The Inland Northwest Informer
Information For Storm Spotters, Cooperative Observers And Everyone
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Pendleton Upgrades Doppler Radar

By Mary Johnson, Meteorologist

The National Weather Service in Pendleton was one of the first offices in the nation to upgrade their Doppler Radar (WSR-88D) to Dual Polarization (Dual-Pol). The installation for Dual-Pol will occur at all NWS offices through the summer of 2013. The Dual-Pol installation in Pendleton began September 24, and the WSR-88D was down for a little over a week. Now that the radar is up and running, staff members are beginning to see the results of this major upgrade.

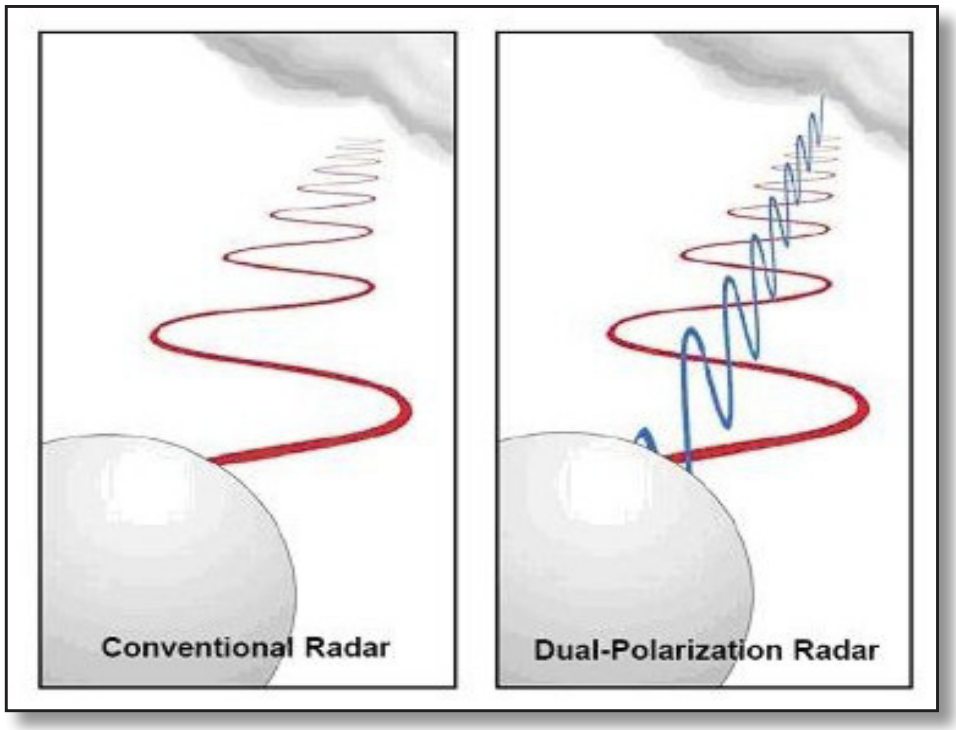

Figure 1. Graphical comparison between single/horizontal polarization radar transmission and dual polarization technology.

What exactly is Dual-Pol? Dual-Pol is short for dual polarization. Most weather radars transmit and receive radio waves with a single, horizontal polarization. Dual-Polarization radars, on the other hand, transmit and receive both horizontal and vertical polarizations. *See figure 1.*

Prior to the installation to Dual-Pol, WSR-88D would measure reflected power from the radar's horizontal pulses. Now, WSR-88D will measure reflected power from the radar's horizontal and vertical pulses. By comparing these reflected power returns in different ways, we are able to obtain information on the size, shape, and ice density of cloud and precipitation particles. WSR-88D has always been a great tool to examine storm structure and estimation of precipitation accumulation, but the new upgrade will help forecasters and technicians to estimate snow and rain rates as well as precipitation types better than the conventional radar.

What does a "Dual-Pol" product look like? There are several Dual-Pol products available, and NWS staff members are presently undergoing a training program to learn how to interpret these products and learn what strengths and limitations each of these products have. Forecasters and technicians have two days of training and one day of weather simulation exercises. There is a learning curve with Dual-Pol, and it will take some time to become comfortable with using these complex products.

Here is an example of a four-panel radar product from NWS Portland. This was taken just a couple of weeks after their installation.

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In This Issue

May 2011 Flooding

By Marilyn Lohmann, Service Hydrologist

Setting the stage for flooding: The snowpack across the mountains surrounding John Day was at 200 percent of normal with several days of mild temperatures, May 10th through the 14th. This allowed the snowpack to ripen or reach the favorable temperatures where large amounts of snowmelt can take place.

On May 14th, thunderstorms moved through the region, followed by 12 to 18 hours of heavy rain that stretched from Grant and Union Counties in Oregon northwest into the East Slopes of the Washington Cascades.

Automated Snotel sites averaged 2-3 inches of rain May 14-15, but more important was the rapid melting of snowpack, with around 5 inches of water released from the snowpack May 14-16.

Sunday morning, May 15th, water from Canyon Creek flooded the Grant County District 3 bus barn, Grant Union High School and Three Flags Field. There was significant damage to the boiler room and old gymnasium at Grant Union High School and to Three Flags Field. There was also water damage to the Grant County District 3 offices and the Grant County Education Service District. Several businesses along the creek were flooded as well and a number of homes in John Day had water in the basements. Clyde Holiday Park along Highway 395 was flooded to a depth of several feet and water was diverted around a number of buildings. The John Day River near John Day crested at 8.5 feet, one-half foot above the flood stage of 8.0 feet.

The flooding was not only confined to John Day, but across Grant County, there was flooding along Dixie Creek in Prairie City. The North Fork, John Day River in Monument, rose to within 1 foot of the top of the levee, with water backing up on the west side of town. The John Day River encroached on the highway through Picture Gorge.

This was only a small section of the flooding the region saw in May 2011. There was flooding across much of the Pendleton forecast area with major flooding across three of the seven counties we serve in Washington and five out of the twelve counties in Oregon. Highlights of the flooding seen elsewhere across the region follows.

Kittitas County Washington - Much of the damage was to farm ground concentrated in the north and west sides of the Kittitas Valley with flooding from Manastash and Taneau Creeks eroding ground around irrigation structures, filling fields with water and silt and clogging irrigation ditches and pipes.

Yakima County Washington - There was flooding and a mudslide on Rock Creek, a mudslide on Bumping Road, flooding on Nile Road from the Nile and the Naches Rivers. Golf courses were flooded along the Yakima River at both Selah and Yakima. There was extensive flooding along the Yakima Greenway from both the Naches and Yakima Rivers.

Benton County Washington – In Benton City, the Beach RV Park next to the river was flooded. The West Richland Golf Course had much of the course underwater. Van Giesen Street

Heavy rains on top of above-normal snowpack caused Canyon Creek to rise over its banks in May 2011, flooding the Three Flags Field at Grant Union High School.

Photo taken by Dave Hannibal.

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Wildfires Burn Many Homes This Year

By Jon Bonk, Incident Meteorologist / Fire Weather Program Leader

A heavy and prolonged snowpack delayed the threat for wildfires during the summer of 2011 but this did not diminish the impact fires had on area communities. Early February, the community of White Swan, Washington experienced a destructive wildfire when a chimney fire spread to surrounding vegetation, became wind driven, and ultimately destroyed 20 homes while burning only 225 acres. This wildfire was very unusual with its occurrence before green-up. Green-up is the period where grasses awaken from winter dormancy and before they dry out during summer. Once green-up occurred across the region, wildfires occurred but rarely became problematic as a cooler than normal spring and early summer kept wildland fuels above critical moisture levels through June.

Burnout operations in progress to protect the Washington Family Ranch from the advancing Hancock Complex on August 27, 2011. Photo by: Rod Bonacker, Central Oregon Incident Management Team Operations Branch Director

Grasses and shrubs across the Columbia and Deschutes Basins dried enough to support wildfire in early July formally starting fire season across Southeast Washington and Northeast Oregon. A fast moving wind driven fire, likely human caused, rapidly burned 50 acres across Northwest Hermiston, Oregon and destroyed a duplex. Very few abundant lightning events occurred, thus keeping fire outbreaks to a relative minimum.

Mountain areas dried enough by early August to bring these areas into fire season. Several lighting episodes occurred igniting the bulk of wildfires seen this season. The most notable lightning starts were the High Cascades Complex burning about 108,000 acres mainly on the Warm Springs and BLM lands, the Hancock Complex burning 57,500 acres on BLM and private lands along the John Day River near Clarno, Oregon.

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Horses look on with Powerline Fire burning in the background as part of the High Cascades Complex on August 29, 2011. Photo by: Jon Bonk, NWS Incident Meteorologist

Mount Washington with the Shadow Lake Fire straddling the crest in the foreground on September 6, 2011. Photo by: Julia Ruthford, NWS Incident Meteorologist

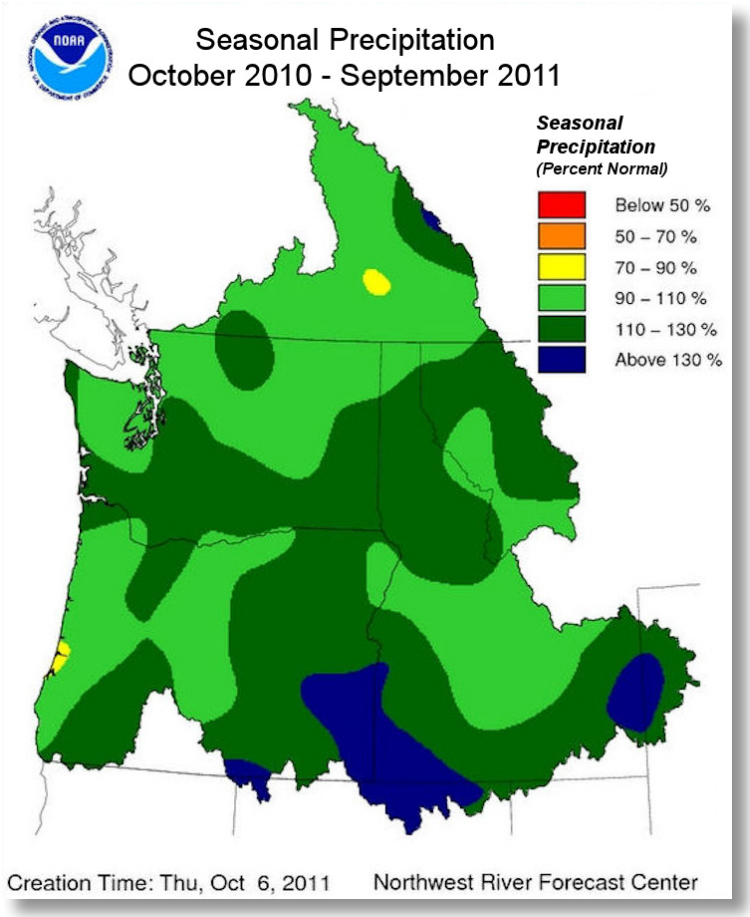
Water Year Precipitation
October 2010 - September 2011

By Marilyn Lohmann, Service Hydrologist

Location	Amount In Inches	Percent of Normal
Bend	13.35	114%
Condon	15.63	107%
Dufur	13.58	101%
Heppner	17.50	123%
John Day City	14.93	110%
La Grande	22.10	120%
Madras	10.14	84%
Meacham	45.93	122%
Milton-Freewater	16.80	105%
Mitchell	14.65	129%
Moro	12.37	108%
Pelton Dam	10.36	96%
Pendleton - Airport	16.99	133%
Pilot Rock	19.29	135%
Prineville	11.98	189%
Redmond - Airport	9.21	108%
Seneca	17.97	132%
The Dalles	15.88	110%
Wallowa	20.31	117%
Wickiup Dam	24.18	110%
Cle Elum	27.05	118%
Dayton	21.15	108%
Ellensburg	10.05	110%
Hanford	6.84	99%
Mill Creek Dam	23.94	121%
Mt Adams RS	55.41	128%
Prosser	8.91	110%
Sunnyside	8.38	117%
Whitman Mission	17.57	122%
Yakima Airport	9.58	116%

October 2010 started off the water year with above normal precipitation and the first snows of the water year coming on October 24th. There was below normal precipitation in November, as well as a brief but very cold period late in the month. On November 22, modified arctic air spread south with lower elevations seeing three days of high temperatures in the teens and 20s and overnight lows dipped below zero. December 2010 saw above normal temperatures. January 2011 was surprisingly drier than normal, but very warm temperatures and some rain caused flooding across the region January 15-20th. February was drier than normal, while March was much wetter than normal, with most of the area seeing precipitation amounts 150 to 200 percent of normal.

April was cooler than normal with the mountains having above normal precipitation, while the valleys saw drier conditions. May was much wetter than normal with amounts 200 to 300 percent of normal. There was flooding on most major rivers through the region. In June, the trend was for drier conditions over much of the region, with the exception of the foothills of the Oregon Blue Mountains, where heavy rain caused flooding in an around the town of Heppner. July, August and September were all drier than normal . ▪▪



Climate Normals

By Diana Hayden , Meteorologist

Every ten years, the National Climatic Data Center (NCDC) recalculates the 30-year climate normals for the United States. The previous 30-year normals included the years 1971 to 2000. NCDC is in the process of releasing new 30-year normals including the years 1981 to 2010. Many of these new normals are now available on the National Weather Service website under "Climate" and "Nowdata". These normals include the daily and monthly values for temperature and precipitation as well as heating and cooling degree days. As more data is finalized, NCDC will also produce normals for freeze dates as well as population-weighted degree day normals products.

To be included in the calculations, a weather station must have ten years of data per month. For the 1981-2010 normals, 9,800 stations were used across the country. The next step is to fill in missing data in the data set using a regression technique based on the neighboring values. This is not done with snowfall due to the large number of zeros. Then the monthly normals are calculated based on the average values over the 30-year period. Daily data is calculated based on observations and statistical methods that are then checked against the monthly averages to ensure consistency.

The following table shows a comparison of the 1971-2000 normals and the 1981-2010 normals for the Pendleton Airport. One thing we must keep in mind is that climate normals were not designed to be metrics of climate change. While changes from one installment of normals to the next do provide some evidence of climate change impacts, one must remember that there are other changes that may lead to the differences as well. These changes include differences due to relocation of individual stations, changes in the method of calculating the normals, and changes in the instrumentation at the individual station over the years.

For more details on how the normals were calculated, please see the online recorded briefing on our website at: http://www.wrh.noaa.gov/pdt/climate/New_Climate_Normals/player.html. This briefing also lists further links to explore in more detail the methodology behind the calculations. ▪▪

	Max Temp Old / New	Min Temp Old / New	Precipitation Old / New	Snowfall Old / New
January	40.1 / 41.8	27.4 / 28.8	1.45 / 1.43	4.9 / 3.7
February	46.5 / 46.8	30.9 / 30.3	1.22 / 1.11	3.3 / 3.3
March	54.8 / 55.2	35.4 / 35.0	1.26 / 1.32	1.0 / 0.7
April	62.2 / 62.1	39.7 / 39.2	1.13 / 1.20	0.1 / 0.0
May	70.2 / 70.0	45.9 /45.6	1.22 / 1.35	T / 0.0
June	78.7 / 78.2	52.0 / 51.5	0.78 / 0.98	T / 0.0
July	87.7 / 88.0	57.5 / 57.2	0.41 / 0.32	0.0 / 0.0
August	86.6 / 86.8	57.3 / 56.8	0.56 / 0.38	0.0 / 0.0
September	77.1 / 77.4	49.7 / 49.4	0.63 / 0.57	0.0 / 0.0
October	63.8 / 63.7	40.7 / 40.1	0.99 / 1.01	0.3 / 0.1
November	48.5 / 49.2	33.8 / 33.4	1.63 / 1.48	2.1 / 5.0
December	40.0 / 39.5	27.7 / 27.0	1.48 / 1.47	5.0 / 6.0

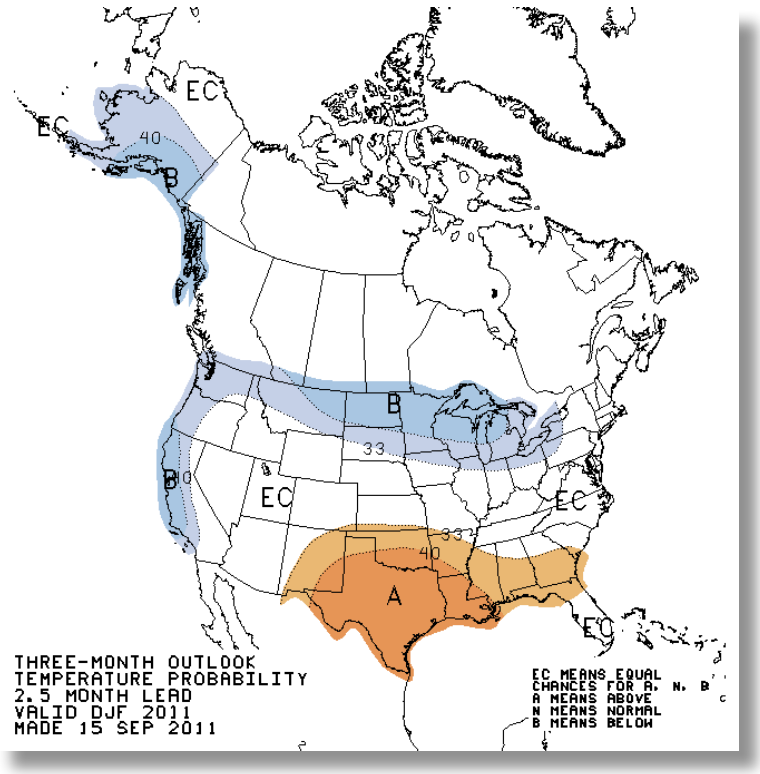
Climate Outlook

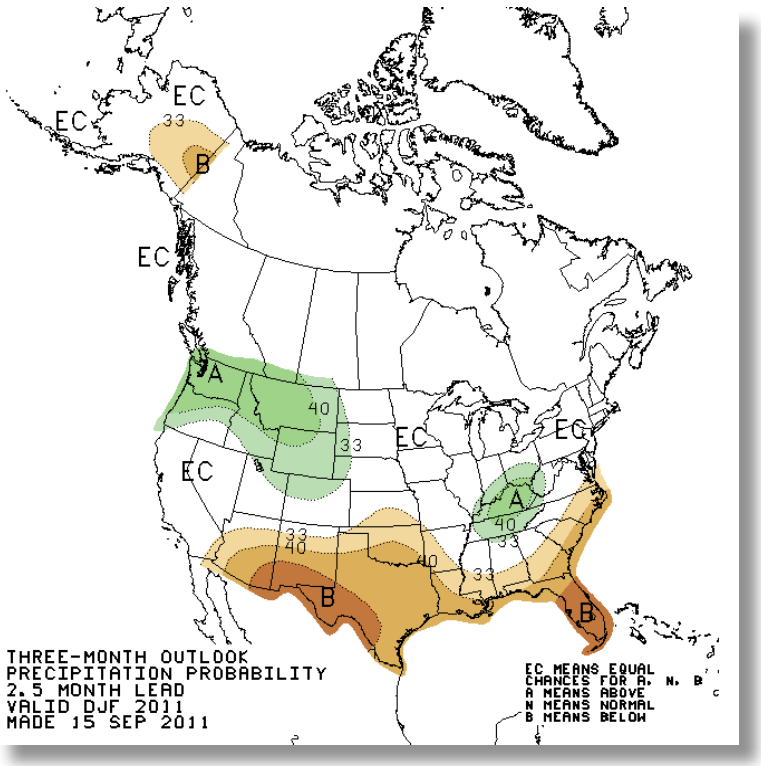
By Diana Hayden, Meteorologist

The Climate Prediction Center, or CPC, has issued a La Niña Advisory for the winter of 2011-2012. This means that La Niña conditions have been observed and are expected to continue. For this winter, CPC expects the current La Niña conditions to gradually strengthen and continue through the winter of 2011-2012. Compared to last year at this time, the current conditions are not as strong, but the current sea-surface temperature anomalies have become increasingly negative in the east-central equatorial Pacific Ocean while the atmospheric circulation anomalies have remained consistent with La Niña.

Historical records of sea-surface temperatures since 1950 have shown that the second La Niña winter is weaker than the previous La Niña winter three out of the five occurrences. While there is uncertainty in the model forecasts, roughly half of the models indicate a La Niña winter with the majority of these models indicating a weak La Niña, while a few models indicate a moderate and even a strong La Niña. Both historical records and the model uncertainty have been taken into consideration in CPC's forecast for the greater likelihood of a weak or moderate La Niña this winter.

The graphics below are from CPC, and are the temperature and precipitation outlooks for the three-month period of December, January and February. There is an increased chance of above normal precipitation for the Pacific Northwest, and an increased chance of below normal temperatures. For the interior Pacific Northwest, the potential for below normal temperatures often occurs later in the winter season. As is the case with dealing with probability outlooks, these graphics indicate probabilities of averages, and the day-to-day weather can still vary. ▪▪





Cooperative Program Highlights

This year's Cooperative Program Observer service awards were presented during a potluck luncheon hosted by and at the National Weather Service Office in Pendleton on September 9, 2011. Observers attending the luncheon and receiving their awards included Pat Perry (Mitchell OR) receiving a 15-year award, Sam Rufener (Grizzly OR) receiving a 15-year award, and John Etter (Pilot Rock 1SE OR) receiving a 10-year award. Other award recipients that were unable to attend will be presented their awards in person at later dates. Those observers include Chris Sandvig of Easton, Washington; Cory Wilson of Wasco, Oregon and Tom Birkmair of Enterprise 20NNE, Oregon. ▪▪

Pat Perry (left) is presented an award for 15 years of service in the NWS Cooperative Program by Meteorologist-In-Charge Mike Vescio. Pat's station is Mitchell 2SE in central Oregon.

Sam Rufener (left) is presented an award for 15 years of service in the NWS Cooperative Program by Meteorologist-In-Charge Mike Vescio (center). Sam's station is Grizzly in central Oregon.

John Etter (left) is presented an award for 10 years of service in the NWS Cooperative Program by Meteorologist-In-Charge Mike Vescio (right). John's station is Pilot Rock 1SE in northeast Oregon.

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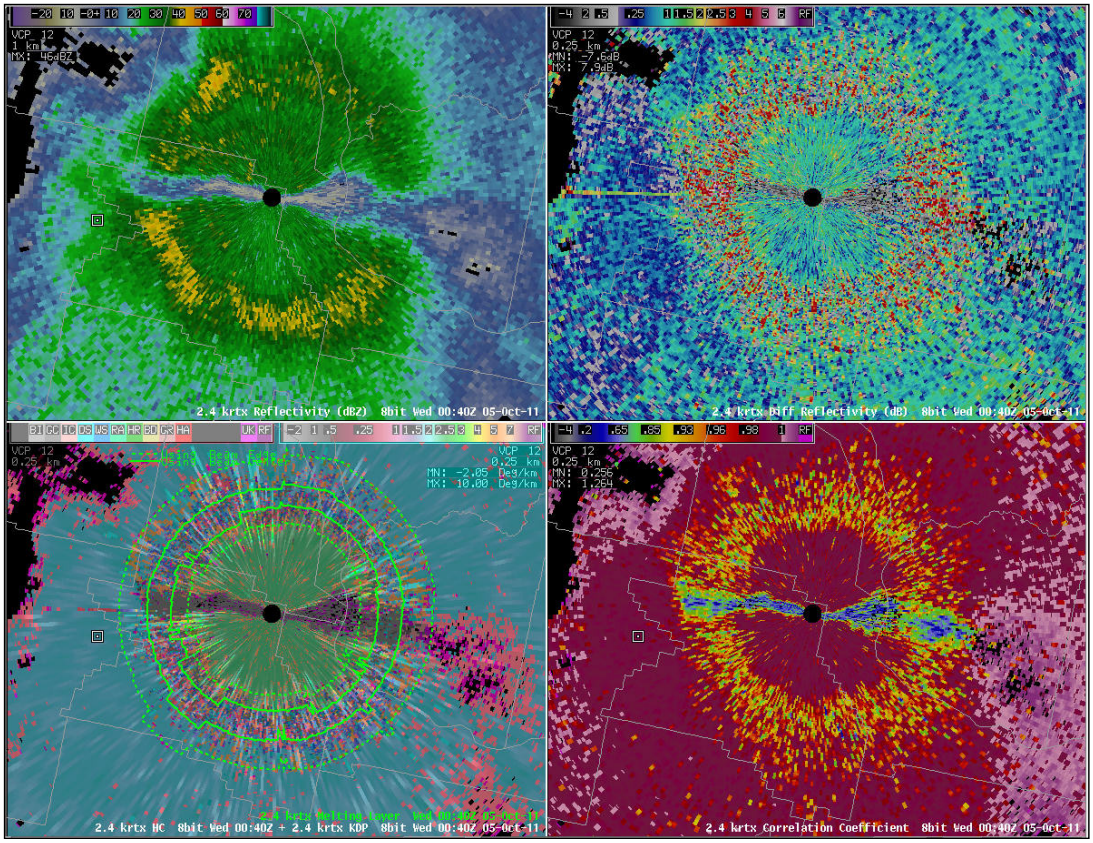
This particular four-panel product (*below*) shows the elevation of the snow levels of the atmosphere in northwest Oregon and southwest Washington as a cold front moved onshore. On the top left-hand corner is base reflectivity at a radar elevation angle of 2.4°. Base reflectivity is a measure of the returns back to the radar at a particular radar angle. The bottom left graphic with the green rings around the radar demonstrates where the bottom and top edges of the radar beam as well as the beam's centerpoint enter the "melting layer" where frozen precipitation changes to liquid. The two graphics on the right are also tools that can determine the snow level by analyzing possible precipitation types along the radar beam (i.e. liquid precipitation type compared to frozen precipitation).

Forecasters and technicians at NWS Pendleton will be sure to utilize the Dual-Polarization products from WSR-88D this fall and winter to gain a better understanding of its capabilities. Our neighboring NWS offices—Seattle, Spokane, and Portland—have also upgraded their radars to dual pol which will be extremely helpful when analyzing the atmosphere over Washington and Oregon. ▪▪



Continued from Flooding Page 2

in Richland, had water covering the westbound lanes. Water was reported in the basement of 1 house in West Richland after an attempt to build a flood barrier by the homeowner failed.

Union County Oregon - Hilgard State Park along the Grande Ronde River was flooded with water several feet deep. There was extensive flooding of fields (approximately 12000 acres) from Cove to Imbler with flooding on Wolf Creek, Ladd Creek and Catherine Creek as well as Cedar and Little Creeks. Twenty-one roads were covered with water and a power substation was partially flooded. 12 houses in Union had water in the basements with the Hot Lake RV Park flooded to a depth of several feet.

Wheeler County – There was flooding of fields and roads along the John Day River as it travels across Wheeler County.

Morrow County – Thunderstorms with very heavy rain moved over the Heppner area on May 14th with rain amounts of 1 to 1.5 inches within an hour. One house was flooded and there was minor flooding on Highway 206 between Heppner and Ruggs and along Highway 207 between Heppner and Lexington.

Umatilla County – Thunderstorms produced heavy rain with street flooding in Hermiston and caused a 12 foot deep sink hole on Stage Gulch Road, 10 miles northwest of Pendleton. ▪▪

Continued from Wildfires Page 3

Additionally, the Dollar Lake and Shadow Lake fires burned along the Cascade Crest in the Mount Hood and Deschutes/Willamette National Forests respectively. Early September saw another fire make a large impact to residences northeast of Goldendale, Washington. The human caused Monastery Complex destroyed 29 homes while consuming 3,600 acres.

The need to adequately prepare your property against the threat of a wildfire cannot be understated...particularly in light of the number of homes burned in the local area and across the country this year. At a minimum, clear the area around your home of debris including twigs, dry grasses, and fallen leaves or needles. For more information on preparing your property, visit the firewise.org website. For a success story video from the Monastery Complex, visit the following post from the Washington Department of Natural Resources:

http://washingtondnr.wordpress.com/2011/09/26/goldmark-seizes-educational-opportunity-for-defending-homes-from-wildfire-monastery-complex-fire-destroyed-29-homes/ ▪▪