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Snow's global action

It has been quite a snowy winter. But in March, the sun is rapidly getting higher in the sky, and the days are growing longer. In just three weeks it will be the spring equinox, when the sun is over the equator at noon, and both our days and nights are just 12 hours long. But let's think about the winter snow one more time before we forget. Snow and ice on our roads create a nuisance for us, but they matter a lot to the earth. Snow insulates the earth, stores water and reflects the sun.

On cold winter days, when the temperature is far below freezing, the crystals of snow are light and powdery – even a foot of snow may contain only one inch of water, and the rest is just air. You can easily check this by filling a large saucepan with snow and melting it on the stove. This blanket of air-filled snow insulates the ground and protects mice and moles from the bitter cold. But after a few days and particularly if the temperature rises closer to freezing, the snow settles and becomes much denser. With melting and refreezing it can turn to ice, which has a density that is 90 percent that of water (this is why ice floats on water).

The snowpack in the forest or on the hills stores a lot of water from winter to spring. Here in Vermont when spring melt comes, the ground becomes saturated with water. The excess runs off into the rivers, which are prone to flooding. We have to wait several weeks till a lot of the water drains out of the soil before we can dig over our gardens in spring.

For us in Vermont, spring flooding is mostly an annoyance, but in the mountains in the western United States and in South Asia, the snowpack can store a foot or more of water – equivalent to several months of rain. The spring melt provides critical irrigation water in spring and early summer. As our climate warms, this snowpack is shrinking. Snowmelt is coming earlier. Many areas will run short of fresh water.

The polar ice sheets of the earth also are storing water. In Antarctica, some of the ice was evaporated from the oceans and fell as snow (which turned to ice) hundreds of thousands of years ago. This ice sheet is 10,000 feet thick in places and a million years old at its base.

At the North Pole, the floating sea ice, which reflects the sun's energy back into space, used to last all summer. This reflection is one of the ways the earth as a whole keeps cool. But now the northern ice cap is melting a lot in summer, and so the warming of the north is accelerating.

The brilliant reflection of the low sun by snow is very familiar to us. We have to protect our eyes when driving or skiing. Because the sun's energy mostly is reflected, little goes into melting snow. The snow lingers, so that it stays cold until the sun gets high in the sky, or until warm winds from the south melt our snowdrifts.

This is a critical year for us and for the earth. The United States, as it wakes from a decade of sleep, needs to pass climate change legislation this year, so that we are prepared for the December global climate conference in Copenhagen.

If the world community can agree to major reductions in greenhouse gas emissions, the earth will rejoice next winter and our children's future will gleam much brighter.

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On the Net

United Nations Climate Change Conference December 7-18, 2009 <http://en.cop15.dk/>
