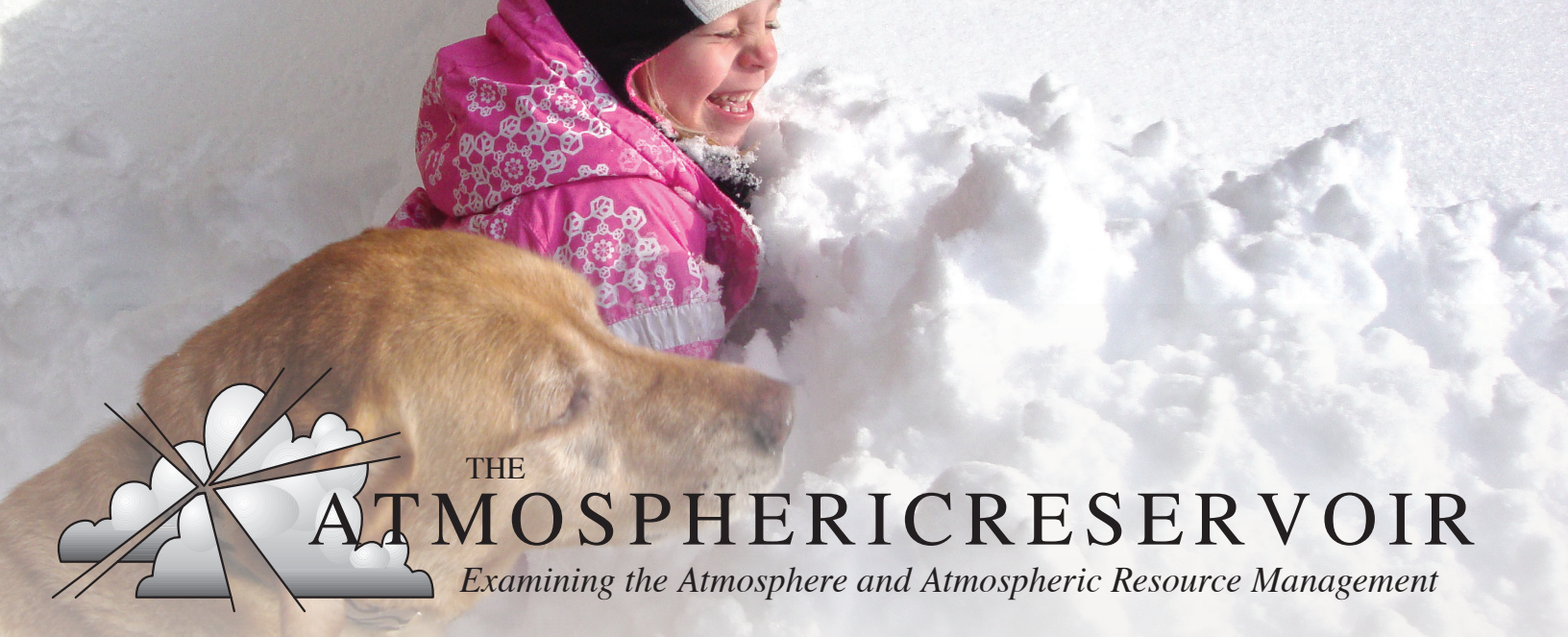

THE
ATMOSPHERICRESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

"Five Things You (Probably) Didn't Know About Snow"

By Mark D. Schneider

You're familiar with the old adage that *no two snowflakes* are exactly alike. Here are five things you probably didn't know about snow:

1. **It can snow when the air temperature is 40-50 degrees Fahrenheit.** The technicality here is that this snow developed in freezing air above the ground and then fell into warmer air close to the surface before melting. As a snowflake begins to melt in the warmer air below, evaporative cooling occurs and this actually slows the rate of melting, thus helping it reach the ground. At higher altitudes (especially in mountainous areas) "warm snows" are more common because of conditions such as low moisture content in the air and convective snowfalls that create large snowflakes and are sometimes associated with thunder snow.

2. **Snow doesn't have to melt; it can sublimate instead.** Sublimation occurs when low relative humidity allows snow to transition directly into water vapor at temperatures colder than zero degrees Celsius without melting first. The snow is evaporating into the air around it. This explains why North Dakota can lose a portion of its snowpack during the winter months when the temperature remains below freezing for long periods of time.

3. **Snow is a good insulator.** Because of snow's lattice structure, approximately 90% of its composition is air. This air becomes trapped in between ice crystals and slows the rate of heat transfer. With less exchange of heat between the ground and the air, snow acts like a blanket insulating the ground below. This is why farmers with winter wheat crops are hopeful for snow cover, as it can literally mean the difference between having a crop and not having one.

4. **The explanation for all snowflakes being six-sided.** According to the Learner.org website,

   "The oxygen atom has a particularly strong attraction to the electron clouds of the two hydrogen atoms and pulls them closer. This leaves the two hydrogen ends more positively charged, and the center of the "V" more negatively charged. When other water molecules "brush up" against this growing snowflake, strong forces between the negatively charged and positively charged parts of different particles cause them to join together in a very specific three-dimensional pattern with a six-sided symmetry. Each water molecule that joins the snowflake reflects this pattern until eventually we can see its macroscopic six-sided shape."

5. **Snow isn't really white.** Our eyes see snow as white because it reflects almost all visible light away, leaving uniformly absorbed wavelengths of visible light which appear white. In actuality, snow is clear and without color.

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