# P1.8 Using "Particularly Dangerous Situation" Wording to Improve Public Response to National Weather Service Watches and Warnings

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**ABSTRACT**

*Response to weather warnings is essential for protection of life and property. As such, National Weather Service (NWS) warnings are designed to stimulate an appropriate public response to weather hazards.*

*The purpose of this presentation is to propose an alternative to the current warning and watch headlines. Since headlines are fundamentally critical for eliciting public action that leads to saving lives, we believe they must reflect our increasing scientific ability to discriminate more serious events which threaten life and property from those that cause lesser amounts of damage.*

*The forecast of Particularly Dangerous Situation (PDS) Tornado Watches has achieved success in discriminating more strong and violent tornado events. Since PDS Tornado Watches can provide useful guidance to the public in focusing their attention, we believe the use of PDS warnings would also enhance public response to a hazardous weather event. The use of PDS headlines does not need to be restricted to convective events. Rather, PDS headlines could be applied to other NWS watches and warnings, including headlines for ice storms, floods and hurricanes.*

## 1. Introduction

Meteorological events are classified as severe or hazardous when they have reached a level of impact such that life or property is threatened. Unfortunately, determining a definitive threshold at which weather threatens life and property is arbitrary and highly variable and dependant on a number of factors. These factors include, but are certainly not restricted to, the population's physical condition and age, ability to respond to hazards, which could include sheltering capability, warning reception and understanding of the hazard, and psychological aspects such as optimism bias and trust in the message (NWS Service Assessment, 2008).

If a warning program is based on the simple premise of stimulus and response, then statements issued by an authoritarian body such as the National Weather Service, should be clear in their intent to produce a specific action. It should be well understood that certain weather events necessitate a specific response in order to protect live and property. Therefore, our criteria for issuing warnings should be reviewed regularly to determine their effectiveness in eliciting the appropriate response.

The purpose of this paper is to propose an enhanced method of communicating weather hazards to a society that, due to advances in communication and preparedness, has become more weather savvy and resistant. The current warning system, particularly for convective events, has been largely unchanged for decades. Therefore, we believe the public needs a more thorough warning language to better discriminate between weather threats.

## 2. Current use of "Particularly Dangerous Situation" wording for Convective Events.

The forecast of Particularly Dangerous Situation (PDS) Tornado Watches has achieved success in discriminating more strong to violent tornado

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events (Dean and Schaefer 2006). Particularly Dangerous Situation wording is used by the Storm Prediction Center for convective watches to heighten public response. According to National Weather Service directive (2011), SPC may enhance a Public Tornado Watch Notification Message by using the words "This is a Particularly Dangerous Situation" when there is a likelihood of multiple strong (damage of EF2 or EF3) or violent (damage of EF4 or EF5) tornadoes. SPC will refer to tornadoes as "destructive" for PDS Tornado Watches.

Also, according to National Weather Service directive (2011), SPC will enhance a Public Severe Thunderstorm Watch Notification Message by using the words, "This is a Particularly Dangerous Situation" when conditions are favorable for widespread significant non-tornadic severe weather events (convective winds greater than 65 knots). An example is a well-defined large bow echo with destructive convective winds occurring at the surface, the bow echo is moving at 48 knots or greater, and downstream conditions suggest the bow echo will be maintained or intensify for the duration of the watch.

We believe where weather events are either occurring or imminent a PDS Severe Thunderstorm Warning or PDS Tornado Warning would sharpen public response.

**3. Examples of PDS Watches and Warnings**

We provide two examples of where we believe PDS warning headlines would have enhanced public response and one example of where the phrase "This is a Particularly Dangerous Situation" was used to enhance a Flash Flood Watch. These examples are meant to illustrate that under certain criteria using this kind of headline in warnings or watches can help protect life and property.

**3.1 An Example of where a PDS Severe Thunderstorm Warning Could Enhance Public Response.**

On 15 April 2011 a line of intense thunderstorms raced across the state of Arkansas. As this line of thunderstorms moved into eastern Arkansas early in the morning, straight-line winds from the squall line picked up a mobile home and killed one of the occupants near Colt. NWS damage survey indicated winds from 70 to 80 miles per hour.

In the case of storms occurring overnight with severe straight-line winds in excess of 75 miles an hour, public response can be problematic. Most preparedness officials would agree that public response to a Severe Thunderstorm Warning is not as great as the response to a Tornado Warning. For Severe Thunderstorm Warnings, sirens are typically not activated and the public is less likely to seek reinforced shelter, such as a storm shelter, etc.

We believe a PDS Severe Thunderstorm Warning for winds in excess of 75 miles an hour would enhance public response to the effects of vigorous straight-line winds. Naturally, the implementation of such wording would need the participation of public officials to respond to these warnings similarly as they have for tornado warnings. Public officials would need to activate sirens and ask people at public or community gatherings (such as at Schools, hospitals and community centers) to respond as they would for Tornado Warnings. The general public as well would need to be educated on the proper response for such events.

**3.2. An example of where a PDS Ice Storm Warning Could Enhance Public Response.**

Ice storms are crippling events that often occur over a large geographic area. This was the case in late January 2009, when a devastating ice storm occurred across portions of Oklahoma, Arkansas, Missouri and Kentucky. According to the National Climate Data Center's Storm Data (2009), the governor of Kentucky called it the biggest disaster in modern Kentucky history. One inch of ice fell over a substantial area, with as much as two inches of ice accumulation reported. Deaths indirectly related to the ice were due to tree falls, hypothermia and carbon

monoxide poisoning. Destruction of numerous trees and power lines occurred with extensive power outages. This was an unusually severe ice storm. For an event such as this the use of a PDS Ice Storm Warning could help heighten awareness of a rare weather event that causes catastrophic damage.

The advantage of the PDS Ice Storm Warning is that it would provide public officials the stimulus to respond with extreme action. Emergency Management officials could open community shelters beforehand. Electric companies would have the confidence that resources must be staged ahead of time to repair broken infrastructure.

### 3.3. An Example of where a PDS Flash Flood Watch was used to Enhance Public Response.

By the afternoon of 24 April 2011, it had become clear that a high probability of an excessive rainfall event was going to occur from 25 April 2011 to 27 April 2011 across the Mid-South. Furthermore, forecast indications showed that this event could rival the infamous early May 2010, Tennessee flood event (NWS Service Assessment 2011). The predicted area of heaviest rain was quite widespread, encompassing much of the Mid-South. The combination of wet antecedent conditions along with excessive and prolonged rainfall led to the NWS Office in Memphis to use enhanced wording for the flash flood watch, including the stand alone phrase; “This is a Particularly Dangerous Situation.” It was the first time such wording was used in a Flash Flood Watch. In addition, it was decided to mention the potential of rivaling the 1 May 2010 to 2 May 2010 rainfall event as a means for people to envision the effects from such widespread excessive rainfall. Coordination with neighboring National Weather Service Offices in Little Rock and Nashville led to multiple offices issuing a Flash Flood Watch with the phrase “This is a Particularly Dangerous Situation.”

After a few inquiries from the media on what exactly a PDS Flash Flood Watch meant, news of this spread quickly and the local newscasts were eager to help get the word out. Several broadcast meteorologists mentioned that in their entire career they have never seen a PDS Flash Flood Watch, which helped focus the public’s attention that this event could rival last year’s catastrophic flooding in spots. From this point through the conclusion of the event, most newscasts led with stories of flooding preparations and forecasts, particularly on the Mississippi River where major flooding was already forecast.

Just as soon as the first event ended, attention turned another excessive rainfall event. The NWS Office in Memphis once again issued a PDS Flash Flood Watch on the evening of 30 April 2011 when confidence was very high for five or more inches of rainfall. Since heavy rainfall had already recently occurred leaving soils saturated, the PDS watch included even more heightened wording such as, “catastrophic flooding possible.” The watch also mentioned likely impacts such as closed or washed out roadways, evacuation of homes and businesses, potential for record high river crests, and locations that aren’t officially considered a flood plain may also flood.

## 4. Conclusion

We believe the phrase “Particularly Dangerous Situation” used in warnings and watches for extreme weather conditions would enhance public response

We also suggest that the use of PDS in other warnings whether convective (i.e. Tornado, flash flood) or non-convective (i.e. Ice Storm) could be beneficial. We believe this would particularly be the case for ice storms and flooding where the public response would be enhanced by the use of this terminology. The possibilities in using this phrase, which would hopefully become synonymous with extreme weather events, could also be applied to other weather hazards including hurricanes and snow storms.

## 5. References

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NOTE: *The views expressed herein are those of the authors and do not necessarily reflect the position of the National Weather Service.*