

The Effects of Climate Change on the Polar Vortex

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Climate change seems like a distant concept to all of us. We doubt climate change existing as a real threat due to those of us not feeling its impact. Hurricanes in Texas, New Orleans, and Florida have cost these states many lives and homes. At a glance, it may seem like these states are prone to disasters, however events such as these are happening and affecting the world as a whole. Locally, Tacoma experienced a sudden turn of weather conditions earlier this year. Leading up to this sudden change, Tacoma experienced its temperature drop for more than a couple weeks. Sudden snow appeared in areas such as Tacoma, Texas, and Tennessee. The explanation for the appearance of snow in states that rarely experience it is a change in the Polar Vortex.

The Polar Vortex is a large area of cold and low pressure air currents that exist close to both the North pole and the South pole. The Polar Vortex grows weaker as summer approaches. As the temperature increases, wind direction changes and the polar vortex becomes deconstructed, eventually causing the tropospheric jet stream, a stream that allows cold air to remain near the polar cap, to weaken. If it is weakened by warming events, cold air would escape and travel into middle latitudes such as the United States, Europe, and some parts of Asia. The sudden presence of temperature drops and snow point to the jet stream weakening due to temperature increase. Many article sources back up this statement with evidence that these weather events and the polar vortex are correlated.

The National Oceanic and Atmospheric Administration created an academic article containing an interview with scientists such as Amy Butler from the NOAA Chemical Sciences Lab, Laura Ciasto from the NOAA Climate Prediction Center as well as Daniela Domeisen who researches surface impacts and SSW's, or Sudden Stratospheric Warmings. Sudden Stratospheric Warmings cause temperatures to increase which, in turn, can significantly alter the Stratospheric Polar Vortex. The Stratospheric polar vortex only appears in winter while the Tropospheric vortex occurs all year round. The NOAA interview states that as of January 2021, the Stratospheric polar vortex has been weakening for several weeks as of when their article was written. This means that temperatures are rising around the pole and wind speeds are slowing down. The decrease in high speed winds are due to a sudden Stratospheric warming event.

Sudden Stratospheric warming events range from pollutants rising into the air to cold air leaving the jet stream. By January 5th, the winds have begun moving in the opposite direction due to such a sudden Stratospheric warming event. These disruptions in the polar vortex are causing regions to have drastic changes in temperature. The Canadian Arctic, Subtropical Africa, and Asia may see warmer temperatures while colder weather might appear in much of Europe, Asia, and in the eastern United States. Sea surface temperatures or variation in wind determine where the vortex splits or displaces. As our climate changes, the effects become long lasting. Fossil fuels are burned, trees are cut down, chemical run off eliminating life in our oceans, and fiercer hurricanes becoming the norm. Without any major changes, the climate will continue to fluctuate and the polar vortex will continue to lose its stability. However, around the world, people are implementing changes to positively impact our future.

Solutions for the future begin in the homes of civilians. From the energy we consume to the food we purchase or grow. Carbon dioxide is accelerating the Earth's warming process. As more greenhouse gases are produced, the more get trapped in our atmosphere and have no way of completely escaping. Consumption can be deadly. Technology production, agriculture production, and home essentials all impact our Earth in both their break down processes and production stage. Buying organic is one of the best choices a consumer can make to avoid fertilizers and chemicals which contribute to agriculture runoff. Some may not be aware that there are natural ways to prevent pests and predators consuming crops without the use for chemicals.

Some businesses and civilians have realized their individual and group impacts and are creating solutions to heal the Earth. B-corps were created to regulate impacts on the community, the planet, suppliers, and workers. Organizations were created with this goal in mind such as Sunrise and 350 Tacoma. These organizations take to the streets to demand for congress to pass acts and legislation to protect both the community and the environment. They are made up of members of the community that are concerned and scared for the future, wanting to make a positive change for a hopeful future. There are other ways to heal the environment which break down to individual impact.

Consumer choice is a powerful tool. Companies make choices based on their customer satisfaction rate. Without revenue, no action can be taken. For products that are consumed, their packaging may be taken as a second thought or seen as the cheaper, the better it is. The ocean doesn't see it that way. Currently, there are 5.25 trillion pieces of plastic in the ocean most of which lay in the depths of the ocean. Plastics heat up our Earth by releasing methane and ethylene throughout the breakdown process. Methane stays in our atmosphere longer than Carbon Dioxide however, is less abundant than Carbon Dioxide. The fate of our planet lays on every single individual on our planet.

Our world's fate resting on our shoulders seems like a lot to take in but not every person is perfect. We are all in this together to heal our planet. No one person has to take up the entire responsibility nor just organizations working towards that goal. We can individually make a great impact in our daily decision making, in our habits, and with our speech. It may seem scary to reach out to a state representative and that is absolutely correct. However, every individual deserves to live a clean and healthy life. No one should have the right to take that from you.