National Weather Service

Volume 4, Issue 2 March 17, 2014

ZSE Weather Watch

A newsletter from the Seattle ARTCC Center Weather Service Unit

Weather Warnings on the Go *by NOAA Public Affairs*

IN THIS ISSUE

Weather Warnings on the Go	1
NEXRAD Coastal Radar Anomaly	2
Unusual 2013-14 Winter Weather Pattern across the U.S.	3
Polar Vortex: What is it?	6

Imagine this: You're driving down the highway, humming along to your favorite tunes, when the cell phone stowed in your bag suddenly makes a strange noise. To investigate, you take the next exit and safely pull over to check the screen. Good thing you did: Your phone just alerted you to a tornado a few miles away in the same county you're driving through.

Sound plausible? It is. America's wireless industry has rolled out a new nationwide text emergency alert system, called **Wireless Emergency Alerts**, which will warn you when weather threatens (**Figure 1**) .

The text alert service is free and automatic – there's no need to sign up or download an app. As long as your cell phone is WEA-capable, you'll get wireless alerts for the most dangerous types of weather from the National Weather Service, no matter where you are, just as soon as the new service is available in your area.

NOAA's NWS will broadcast warnings for weather emergencies that are most dangerous to life and property: tornadoes, flash floods, hurricanes, extreme wind, blizzards, ice storms, tsunamis, and dust storms.

How weather text alerts work

If you're at home or traveling with your cell phone through an area where a weather warning has been issued, your phone will pick up alerts broadcast by nearby cell towers. Those towers will broadcast the message much like an AM/FM radio station, and cell phones within range will immediately pick up the signal — provided they are WEA-capable. When your phone receives a message, it will alert you with a unique ring tone and vibration.

The message will look like a text message, but it's not the traditional text message most people are used to. This text message will automatically pop up on your cell phone's screen; you won't have to open it up to read it.

And there's more good news: Regardless of where you are, this service will send alerts appropriate to your real-time geographic location. For example, if a person with a WEA-capable phone from New

***Figure 1** – Example Wireless Emergency Alert message on an iPhone 5.*

Jersey happens to be in Southern California during and after an earthquake, they will receive an "***Imminent Threat Alert***" on their device.

The new weather messages are part of a broader **Wireless Emergency Alerts** initiative – a partnership among the wireless industry, the Federal Communications Commission (**FCC**) and the Federal Emergency Management Agency, or **FEMA**. NOAA's National Weather Service is one of many agencies **authorized to send emergency alerts** to cell phones through this new system.

Wireless Emergency Alerts improve the way governmental agencies communicate with the public regarding hazards that pose a significant threat to life and property; they help people plan for and stay safe when they're at risk in dangerous situations — even in their own homes. You might also receive emergency alert messages such as **Amber alerts**, local hazards (**Figure 2**) (e.g., chemical spills), and even national emergencies.

All major wireless carriers and hundreds of smaller carriers take part in WEA on a voluntary basis. To find out if you phone is WEA-capable or if you have other questions related to the receipt of WEA on your cell phone, please contact your wireless carrier or check the link:

http://ctia.org/wea

For information about WEA as it relates to the NWS, check the link:

http://weather.gov/wirelessalerts

WIRELESS EMERGENCY ALERTS CAPABLE

Look for for cell phones bearing this logo.

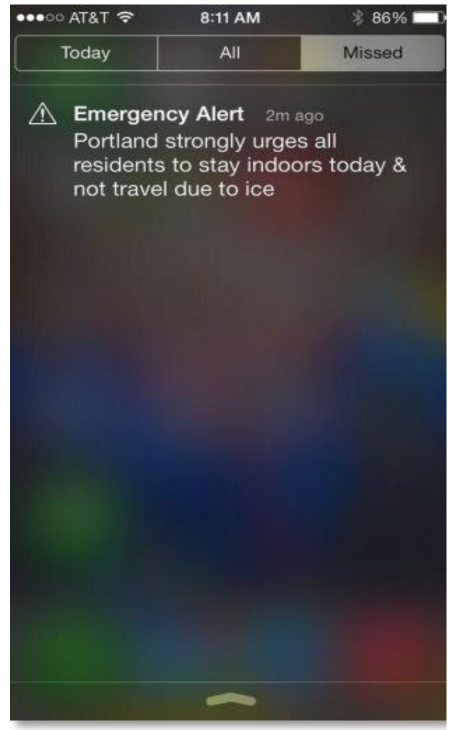

***Figure 2** – Example WEA message for hazardous road conditions in the Portland area due to ice.*

NEXRAD Coastal Radar Anomaly *by John Werth*

Ever wonder what the persistent echo is just offshore from Hoquiam, Washington, seen on many images from the Langley Hill coastal radar? It often shows up - even when skies are clear and there isn't any weather in the surrounding area. The return typically has the shape of a half circle and shows precipitation intensities in the light to moderate range (green and yellow areas in **Figure 4**.) Air traffic controllers at the FAA's Seattle Air Route Traffic Control Center routinely alert pilots to the apparent weather just offshore and will continue to do so until they receive confirmation from pilots there isn't any precipitation in the area.

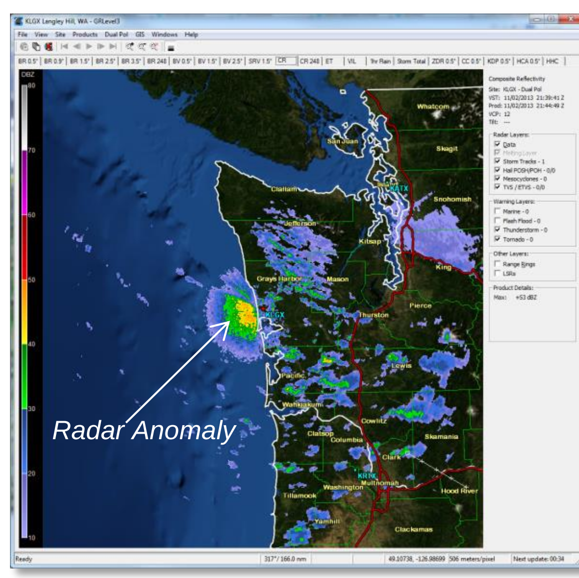

***Figure 4** – Sample composite radar reflectivity image from the Langley Hill radar 2 Nov 2013.*

The echo pattern is seen in the lower elevation scans from 0.2 degrees to 1.5 degrees (**Figure 5**), and is often visible in composite reflectivity images. To create composite reflectivity images, NEXRAD software takes the strongest returned energy for each elevation angle in a volume scan and compiles it into one image, called composite reflectivity (**Figure 6**). FAA controllers view NEXRAD 0-60kft composite reflectivity images - created by the FAA's Weather and Radar Processor (**WARP**) - on their Display System Replacement (**DSR**) workstations.

The Langley Hill radar is the only National Weather Service NEXRAD radar in the country allowed to interrogate weather

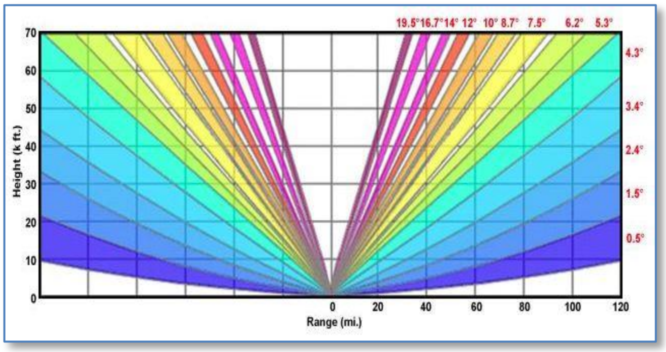

Figure 5 *– NEXRAD beam heights with distance for various antenna elevation angles in precipitation mode.*

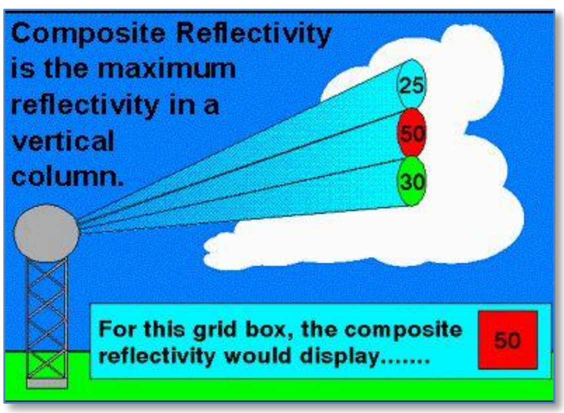

Figure 6 *– Diagram showing how composite reflectivity images are created by NEXRAD.*

using a 0.2 degree elevation scan. This allows the radar to interrogate weather near the earth's surface in much greater detail and distances. At distances less than 20-25 miles from the radar, the lower portion of the radar beam at the lower elevation scans, hits the earth's surface, reflecting energy back to the radar. In this case, the persistent echoes offshore are known as sea clutter or ocean clutter. What the radar sees is ocean waves striking the Washington coast. The larger the ocean waves, the more energy returned to the radar, which the radar interprets as an area of moderate or even heavy precipitation.

At the lower elevation scans, the radar also detects ground clutter (terrain features) over inland areas. So why don't we see similar returns over inland areas like we see just offshore? You normally would; however, the radar has ground clutter suppression software that subtracts out returns from known ground clutter. Terrain features don't move, so the radar is programmed to ignore returns from the ground clutter. Not so easy with ocean clutter though, since it's composed of ocean waves of varying height.

Unusual 2013-14 Winter Weather Pattern across the U.S. *by James Vasilj*

A persistent ridge was located in the northeastern Pacific Ocean from late 2013 into early 2014 (**Figure 7**). This resulted in overall warmer than average temperatures (**Figure 8**) and drier than average conditions (**Figure 9**) west of the Rocky Mountains. There was concern about the meager snow pack in the Cascades and Sierra Nevada Mountains, which provides drinking and irrigation water for many areas in the western U.S. It also disappointed many skiers who weren't able to get onto the slopes and led to wildfires in California in January, which is supposed to be a time of relatively wet weather for the state. Much of California and northwestern Nevada were in extreme drought conditions at the end of

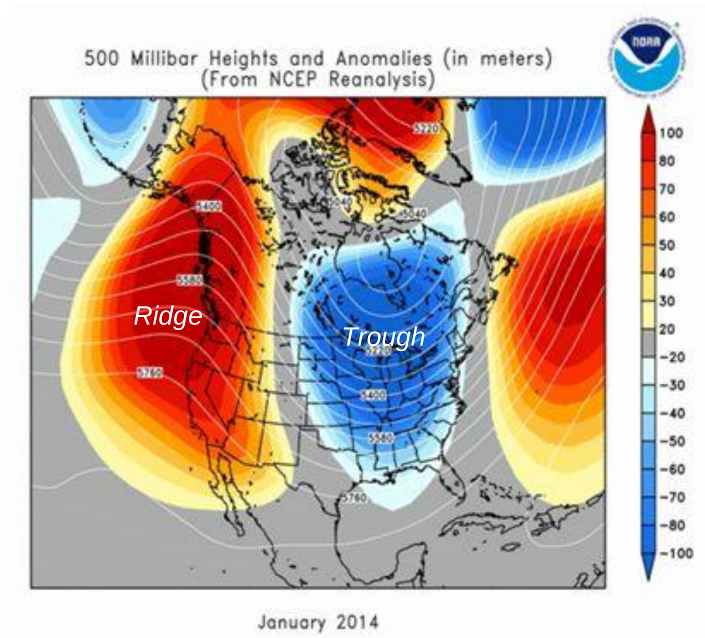

Figure 7: *Anomalies near FL180 with higher in red and lower in blue.*
http://www.ncdc.noaa.gov/sotc/synoptic/2014/1

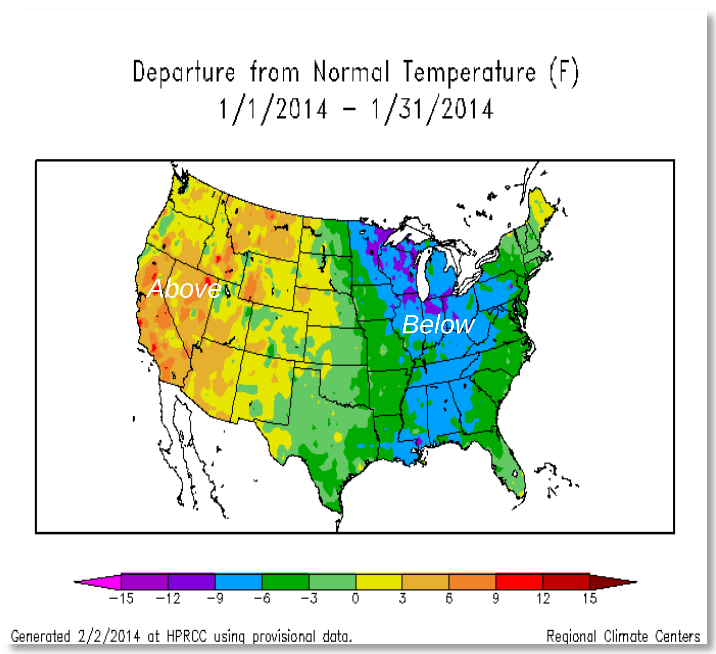

Figure 8: *January temperature departure from normal, above normal in yellow/red and below normal in green/blue.*
http://www.ncdc.noaa.gov/temp-and-precip/maps.php

January (**Figure 10**).

The pattern of a strong ridge over the NE Pacific resulted in a deep trough over eastern North America, which led to a very active period of winter weather over the eastern part of the country. Strong cold fronts, coupled with moisture from the Gulf of Mexico, brought a series of snowstorms to the eastern US. For the month of January, Chicago received 33.7” of snow (average 10.8”), Minneapolis 22.7” (average 12.2”), and New York City 19.7” (average 7.0”). And for those same locations, the temperature departures from the historical average were Chicago -8.1°F, Minneapolis -7.4°F, and New York City -4.0°F. Southern cities also had significant temperature departures including Nashville -5.3°F, New Orleans -6.4°F, and Atlanta -6.3°F. By contrast, west coast cities had warmer than average temperatures, including Seattle +2.3°F, San Francisco +4.8°F, Los Angeles +4.6°F, and Anchorage +13.1°F. That warm spell in Alaska actually brought Anchorage’s daily average temperature in January to an incredible 30.2°F!

Relief for the Pacific Northwest came in February when a series of fast moving frontal systems brought significant rain to western Washington and Oregon lowlands and heavy snow to the Cascades. The snowpack recovered to near average conditions in most Washington areas by early March, but still lagged behind in Oregon. In late February and early March, a vigorous weather system moved through California, bringing much needed rain. However, the region still remains in extreme to exceptional drought.

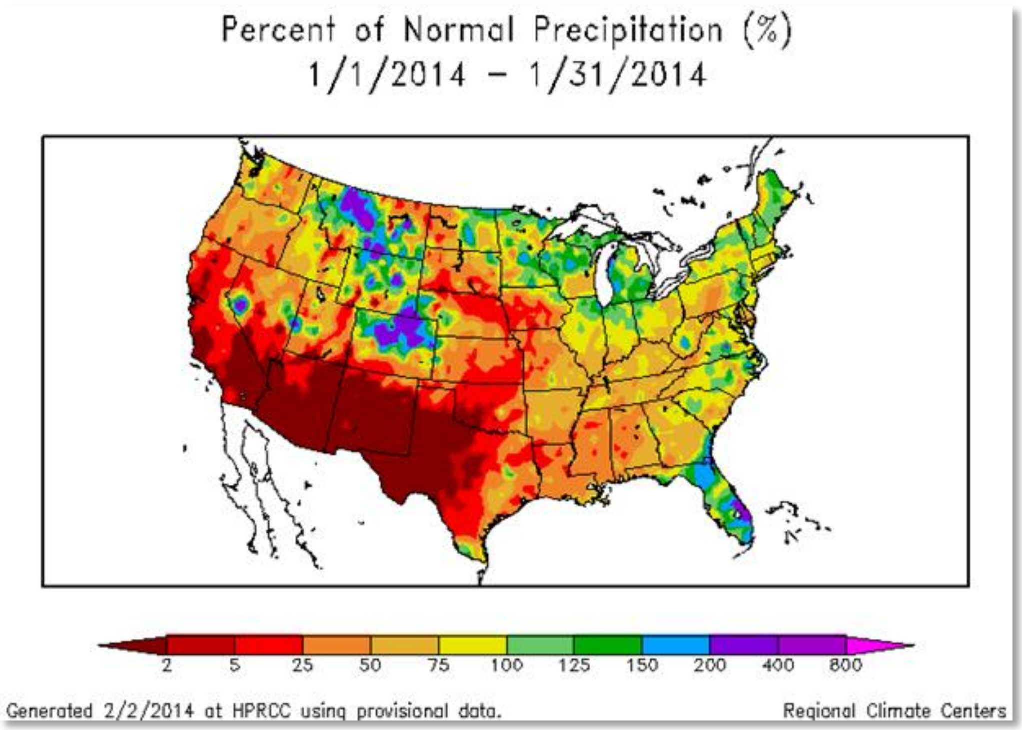

Figure 9: *January precipitation departure from normal, below normal in yellow/red, above normal in green/blue.* [*http://www.ncdc.noaa.gov/temp-and-precip/maps.php*](http://www.ncdc.noaa.gov/temp-and-precip/maps.php)

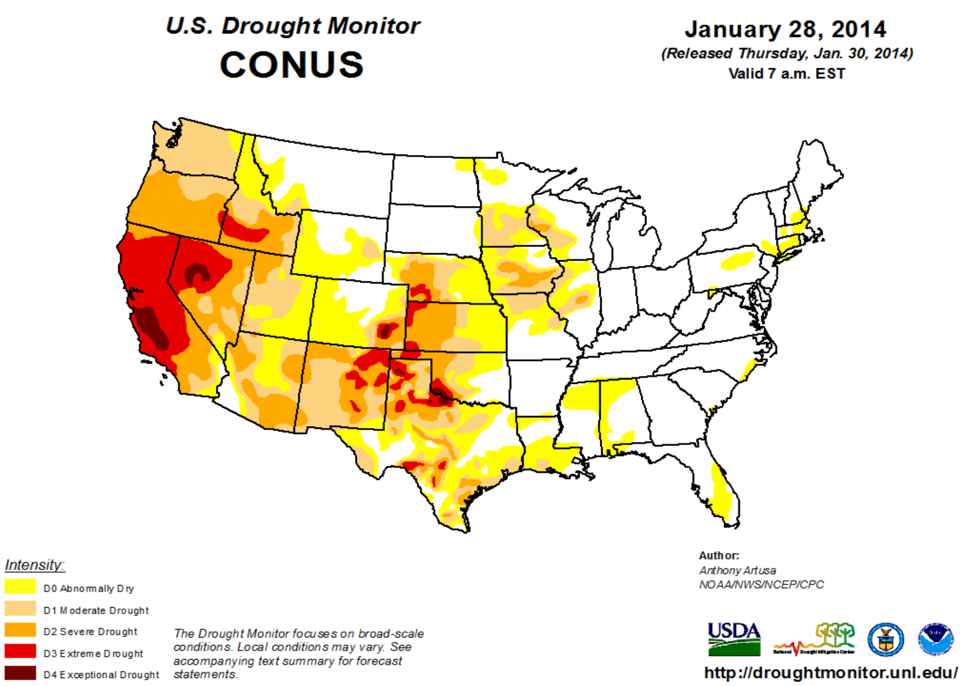

Figure 10: *Drought monitor analysis with extreme/exceptional drought in red/maroon.*
[*http://droughtmonitor.unl.edu/*](http://droughtmonitor.unl.edu/)

Polar Vortex: What is it? *By Steve Adams*

SEATTLE CWSU
FAA ARTCC
3101 Auburn Way S.
Auburn, WA 98095

Phone: 253-351-3741
Fax: 253-351-3412

Web Page:
www.wrh.noaa.gov/zse

"Protecting Life and Property"

With numerous cold outbreaks over the U.S. this winter season, the media latched onto what many think is a new phenomenon called the **Polar Vortex**. However, the Polar Vortex is not a new phenomenon. The Polar Vortex was first described as early as 1853 and measurements have observed its existence since 1952. The official definition of a Polar Vortex (or Circumpolar Vortex) from the Glossary of Meteorology, produced by the American Meteorological Society, is:

The planetary-scale cyclonic circulation, centered generally in the Polar Regions, extending from the middle troposphere to the stratosphere.

These cold-core, low pressure areas strengthen in the winter and weaken in the summer due to the greater temperature differential between the equator and the poles in the winter. The vortex over the Northern Hemisphere often has two centers, one near Baffin Island (north of Hudson Bay) and the other over northeast Siberia (**Figure 11**). When the Polar Vortex is strong, westerly wind flow strengthens across the Northern Hemisphere. This keeps the significant arctic air-mass from penetrating south into mid-latitude regions. When the Polar Vortex weakens, the flow pattern across the mid-latitudes also weakens, resulting in buckling of jet stream winds, allowing arctic air-masses and thus significant cold outbreaks, to shift further south into the more-populated, mid-latitude regions (**Figure 12**).

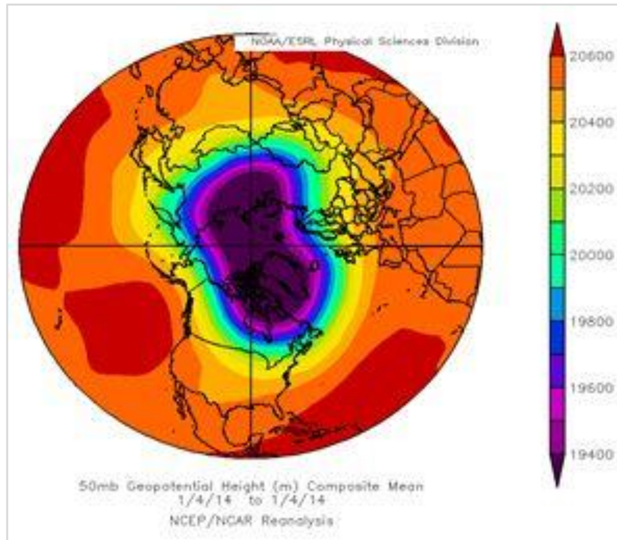

Figure 11*: Image of the Polar Vortex on a 50mb (~65,000 feet msl) Geopotential Height Map*

Weakening of the polar vortex during winter months is caused when stratosphere temperatures show significant warming over a short time frame. This is referred to as **sudden stratospheric warming.** Some scientists have theorized that man-made climate change has influenced stratospheric warming and hence the Polar Vortex. However, there is no substantial evidence of this being the case. In fact, many top scientists agree these events are nothing more than natural fluctuations in the climate.

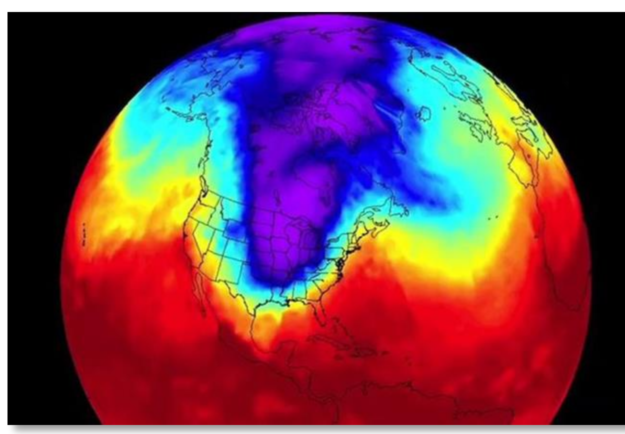

Figure 12*: Arctic air (dark blue/purple) pushing south into the U.S.*