Big Data Analysis of Climate Change: Extreme Temperature, Rainfall, Snowfall

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Objective: The severity of global warming impact is often masked by ‘average’ numbers. This project measures the extremes of climate change, and identifies geographic areas where: - Temperatures have gotten Hotter or Colder - Rainfall has Increased or Decreased - Snowfall has Increased or Decreased - Ice coverage change has affected climate Methods: I used Google BigQuery (SQL), Tableau, and linear regression to analyze 2+ billion global records in NOAA’s Global Historical Climatology Network (GHCN) dataset and quantify regional climate trends over five decades. Results: I had two major discoveries: - Summers have gotten cooler in the Upper Midwest. This shows that the Polar Vortex affects more than just winters. - The Great Lakes region gets 30% more snow in February over the past 50 years due to decreased and delayed ice coverage from global warming allowing more "lake effect snow" in late winter months when the lakes typically freeze over. The severity of climate change becomes more apparent when we look at the regional extremes instead of only looking at averaged measurements: - Barrow, Alaska has warmed 5 times faster than the global average, while parts of the Upper Midwest have gotten cooler due to the Polar Vortex - New England and the Upper Midwest received 15% more rain, while the Southeast and West have gotten as little as 41% less rain - New England states received nearly 50% more snow, while states like Arizona received 46% less snow Conclusions: Different geographic regions show much more severe effects of climate change than global averages. Extreme climate change trends appear to have started over 50 years ago, much earlier than recent public awareness.

Awards Won:

American Meteorological Society: First Award of $1,500