National Weather Service
Aberdeen, South Dakota

October 2014

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Winter Weather Preparedness

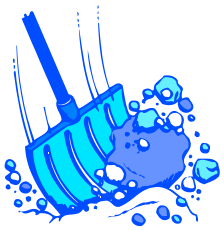
October 22, 2014 – Winter Weather Preparedness Day in South Dakota

November 10-14, 2014 – Winter Weather Preparedness Week in Minnesota

Winter in the northern plains can be described in many ways, but unpredictable typically isn't one of them. At some point, we know it will snow and temperatures will fall below zero. Roads will be difficult to travel, and high winds will produce dangerous to deadly wind chills.

Are your ready for it? Do you know how to stay warm, safe and happy all winter?

The South Dakota department of Emergency Management, as well as the Minnesota Department of Public Safety, has partnered with the National Weather Service offices in each state, to take a day or a week to highlight the dangers of winter. It is used to help refocus one's thoughts from the dangers of severe summer weather, to the dangers associated with hazardous winter weather.

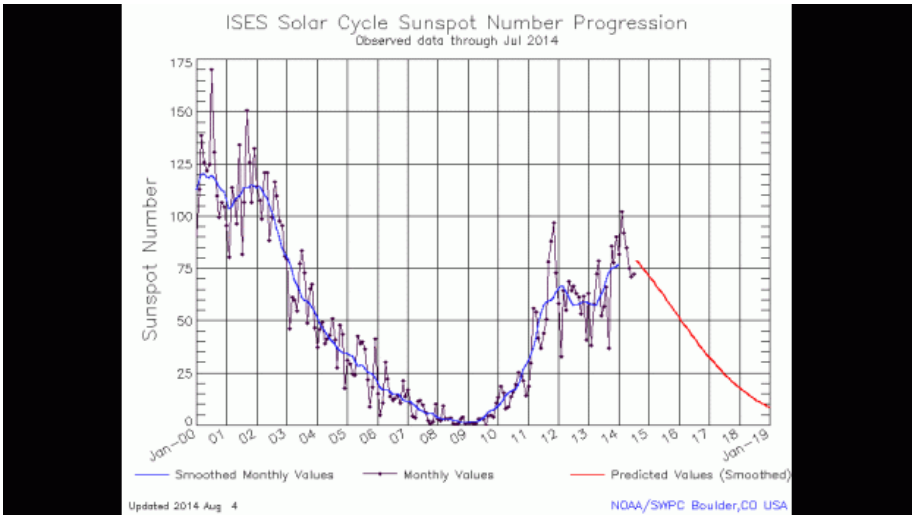


Observing Aurora

This winter may be our best in some time to view aurora. Why? There are several key ingredients that need to come together to see aurora in the Dakotas. (1) We need an active sun – In fact the solar cycle is currently peaking. (2) We need clear skies – winter is the best time to view thanks to our long, clear and cold nights. (3) There are numerous new tools for tracking aurora events.

Background - The Sunspot Cycle & Solar Flares

The earliest surviving record of sunspot observations dates back to 364BC by Chinese astronomer Gan De. Over the centuries of observations, it was realized the average number of sunspots waxes and wanes with an approximate 11 year cycle. Currently, we are on the closing end of the latest peak, which means sunspot activity is expected to continue to drop over the next several years. This particular peak is below average, and much below the active conditions of the previous peak.



So what is a sunspot and how does it relate to aurora? A sunspot is a cooler region of the Suns surface caused by anomalies in the magnetic field. Sunspots last for several days and migrate across the surface of the sun. Plasma trapped within the magnetic fields is released when the field become stretched and contorted, and end up breaking and reconnecting. This accelerates and ejects particles into space as a solar flare. If headed in our direction, it typically takes a day or two after a solar flare for particles to reach Earth. The particles become trapped within Earth's magnetic field and are deflected towards the poles. When these particles impact the atmosphere, they impart energy which is released as the familiar colors that make up aurora.

Flares are classified by the energy released: A B C M X; and the stronger the storm, the greater the impact on the Earth's magnetic field. The strongest flare ever observed was also the first ever observed and visible to the naked eye – called "The Carrington Event" of 1859. This storm produced aurora as far south as Cuba and Hawaii, and the current induced on telegraph lines allowed some stations to communicate without electricity, while it caused others to catch fire! Typically, flares need to reach X strength to be strong enough to produce aurora that we can observe this far south.

Observing Aurora (cont.)

Colors

Red: At the highest altitudes, excited oxygen atoms emit red. The low concentration of atoms and lower sensitivity of eyes at this wavelength make this color visible only under some circumstances with more intense solar activity.

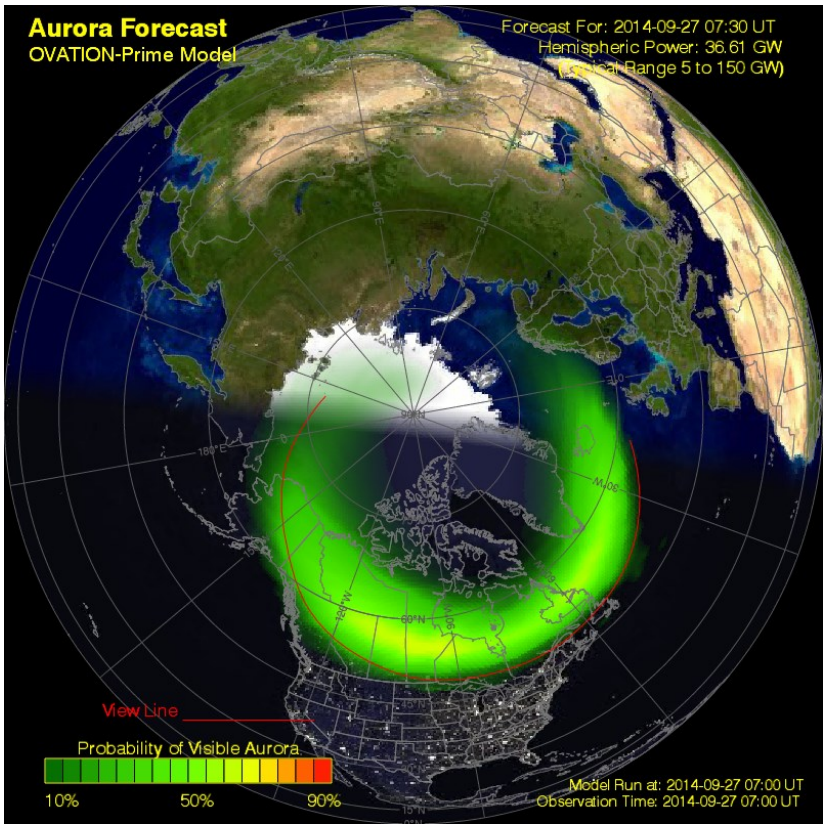
Green: At lower altitudes, the higher concentration of oxygen and greater eye sensitivity in green make green auroras the most common.

Yellow and Pink: These are the result of mixing red with green or blue.

Blue: At yet lower altitudes, excited nitrogen atoms take over. It radiates in both red and blue parts of the spectrum.

Viewing

First, we need to determine if the Sun has been active. Space Weather Prediction Center forecast page: **http://www.swpc.noaa.gov/forecast.html** gives the strength of solar flares. Remember, strong flares of category X are typically required to force aurora far enough south for viewing. The Ovation-prime Model at: **http://origin-www.swpc.noaa.gov/** was developed at Johns Hopkins Applied Physics Lab, and provides estimates on aurora activity levels out to 30 minutes.



Holm Award Winner—Larry Blaseg

Larry Blaseg of Miller, South Dakota is presented with the 2014 John Campanius Holm Award during a ceremony held at the National Weather Service office in Aberdeen, SD. Pictured with Mr. Blaseg are representatives from the South Dakota congressional delegation. Pictured from left are; Judy Vrchota from Senator Thune's office, LaDonna Rodvold from Congresswoman Noem's office, Mr. Larry Blaseg, and Kati Bachmayer from Senator Johnson's office. Larry has been observing for over 25 years.

Congratulations

Winter Weather Products

Winter storms can range from a moderate snow over a few hours to a blizzard with blinding, wind-driven snow that lasts for several days. Some winter storms are large enough to affect several states, while others affect only a single community. Many winter storms are accompanied by dangerously low temperatures and sometimes by strong winds, icing, sleet and freezing rain.

Regardless of the severity of a winter storm, you should be prepared in order to remain safe during these events.

Winter Storm Outlook – Information that is sent out stating that a hazardous winter weather event may develop. This allows people to make preparations well in advance. An outlook is generally issued 3+ days in advance.

Winter Storm/Blizzard Watch – Issued when the risk of a hazardous winter weather event has increased, but the exact location and/or timing is still in question. Typically issued 12 to 48 hours in advance of the winter weather event. The likelihood of the event occurring is 50% or higher. People in a watch area should review their winter storm plans and stay informed about weather conditions.

Winter Weather Advisory – An advisory is issued when a hazardous winter weather event is already occurring or imminent. Generally speaking, advisory conditions are expected to cause significant inconveniences, and could become life-threatening is caution is not exercised. The likelihood of the event occurring has increased to 80% or higher.

Winter Storm/Blizzard Warning – Lives and property will be threatened by the weather event. Hazardous weather is occurring or will be within the next 24 to 36 hour. People in a warning area should take precautions immediately. The likelihood of the event occurring has increased to 80% or higher.

Winter Survival Kit

With the arrival of fall, it is time to begin winter weather preparations. One of the most important tasks is to put together a winter survival kit for your vehicle. What follows is a list of items to consider putting into your kit. Don't feel like the items on this list are the only things that should go into your survival kit. This is only a sample. Perhaps your personal experience or situation dictates that other items need to be added. What is important is that you have a kit in your vehicle.

Survival Kit sampler:

-blankets/sleeping bags/old coats...etc.
-high-calorie, non-perishable food...such as nuts, granola bars and trail mixes
-flashlight with extra batteries
-first aid kit
-knife
-extra clothing to keep dry
-a large empty can and plastic cover with tissues and paper towels for sanitary purposes
-a smaller can and water-proof matches to melt snow for drinking water;
-an empty coffee can and candles
-a sack of sand (or cat litter)
-shovel
-windshield scraper and brush
-tool kit
-tow rope
-booster cables
-water container
-compass
-road maps

Also remember if you become stranded in your vehicle during a winter storm, **NEVER** leave the safety of the vehicle. Your odds of survival greatly increase if you remain with the vehicle. Additionally, you can run your vehicle safely for 10 minutes each hour **IF** you can ensure that the tailpipe is free and not plugged up with snow and you roll down your window 1 inch for ventilation. Also travel with a fully charged cell phone, with a backup battery if possible.



Time to Prepare for Winter

The beauty and transition of the fall season is in full swing across the upper Midwest. Thoughts turn toward the cool, crisp evenings, the upcoming or ongoing hunting seasons, and enjoying the beauty of the leaves turning various shades of red, orange, yellow and brown. This is also the time to take a moment and begin preparing for the upcoming winter. The heat, humidity and thunderstorms of summer are a memory. Living in the Dakotas, we know that snowstorms, frigid temperatures and bitterly cold wind chills are just around the corner. Taking the time now to prepare for the winter months will be easier and less stressful than trying to deal with any potential problems during the middle of winter.

In the Home:

-Check the windows and doors for drafts. Also check the insulation of the house in the attic. Were there any leaks during the summer rains? Insulation that gets wet doesn't insulate that well.
-Make sure that the heating system in the home is running at optimal performance. Are the furnace filters clean? If a wood burning stove or fireplace is in the home, has the chimney been cleaned?
-Is the carbon monoxide detector properly placed and operating correctly?
-Are rain gutters cleaned out to prevent the formation of ice building up?
-In the outside chance that you become stranded in your home during a winter storm, are there enough provisions on hand to make it through? Non-perishable food items, dry wood for burning if you have a fireplace or wood stove, and drinking water are a must to have on hand.
-Don't forget that on Sunday, November 2nd, we "fall back" time wise. That is also a great time to replace the batteries in any smoke detectors, carbon monoxide detectors and NOAA weather radios.

In the Vehicle:

-Has your vehicle been starting slower now that cool weather is here? A battery can lose up to ½ of its starting power during the dead of winter.
-Does the anti-freeze test down to at least 30 below zero? This would also be a good time to check the entire heating system of the car. Do any belts look worn or have cracks in them? Are hoses soft and squishy? Now is the time to repair or replace them.
-Do the tires have ample tread left? If the tires are getting rather thin in the tread department, it might be time to have the tires replaced.
-Is the winter survival kit in the vehicle? Elsewhere in this issue is a sample list of what a winter survival kit should contain.
-Don't let the vehicle fall below a half tank of fuel. This helps to keep condensation from forming in the tank, and helps to keep the fuel line from freezing up. If you have a diesel powered vehicle, is the fuel blended properly to keep from gelling up?

This is just a small sampling. The following website offers additional items, ideas and suggestions to make it safely through the winter season:

http://www.redcross.org/www-files/Documents/pdf/Preparedness/WinterStorms.pdf

Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

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Autumn carries more gold in its pocket than all the other seasons.

~ Jim Bishop