The Impact of Weather on Recent U.S. Protests in the Washington, D.C., Area

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Motivation

During a conversation with an emeritus professor in the meteorology-climatology department, we discussed how the weather impacted historical events such as the JFK assassination. That discussion, as well as interest in working for the intelligence community, led to wanting to better understand how weather affected the events of 6 January 2021 and further, protests in general in the Washington, D.C., area.

Background

Severe weather events can lead the news cycle for weeks depending on the severity of their impact. What is less thought of is how weather on clear and stormy days can be significant to the way historical events unfold. The four protests studied for this project are:

- The March for Life (01/22/2016) - was cut short due to intense snowfall from the well forecast Winter Storm Jonas.
- The Women's March on Washington (01/21/2017) - understanding that Winter Storm Jonas had happened the year before, those who attended the protest were most likely aware of the forecast and the possibility of a snowstorm in mid-January.
- D.C. Black Lives Matter (05/21/2020-06/23/2020) - a thunderstorm on June 4 that began around 8:00pm, "dispersed many demonstrators" (Hagemann 2020). During this storm, "two National Guard members were injured when lightning struck near their post" (Barnes 2020).
- January 6, 2021 - both officials and attendees prepared for this event. Officials stationed officers strategically, closed roads, and put up barricades made from bike racks. Protestors had riot gear and makeshift deterrents of their own. The day itself was clear with some cloud cover and average to warmer than average temperatures.

CASE STUDIES

March for Life 2016

On Friday, January 22, 2016, a significant winter storm was expected for the D.C. area. With very cold air from a high-pressure center over New York feeding two low-pressure systems, 18-30 inches snow was forecasted well ahead of time. There was a lot of uncertainty in the track and timing of the system which led to a large range in forecast snow totals, but forecasters became more confident over time. The low-pressure systems generally tracked where they were forecast to although snow started earlier than expected. Overall, the storm was well forecast. Uncertainties were explicitly stated, and the significant winter storm and blizzard conditions were mentioned in the ADFs many days ahead of time.

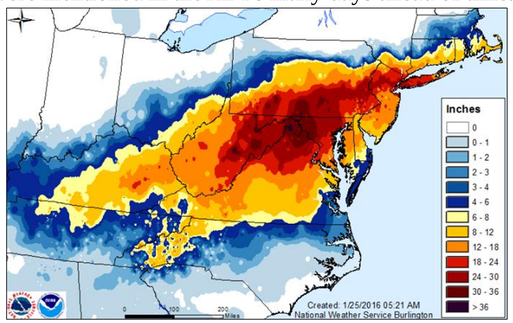


Figure 1. Total Observed Snowfall from Winter Storm Jonas January 22-24, 2016

Women's March 2017

On Saturday, January 21, moist air from showers the day before and warm temperatures (45-55°F) indicated a very moist air mass that resulted in dense fog through much of the morning and overcast skies. The D.C. area was underneath convergence aloft which suggested sinking air and therefore a smaller chance of precipitation. The forecast for this day was a bit more uncertain with the warm temperatures suggesting that it was a very stable air mass and moisture within this air allowing for dense fog.

Black Lives Matter 2020

On Thursday, June 4, storms were possible but not expected. A warm front moved through the area late Tuesday night into early Wednesday morning resulting in warm moist air throughout the region. Wednesday night, increasing inhibition created muggy conditions for Thursday. With CAPE between 1000 and 2000 J/kg, a stalled cold front north of the forecast area, upper winds parallel to the boundary, and a shortwave moving over the region convection initiation was encouraged in the late afternoon on Thursday. A storm with heavy rain formed over D.C. around 8:00pm and continued past 12:00am. Overall, the event was moderately forecasted with the fronts in the wrong places.

January 6, 2021

On Wednesday, January 6, 2021, high-pressure dominated the eastern half of the U.S. This meant average to slightly-warmer-than-average temperatures for the, D.C., area along with winds from the northwest and partly cloudy skies. This day was forecast well a week ahead of time with the temperatures forecast seven days out and cloud cover and winds due to a weak cold front mentioned a few days before. Overall, the forecast verified well and would have provided National Weather Service customers with an accurate forecast throughout the day of January 6, 2021.

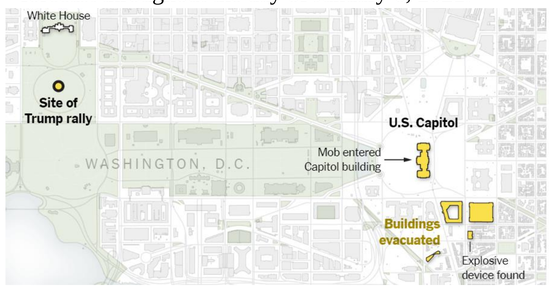


Figure 2. Layout of D.C. with important sites from January 6, 2021

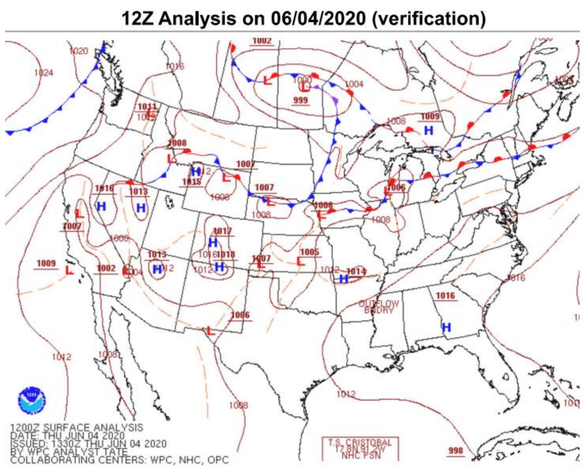


Figure 3. Forecast verification map from June 4, 2020

Next Steps

Throughout this next year, I will work on correlating the forecasts I have studied with the planning done by officials in D.C., the timeline of events on the days of the protests, and the after-action reports following each of the events. This will aid in understanding of how weather played into the planning for these events and where it can be incorporated in order to ensure safety of officers and protestors in future protests. I plan to defend in March.

Hageman, H., 2020: Protestors Came Out Again In Washington, D.C. – And Some Stayed, Despite Thunderstorm. Nebraska Public Media.
Barnes, S., 2020: 2 National Guard Hurt by Lightning Strike as Storms Hit DC Protests. NBC Washington.
Figure 1: Buchanan, L., L. Gamio, C. Kelso, D. Khavin, L. Leatherby, A. Parlapiano, S. Reinhard, A. Singhvi, D. Watkins, and K. Yourish, 2021: How a Pro-Trump Mob Stormed the U.S. Capitol. The New York Times.
Figure 2: Philadelphia/Mt Holly Weather Forecast Office, 2016: Winter Storm Summary for January 22-24, 2016. National Weather Service.
WPC Surface Maps: https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive_maps.php?arcdate=01/22/2017&selmap=2017012200&maptype=namussfc
WPC Outlook: https://www.wpc.ncep.noaa.gov/archives/web_pages/medr/get_medr_products.php
SPC Upper Air: https://www.spc.noaa.gov/obswx/maps/
SPC Storm Report: https://www.spc.noaa.gov/exper/archive/event.php?date=20110620
SPC Outlooks: https://www.spc.noaa.gov/archive/
Iowa State Mesonet: https://mesonet.agron.iastate.edu/request/download.phtml
Mesowest: https://mesowest.utah.edu/

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