

Accelerating climate change brings more extreme weather

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This winter we have been experiencing alternate periods of freezing and thawing. I thought my gardening was over for the year when the ground froze hard by Christmas, until heavy snow fell and insulated the ground. Air temperatures fell below minus 10 degrees at night, but under the snow my garden soil thawed again.

Then when temperatures rose to 50 degrees, the snow melted. On Jan. 15, I was able to dig under more of my rye cover crop and prepare a bed for planting peas in a couple of months. Four out of the last seven winters, I have had the delight of digging the soil on warm days in January.

Winters are very variable. But on average, mean winter temperatures are warming twice as fast as in summer. The winter minimum temperatures are rising much faster than mean winter temperatures. This matters a lot because as the coldest nights get warmer, more pests can survive the winter. On the other hand, peaches can now be grown in parts of Vermont.

Paradoxically, warmer temperatures can mean more snow because warmer air can hold more vapor before it condenses. For this to happen, surface water must be available for evaporation. The Great Lakes, for example, are freezing much later than they used to. When cold air blows across ice, very little evaporates. But when cold air blows across open water, it picks up a lot of moisture — and this increases the lake effect snowfall downwind. This extra snow may actually help the forests of northwestern New York as the climate warms, because it supplies them with water from Lake Erie and Lake Ontario for winter and spring melt.

The intensification of coastal storms that we are seeing is also related, as ocean temperatures are warming. In the case of Hurricane Sandy in late October, we had heavy rain on the coast and heavy snow in the Appalachian Mountains.

Another example is the big winter storm, nicknamed Nemo, that dumped several feet of snow on southern and eastern New England a couple of weeks ago. Nemo formed when a frontal system coming from the west merged with a storm coming from the Gulf of Mexico that carried a lot of moisture. A powerful coastal storm — a nor'easter — developed and moved up the coast with strong winds and heavy precipitation that fell as snow over land.

Warmer temperatures over the Gulf Stream again caused more evaporation. A lot of energy is required to evaporate water. Over the ocean this energy comes from the sea, which has stored the sun's energy from the summer before. When the rising water vapor condenses again in clouds, this stored energy is released to the atmosphere. The result is intensified winter storms, with stronger winds and more snow.

We are less than a month from the spring equinox, and the days are getting noticeably longer. I still have plenty of garlic and butternut squash from last year that are delicious when baked. My spinach under glass is doing well — and to my surprise, a little unprotected kale is still surviving. Soon it will be time to plant my peas and prepare for another spring.

Climate change is accelerating, and we must prepare for greater extremes. This year I am thinking about how we can build more resilience into our communities.

What will you do differently this year to help the Earth and mitigate some of the damage from past decades? We need the Earth's help. That means working with her, rather than simply following our self-interests.