Polar Vortex and Long-Duration Events: Climate Change in the U.S. and Canada

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This project investigates regions of the U.S. and Canada affected by the Polar Vortex and impacts of “stuck” or persistent extreme weather patterns such as: longer rainstorms, longer heat waves, longer cold spells, and longer drought. First, I identified regions of the U.S. and Canada affected by the polar vortex and an increasingly meandering jet stream. Then, I investigated whether these regions have also experienced increased long-duration weather events in recent decades. NOAA public weather datasets are analyzed with Google BigQuery (SQL), least squares linear regression, and Tableau for data visualization. Regional climate changes in the U.S. and Canada are consistent with an increasingly meandering jet stream sending dry arctic air to the U.S. southwest (increasing drought), returning moist air from the Gulf to the northeast (increasing rain), with freezing temperatures dipping in the Upper Midwest and Canada (polar vortex). Extreme, rare longer-duration weather events are increasing much faster than more common shorter-duration storms. This is evidence of “stuck” weather patterns contributing to longer rainstorms in the northeast, and both heat waves and drought in the southwest. The polar vortex is not just affecting winters (more days below freezing), the polar vortex is affecting summers as well (fewer days above 90 degrees Fahrenheit).

Awards Won:

American Meteorological Society: Certificate of Honorable Mention