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## 1. Objective

The integration of UAS into the US weather surveillance network needs to be guided by the needs of the principal users of the data collected. One of the primary user groups is the US National Weather Service (NWS). In an effort to assess the data gaps that exist for short-term forecasts (< 1 day lead time), we are pursuing a mixed-methods approach that consists of 1) qualitative focus groups and one-on-one interviews and 2) a quantitative survey. Results from the focus groups and interviews are presented here.

## 2. Methodology

- Participants in this study were recruited from existing contacts at the NWS and through open invitations sent by division chiefs at NWS regional offices to forecast office Meteorologists in Command encouraging them to invite their staff to participate
- Participants completed a short pre-survey to provide contact information and willingness to participate
- Focus groups and interviews included a facilitator and an atmospheric science expert
- Participants were asked to begin by discussing data gaps without specifically considering how UAS might play a role
- Following a focus group or interview, participants were asked to complete a post-survey that assessed participant demographics and political ideology
- The present study and all of its methods and measures were reviewed and approved by the University of Nebraska Institutional Review Board for the Ethical Treatment of Human Subjects (RII Track-2 FEC: Unmanned Aircraft System for Atmospheric Physics, IRB Approval #: 20151115696 EX).

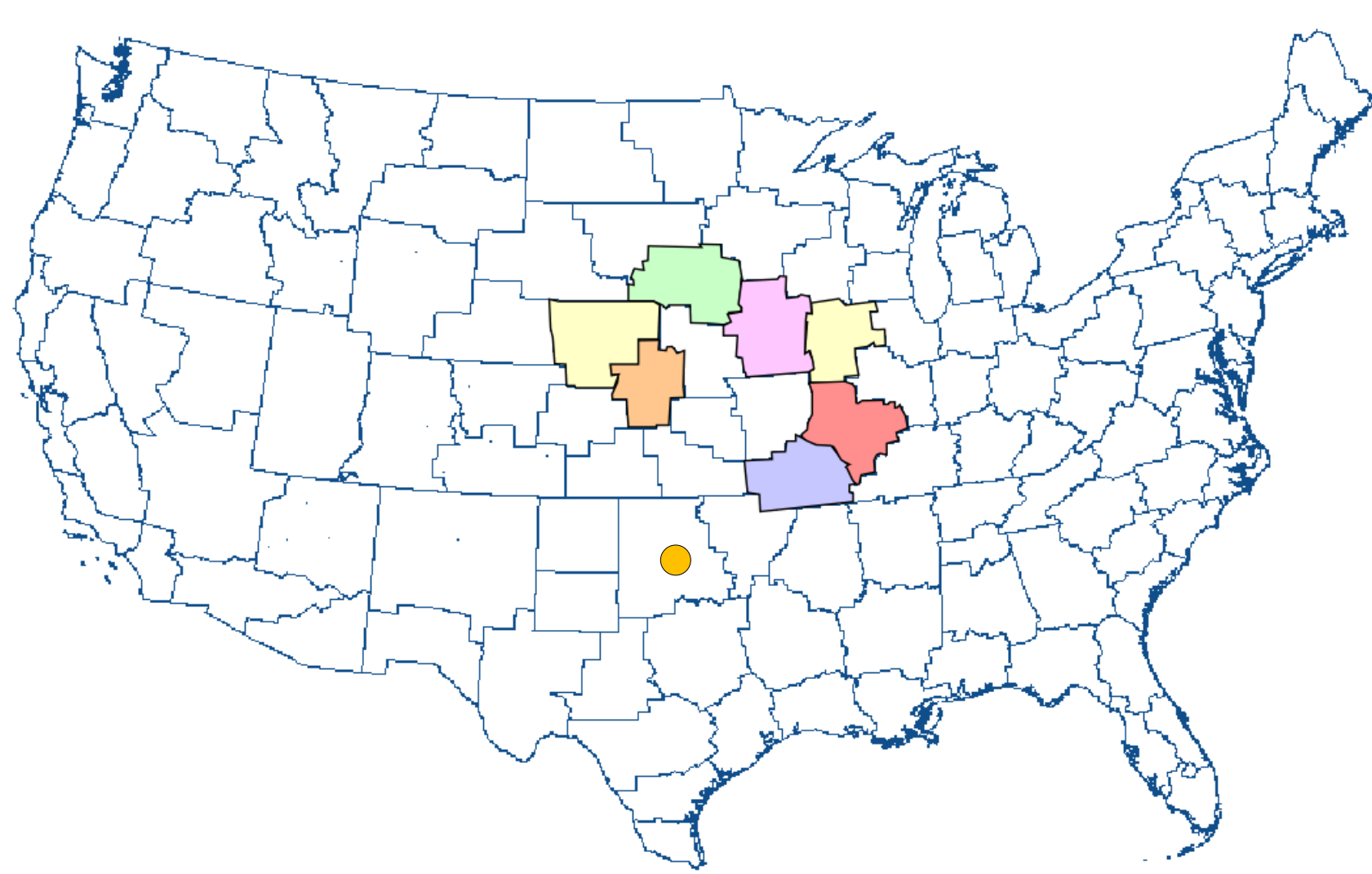


Figure 1. County warning areas of forecast offices for participants (color-filled polygons) and location of the Storm Prediction Center (orange circle)

## 3. Participants

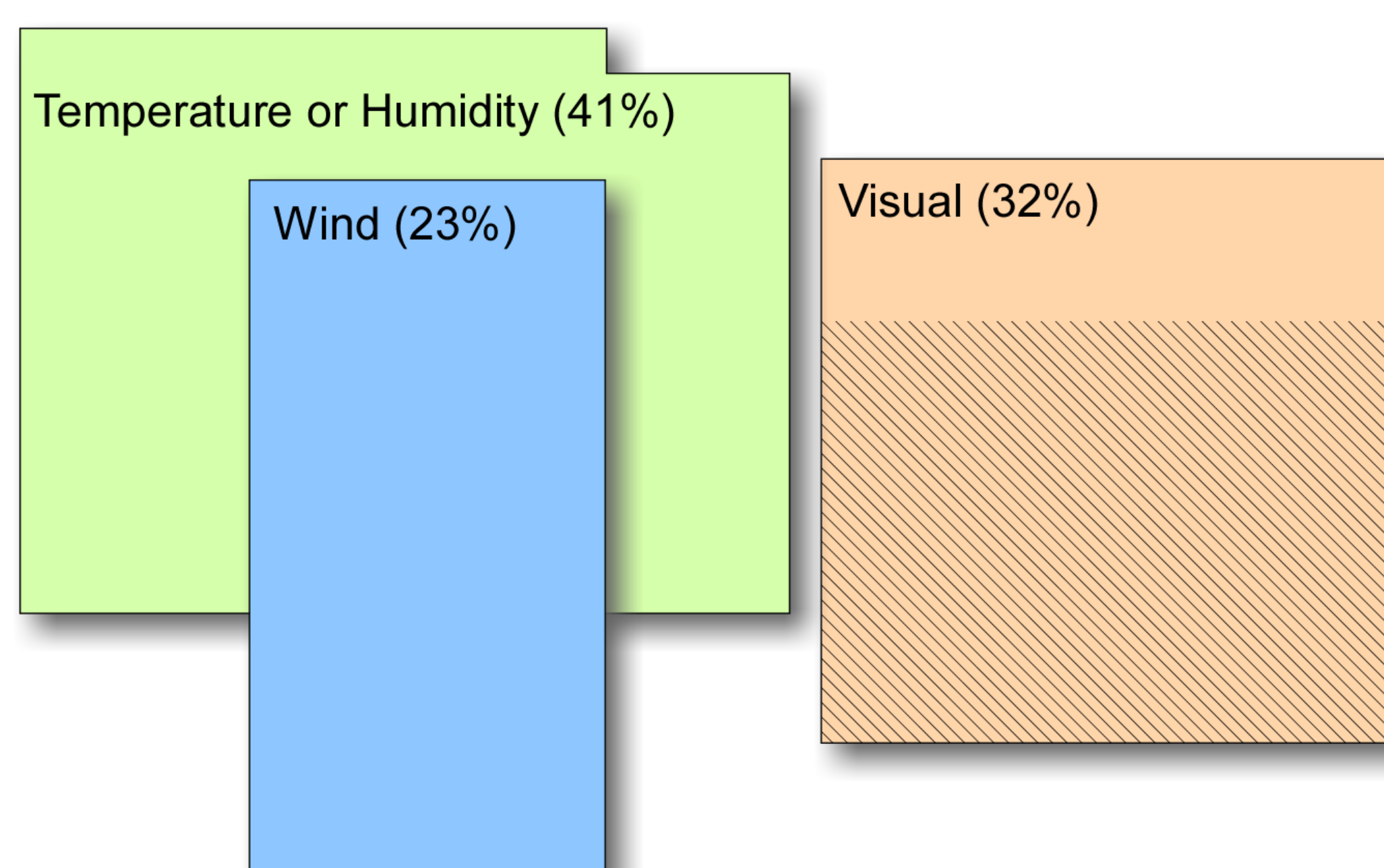
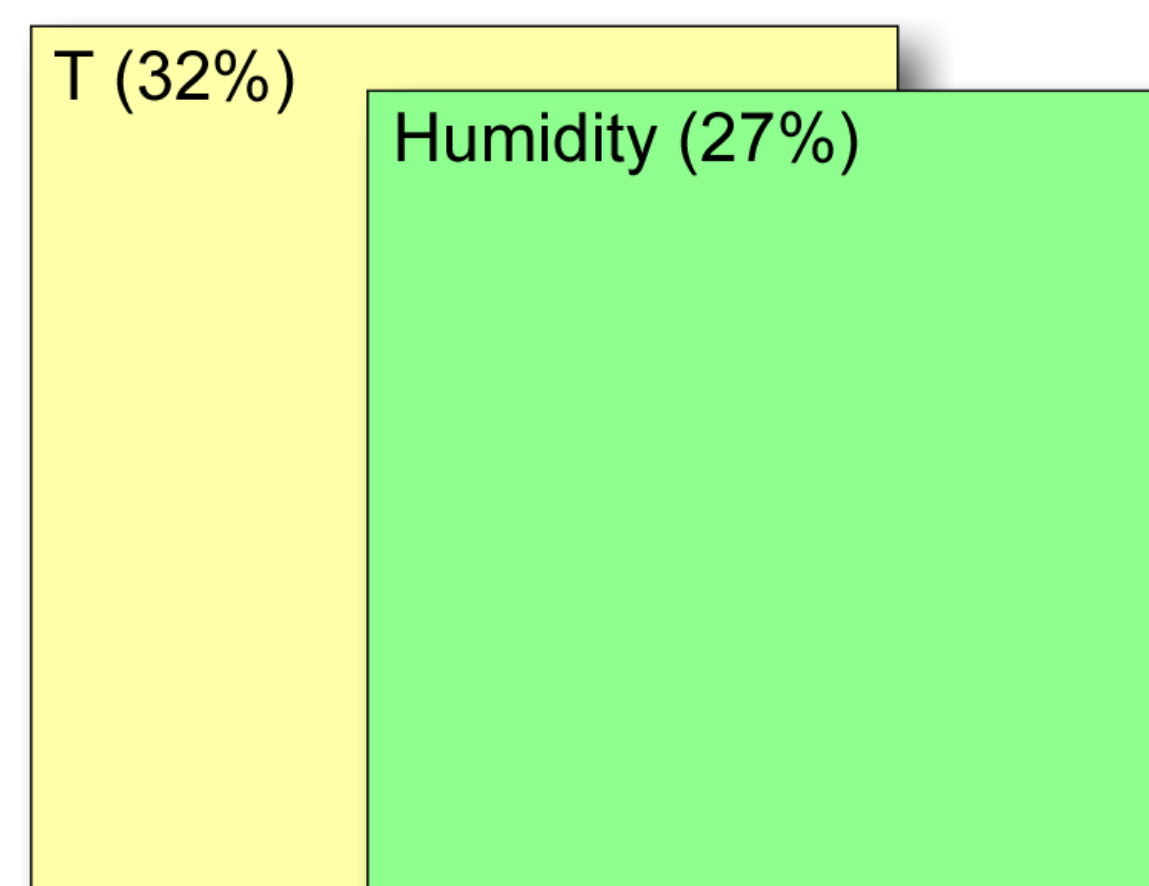
- 17 people completed the pre-survey
- 10 people participated in a focus group or interview
- 2 focus groups with 4 participants each
- 2 one-on-one interviews
- 9 men and 1 woman
- 4 general forecasters
- 3 Science Operation Officers
- 3 Warning Coordination Meteorologists
- Participants were from 7 forecast offices and the Storm Prediction Center (Figure 1)

## 4. Results

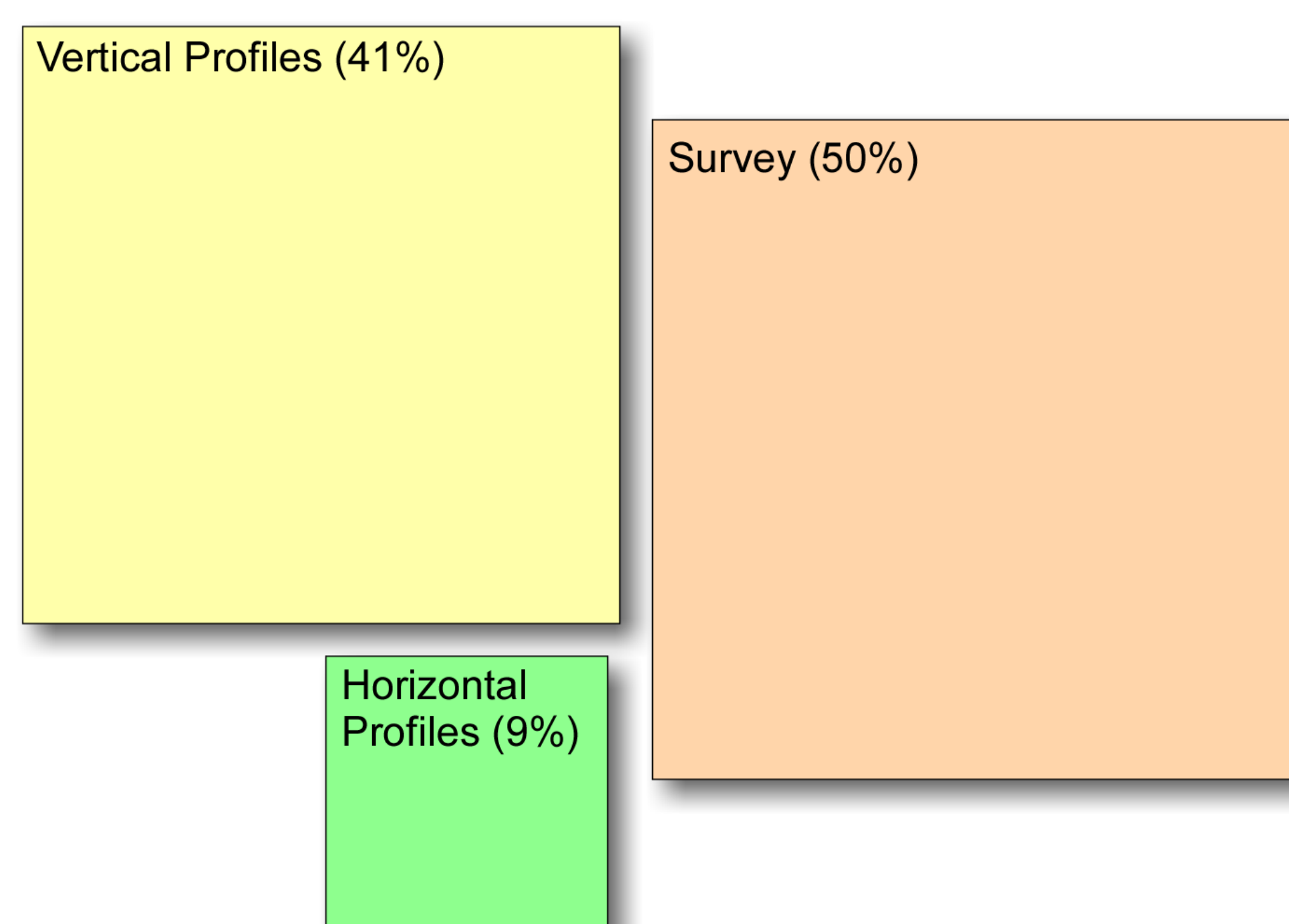
### Phenomena for which data gaps exist

- Cap strength
- Wind shear of preconvective environment
- Low-level jet
- Radar gaps
- Storm appearance
- Cold pool temperature
- Layer saturation
- Cold air drainage
- Damage survey
- Temperature profile in mixed-precipitation
- Ground conditions during flash flooding
- River flow
- Hydrometeor type
- Moisture gradients for convection initiation (CI)
- Airmass boundaries for CI
- Nocturnal storm evolution
- Ice jams
- Levee breach
- Water routing in river flood situations
- Cloud field of preconvective environment
- Fire weather
- Severe weather alerts
- Near-storm vertical wind profile
- Snow accumulation

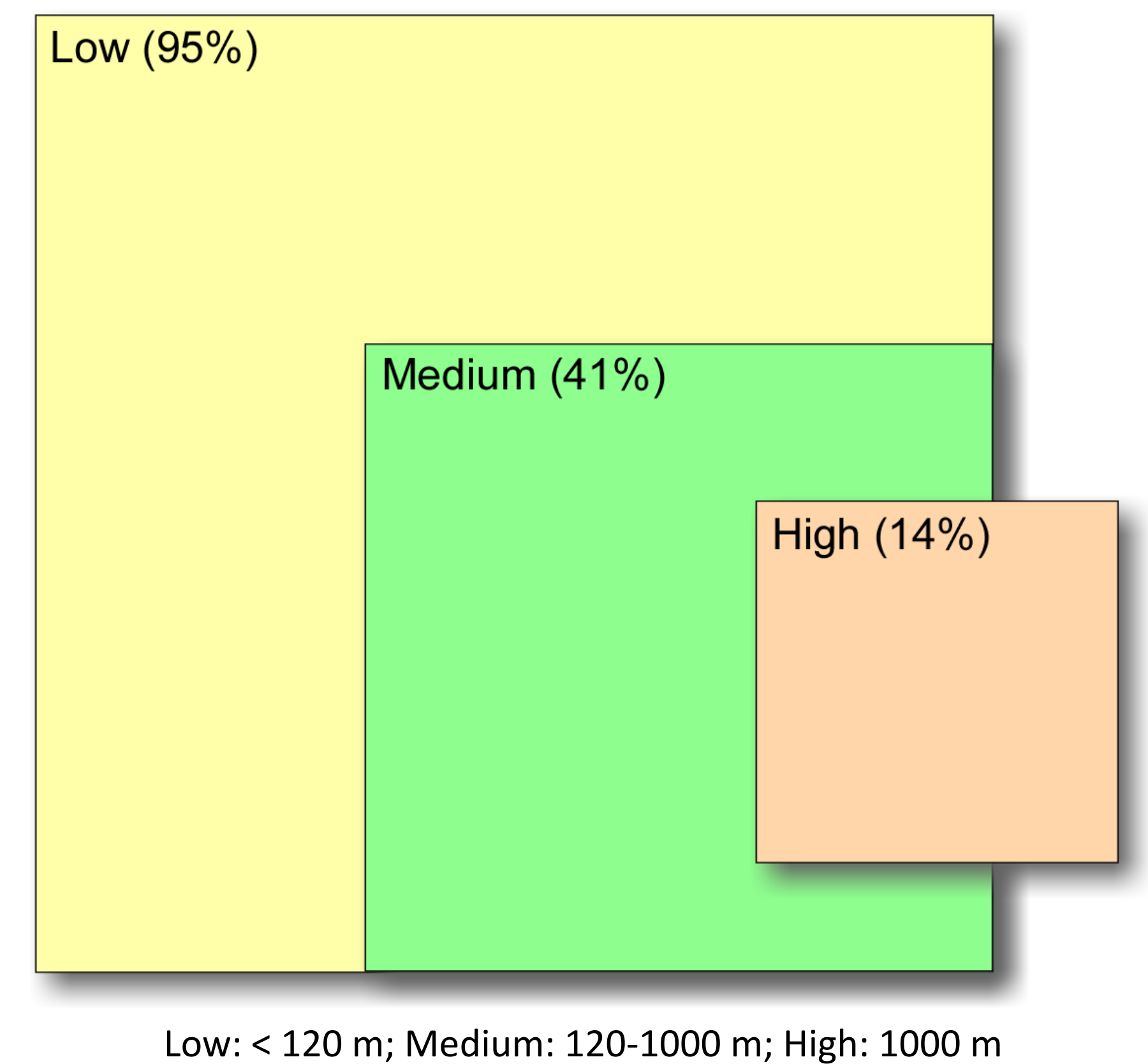
### Variables for Phenomena



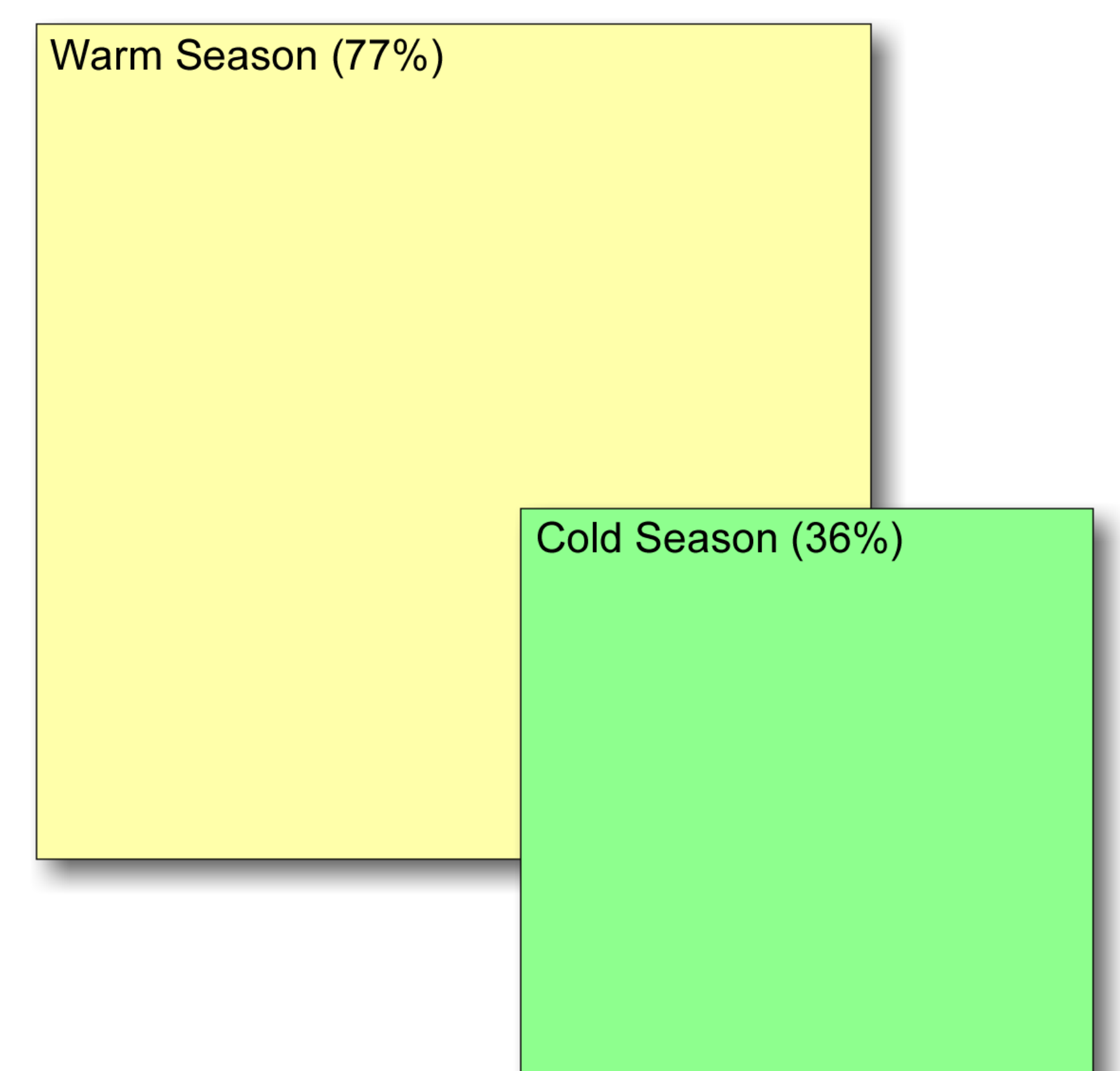
### Flight Characteristics for Phenomena



### Flight Ceiling for Phenomena



### Season of Operation for Phenomena



### Data Dissemination

- Assimilation of data into NWP models is important BUT highest priority is making the data directly available to the forecaster
- Prioritize dissemination via web pages and not through AWIPS

### Operation of UAS

"...My pie-in-the-sky opinion on this it would be that the soundings or the upper air data above the surface could ... be **concentrated in areas where we have [a] severe weather outlook for that day**, whether it's automated or whether we draw a line and send it and say 'hey, you know, this is where we'd like some data,' ... it would benefit us a lot more to have the data from areas where severe weather is possible."

"I guess my only addition ... would be the deployability of the UAVs, to **get them out there as quickly as possible** - not have a very complicated system to get them deployed because we will need them [in] probably be less than an hour."

"...for forecasting, **it's all about being able to trust the data**, so if we can trust the data and it's coming in, then it will be useful."

## 5. Acknowledgements

- University of Nebraska Public Policy Center
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