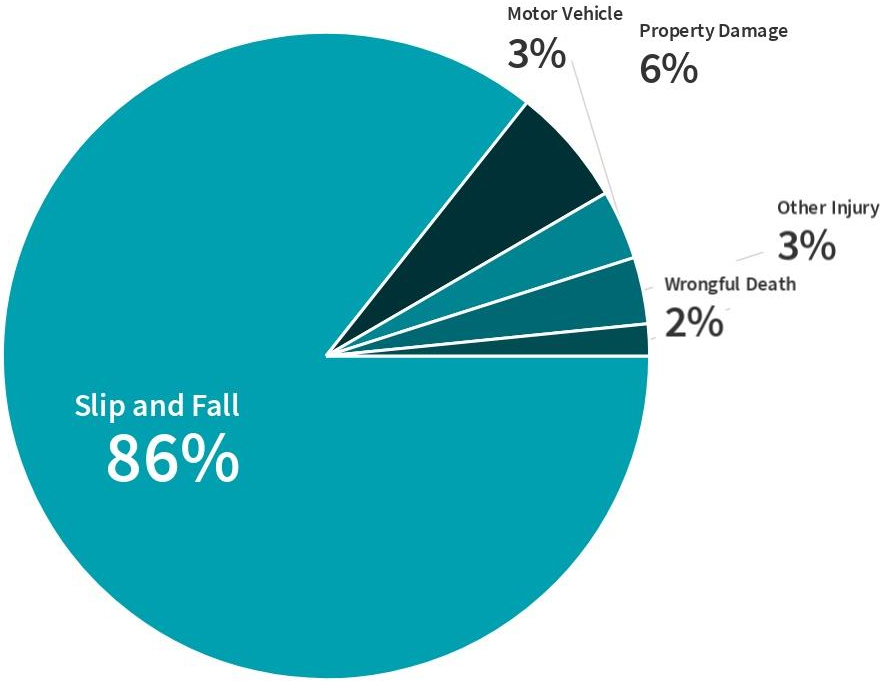


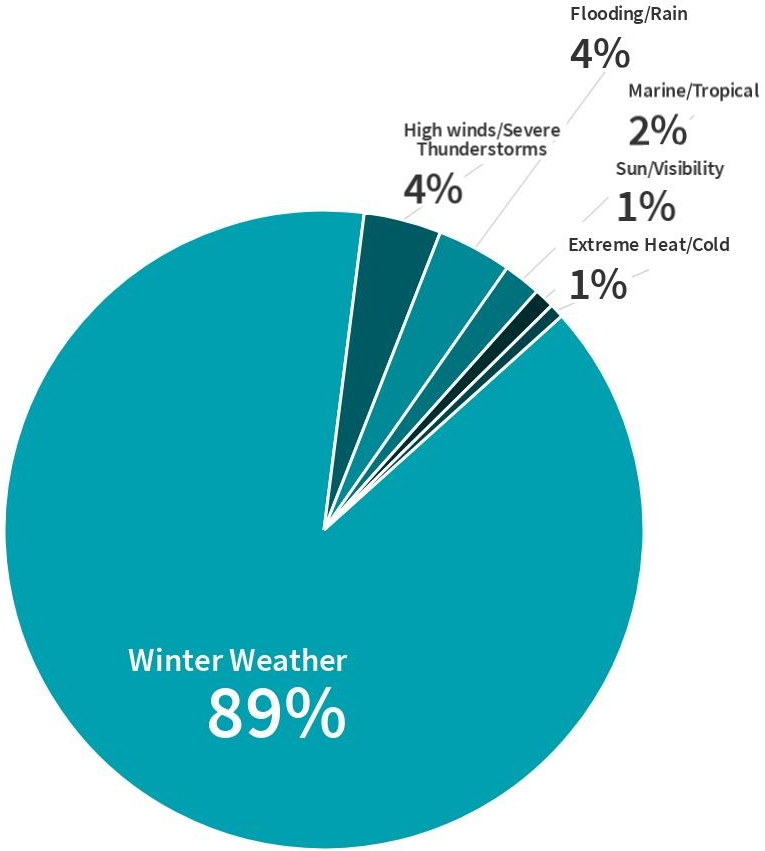
Draft reports

Testify

Case Examples

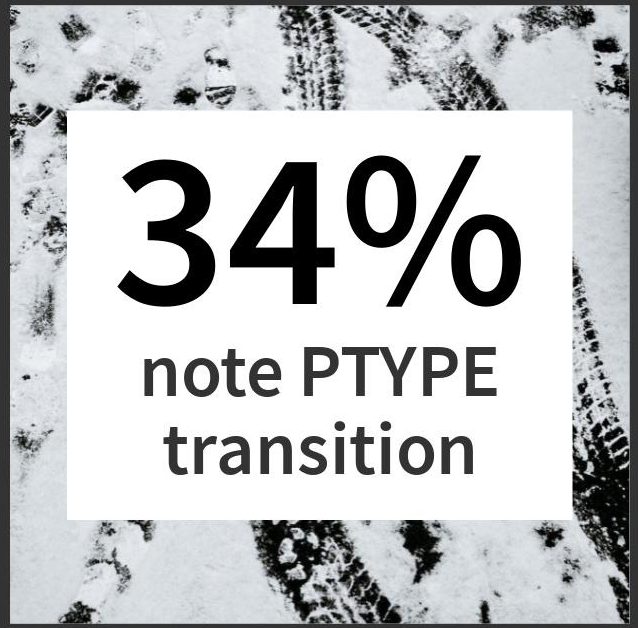
STM Weather: Types of Cases





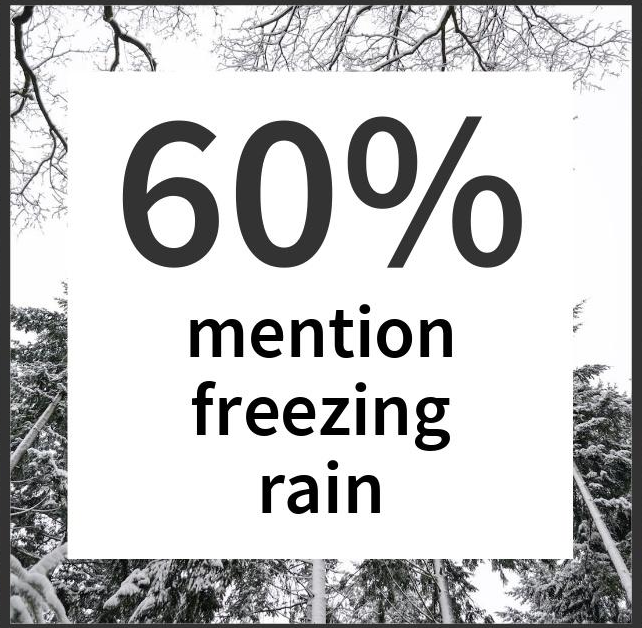
Winter Weather Cases: 2021-2023

169 total



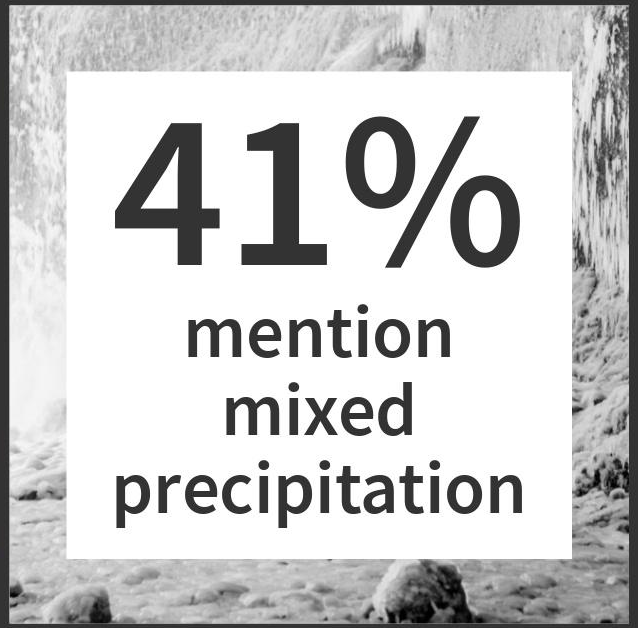
34%

note PTYPE transition



60%

mention freezing rain



41%

mention mixed precipitation

At least half of the time, our winter cases involve precipitation types other than snow!

Typical issues related to winter precipitation

End time of precipitation

How much snow fell?

Notice

Launch the force of harm

Common situation: Mixed precipitation event 1-4 days prior to an incident

Key components of a meteorological chronology:

- How much precipitation
- Timing of precipitation
- Precipitation types
- Temperatures (ground and air)
- NWS Warnings/Advisories/Statements
- Complicating factors: winds/blowing snow, mixed precipitation

Tools in our toolbox

1. Radar
2. ASOS: PTYPE sensor
3. NYS Mesonet
4. NYSM Cameras
5. CoCoRaHS comments
6. AFDs/PNSs/LSRs

NYS Mesonet Cameras

CoCoRaHS comments

"At 8:00 am 10 February 2022, drizzle, **freezing on deck surfaces, not on cleared asphalt or on snowpack**; temp +30F, rising slowly from overnight low of +26F. **Treacherous walking** on thoroughly crusted snowpack with a wet surface."

"There was nearly continuous light snow of varying intensity, with **two bursts of moderate snow, during the day**. The snow was very **light and fluffy**. Snow ended at around 8:45 PM."

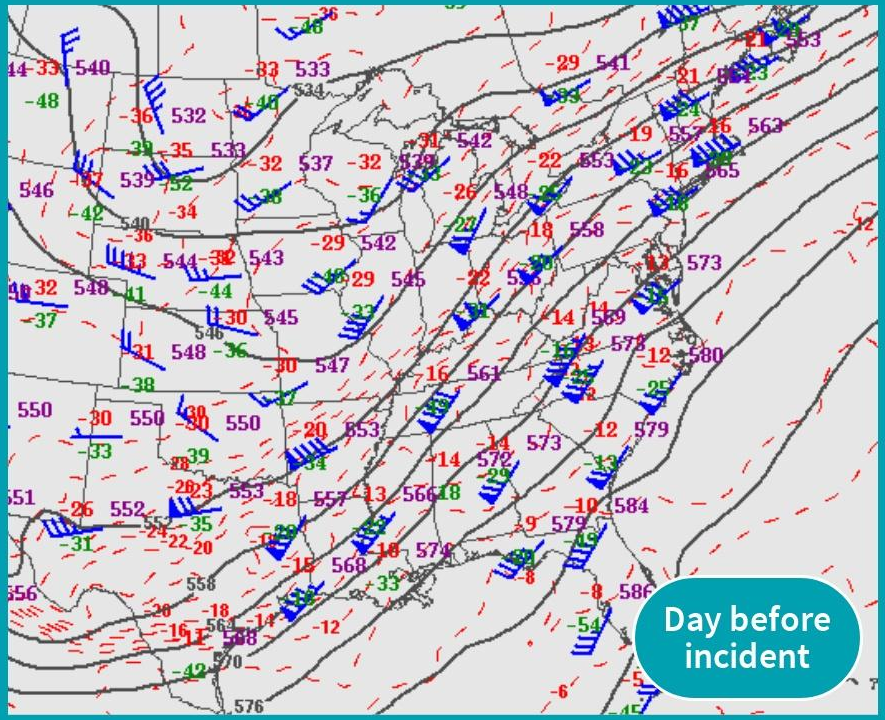
"Light rain just before midnight mixed with and changed to very heavy wet snow early overnight. Unable to take an accurate core sample due to **slushy nature of the snow** on the board however, the water content of the snow is very high. Light snow and 33F at ob."

"**Many trees and branches down** due to the weight of the snow. Quite a storm."

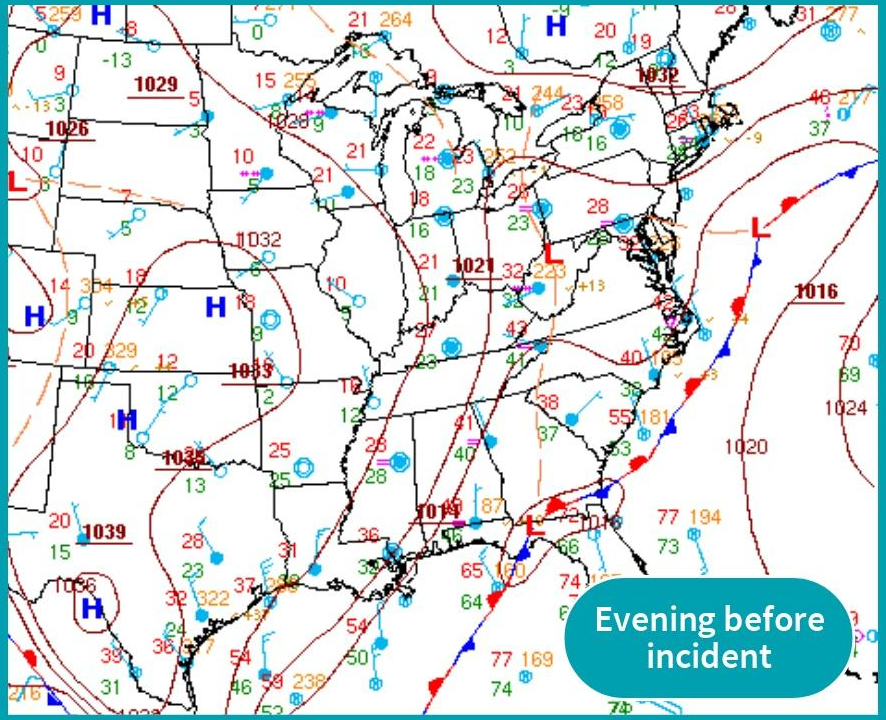
A Case Example: Mixed Precipitation Storm in Progress

- Occurred in NYC metro area
- Plaintiff slipped and fell at 4:00 AM
- Walkway was shovelled appx 5:55 PM the prior evening
  surveillance video footage and photographs
- No salt/sand applied

Weak upper level impulses, surface low passing to south



500 mb

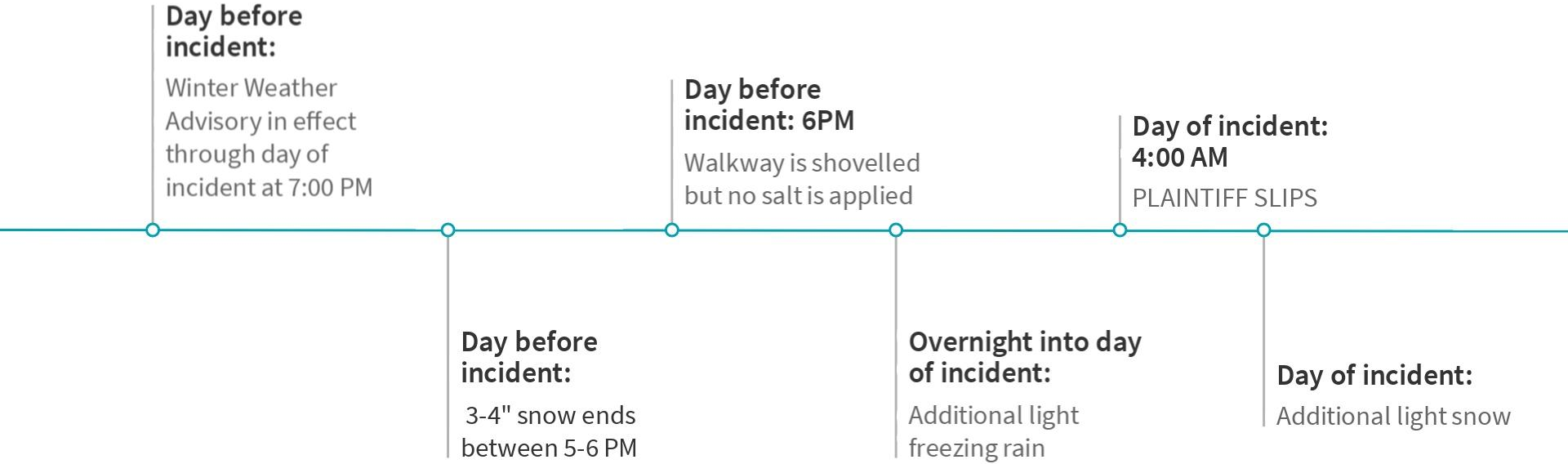


Surface

Synopsis:

- **3-3.5" snowfall the day before the incident**
  Ends by 5-6 PM
- **Very light precipitation continues on radar through 12:30 AM, then again after 3:00 AM**
- **ASOSs report FZRA/UP**
- **CoCoRaHS comments:**
  Light to moderate snow yesterday morning tapered off to a mixture of occasional light snow, sleet and freezing drizzle. At time of observation, light snow grains were falling.
- **NWS: WW Advisory in effect thru 7:00 PM on date of incident**
  Long duration winter weather event
- **Additional accumulating light snow after incident (1-2")**

Chronology:



Timing of precipitation and change of ptype is key here: defendant may have created the hazardous situation by clearing to pavement and not applying salt!

In Summary

- Forensic meteorologists rely on many observational data sources
- At least half of STM Weather winter weather cases involve mixed precipitation
- Determining timing, location, intensity and type of precipitation can all be key factors
- NYSM cameras and CoCoRaHS comments provide additional 'ground truth' when compared with other observations

A wish list for researchers

- Ground surface temperature measurements
- PTYPE (either best guess or via instrumentation) in NYSM data
- Surface observations...lots and lots!

Thank You!

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