NATIONAL WEATHER SERVICE - MEDFORD, OREGON

Summer 2015
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THE CRATER CHRONICLE

Summer Begins June 20 at 3:34 pm PDT.

INSIDE THIS ISSUE

NWS Medford Staff Visits a Prescribed Burn — Ashland, OR

On May 18th, meteorologists Michelle Cohen, Brett Lutz, Sven Nelaimischkies, Brian Nieuwenhuis, and Charles Smith visited a prescribed burn in the Ashland watershed of southwest Oregon. While many think of prescribed burns as being conducted for the sake of reducing potential wildfire fuels, one of the main purposes of this burn was to conduct in a safe manner what nature has been doing for thousands of years. For instance, when the first surveys of this forest were undertaken almost a hundred years ago, Madrone trees comprised about ten to fifteen percent of the forest in southern Oregon, but fire suppression efforts since that time have allowed the percentage of Madrones to climb to fifty to sixty percent. Prescribed understory burns, such as this one, work to restore the natural balance of flora within the watershed.

The burn was conducted by the City of Ashland, the Nature Conservancy, and Rogue-River Siskiyou National Forest and was, in part, a training exercise as well as a burn, with fire crews from as far away as Spain participating. We learned about the logistics and operations of the exercise, as well as how our forecasts, both general and spot, can impact the planning and implementation of the burn. The effects of the fire on local weather was also apparent, as observed inflow winds were enhanced when the size and heat of the burn increased. The need for increased communication between the NWS and the fire crews was discussed, with a strong emphasis on the need for feedback on the accuracy of the forecast, especially with burns that extend over many days. Overall, comments from the attending agencies and crews were very positive, and with mutual understanding, our partnerships with these groups was further cemented.

Meteorologist Michelle Cohen taking a wind observation with a Kestrel.

On the Front Lines–Interview with an Incident Meteorologist

Brad Schaaf, *Meteorologist Intern* &

Shad Keene, *General Forecaster & Incident Meteorologist*

As we approach wildfire season in the western United States, our office prepares to assist wildland fire agencies across southern Oregon and northern California. Knowing how the weather will impact a fire and, conversely, how a fire can impact the weather is essential to ensuring the safety of the brave firefighters that work tirelessly to help keep us safe. This is why the National Weather Service (NWS) office in Medford works around the clock to provide accurate forecasts for conditions conducive for wildfires as well as maintain a weather watch to alert those on the front lines of weather changes which can quickly create unsafe conditions. My colleagues in emergency management say, "All disasters are either created by the weather or are impacted by it." This statement rings true for wildfires as well.

Because weather conditions can change so quickly at a wildfire, it is important to have a dedicated person to observe and continuously forecast the weather for that particular wildfire. Although our office can do this to a limited extent, we are not staffed enough to specifically and consistently watch the conditions at every fire that happens in our area. We have overcome this, however, with our Incident Meteorologist (IMET) program. The NWS trains and certifies meteorologists to be able to go to a wildfire and be an on-site person who will observe and forecast the weather for firefighting operations. This program continues to be extremely successful as information and communications are nearly instantaneous during this set-up, which reduces the number of tragic deaths from firefighting.

These dedicated professionals spend weeks away from their families each summer by helping this important cause. Our office in Medford has two IMETs who are constantly trained and ready to assist with wildfires. I was lucky enough to sit down with Shad Keene, an esteemed colleague and certified IMET, to talk about life on the fire.

Brad (BS): Thank you for taking some time to speak with me. What does an IMET do?

Shad (SK): IMETs provide on-site weather support in large incidents such as wildfires. The IMET's primary responsibility is to assist in protecting wildfire crews by providing early warnings of thunderstorm outflow winds, frontal wind shifts, or other critical fire weather conditions. IMETs provide other decision support, such as warnings of high winds that may affect the mess tents where personnel eat meals. Additionally, IMETs provide important forecast information that goes into the planning process, allowing fire crews to take advantage of favorable weather windows or prepare for especially harsh weather conditions that would hinder firefighter efforts.

BS: What is your favorite thing about being an IMET?

SK: I love being able to communicate a weather forecast directly to the customer. Important elements such as confidence in the forecast, the seriousness of a weather pattern, or an explanation of an important fire weather term can be conveyed so much more effectively in person. Additionally, I like the challenge of forecasting in new locations with each dispatch.

BS: What is the most difficult thing about being an IMET?

SK: During active weather, it can be mentally exhausting to stay tuned in to local weather patterns for 16 hours a day, knowing that this weather at any time can significantly impact firefighting crews. Additionally, sometimes data and communications are poor, so I have to use different methods of forecasting than I would if I had all the data that today's technology allows for. The positives of being able to contribute to an incident management team on a wildfire overshadows these challenges.

BS: How does the information provided by the weather service offices help you with your IMET duties?

SK: Weather forecast offices are invaluable on a fire. For instance, when I was in South Florida providing weather support for a wildfire in drought-stricken Big Cypress National Preserve, I relied on the weather office for tips on forecasting sea-breeze thunderstorms and guidance on what parameters to focus on for severe weather. Having a weather office to communicate with 24/7 is necessary, especially since they are experts on the local weather conditions.

BS: How has being an IMET benefited your career—specifically as a meteorologist? *(cont. on pg. 3)*

IMET Shad Keene, examining fuel conditions with Fire Behavior Analyst in Siskiyou County .

SK: It's improved my ability to communicate weather forecasts to customers face to face, and it's honed my skills in the interesting and often-challenging world of mountain meteorology. Additionally, being around a wide variety of great leaders in all types of career fields provides perspectives on leadership that I can carry with me and apply to the rest of my own career.

BS: Working several non-fire related incidents in emergency management, food was something that was welcome and (thankfully) provided. Unlike the office I was stationed in which brought in professional catering, wildfire sites are often in remote locations. How does the food rate at the Incident Command Posts?

SK: It's excellent. I love eating, and it's amazing to see such good food being prepared in some pretty remote locations.

BS: That's great! It reminds me of a very long camping trip. Speaking of which, how do you cope with spending long periods of time away from your family?

SK: I try to communicate with my family every day. They are sacrificing a lot by supporting my work as an IMET. Additionally, to keep it in perspective, I know that many firefighting crews spend so much more time away from home than I do as an IMET, so I have it relatively good.

BS: What is life like amongst the firefighters?

SK: It's fun. It's eye-opening. I learn a lot about their line of work, and I've gained an immense appreciation for the work firefighters do, especially when it comes to long hours risking their lives fighting large wildfires.

BS: Thank you again for speaking with me!

Incident meteorologists play a vital role in the firefighting process of a wildfire. They make sacrifices every day in order to help the brave firefighters on the front lines who are also making extreme sacrifices as well. The National Weather Service's mission is to protect life and property, and the IMET program is a great way to do this by providing around the clock, onsite support to our partners.

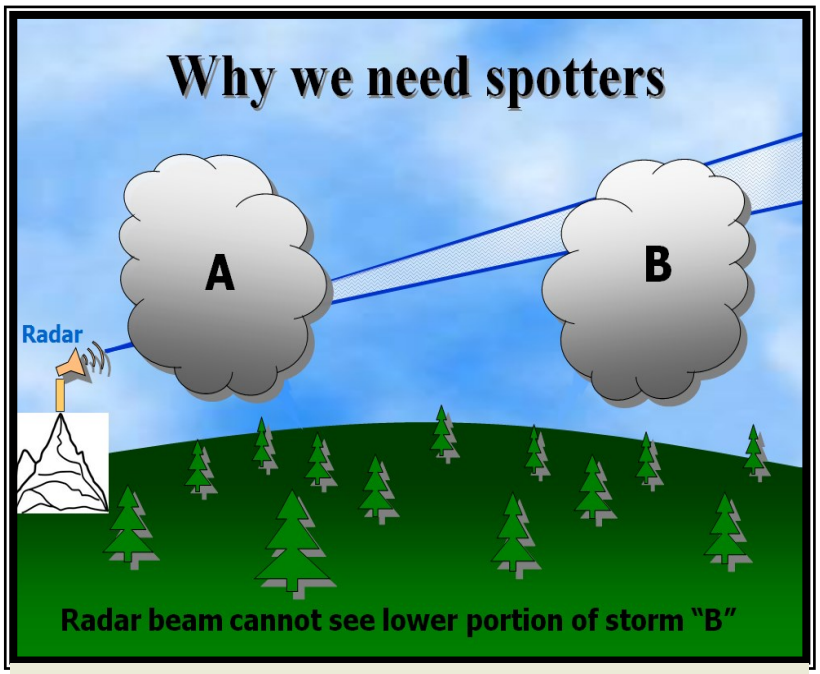
For more information on the IMET program, check out the websites listed below:

- http://innovation.srh.noaa.gov/imethistory/
- http://www.nws.noaa.gov/com/weatherreadynation/imet_article.html

The Crucial Role of Trained Weather Spotters

Charles Smith, *Meteorologist Intern*

"I wonder what is happening underneath that storm?". This is a question I've heard often during my short career as a meteorologist. Questions like this are the primary reason we value and utilize trained weather spotters in the National Weather Service. These trained spotters provide us ground truth as to what is happening with a storm that none of our observation systems, satellites, radar, automated surface observations or lightning detection networks can provide. In addition, our weather spotters can and do play a role in how we issue warnings. We consider their reports, and if we have evidence that supports those reports on radar or other meteorological parameters, we may issue a warning based on that report.



Due to the curvature of Earth, as the radar beam goes further in distance, it also gets higher. This results in the radar sampling higher portions of storms that are further away from the radar. Trained spotters provide us ground truth to what is going on, not only at the ground, but also how the base of the storm is behaving.

Finally, the act of weather spotters reporting significant weather can be important for making an accurate forecast within the next few hours. If we receive a report of a certain storm producing large severe hail and damaging winds, we compare the characteristics of that storm with others we see on radar, and if they have similar parameters that reside in a similar environment, we would likely issue a warning. As you can see, trained weather spotters are very important to the National Weather Service and the forecast process. "Accurate interpretation is the real deficiency - what is needed is more and better observations" –Robert Fitzroy (British Scientist, 1805-1865).

The Heat Is On — Heat Impact Level: What is it?

Ryan Sandler, *Warning Coordination Meteorologist*

In early June we experienced record heat across the region with five consecutive days around 100 degrees in the Rogue Valley. In addition, humidity levels were higher than normal creating very uncomfortable daytime conditions so early in the season. The forecast heat was so intense that the Special Olympics cancelled their regional competitions across Oregon in Ashland, Gresham, Eugene, and Banks.

Temperatures have been recorded in Medford since March of 1911. During the past 105 summers, the three hottest summers (June, July, August) occurred in 2013, 2014, and 2015. This is very likely not a coincidence and we can expect hotter summers in the future.

To address impacts of such unusual heat, the National Weather Service (NWS) has developed an experimental Heat Impact Level (HIL) forecast to provide an outlook of potential risk from upcoming heat. The NWS calculates a daily HIL value for each location out to 7 days. The potential risk is presented as both a color and number that places forecast heat for a specific location into an appropriate level of heat concern, along with identifying who/what is primarily at risk at that level. The HIL is accompanied by recommendations for heat protection and is a useful tool for planning for upcoming heat. It is not specifically linked to the NWS's heat watches, advisories, or warnings. These products remain the official products from the NWS. The experimental HIL is simply another tool that can be used to protect lives and property from the potential risk of excessive heat. It is especially useful for those who are more easily affected by heat or those who provide support to those communities. *(cont. on pg. 5)*

Saturday Heat Impacts

High Risk Areas (West Side valleys)

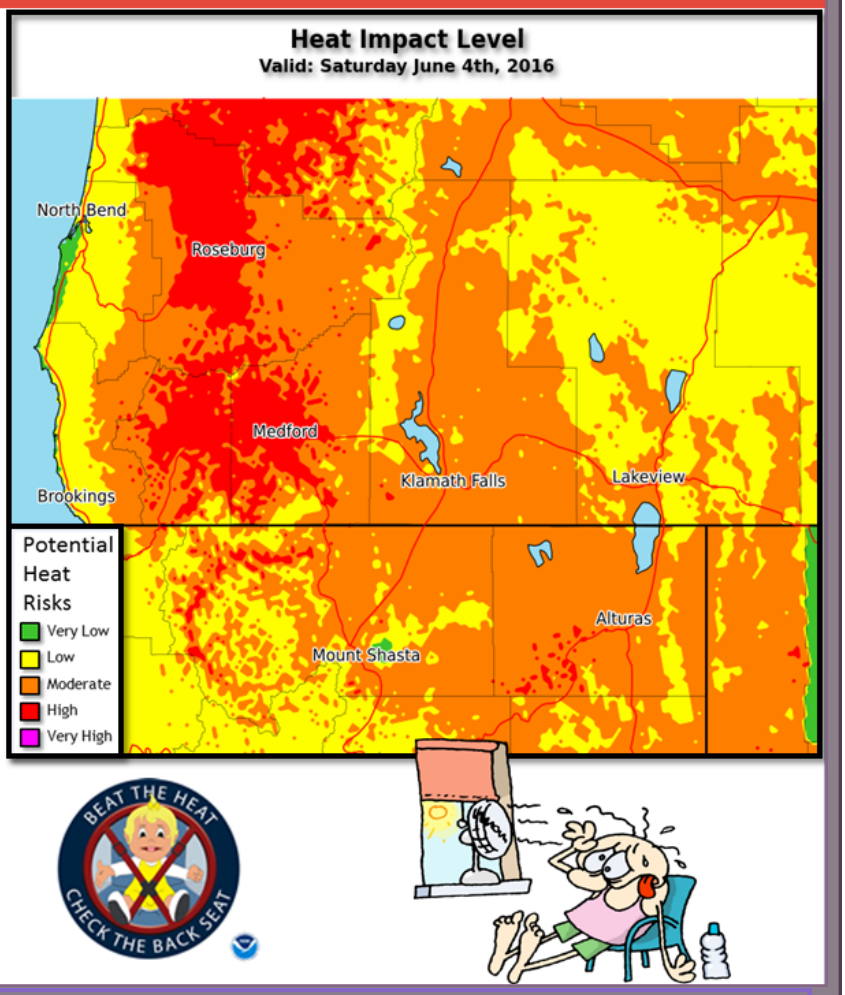
- Dangerous for most…especially for those w/o proper hydration or adequate cooling.
- This type of heat happens a few times each year.

Moderate Risk Areas

- Most dangerous for those sensitive to heat. General public is not likely to be affected.
- This type of heat happens many times a year.

What To Do:

- Drink water ***before*** you're thirsty and stay hydrated!
- Avoid being outdoors in the sun between 10 a.m. & 6 p.m.
- Seek air-conditioned buildings.
- If you must be outdoors, take frequent breaks in the shade or indoors.
- Help elderly, kids & pets stay cool.
- NEVER leave kids or pets in a closed vehicle!



NWS Medford created this Weather Story based on HILs for conditions expected Saturday, June 4th.

The HIL takes the following into consideration:

1) How significantly above normal the temperatures are at your location.

2) The time of the year (for example, is this early season heat that you likely haven't become used to, or late season heat that you have become more used to).

3) The duration of unusual heat (for example, are temperatures overnight at levels that would lower heat stress, or will warm overnight temperatures continue to add to heat stress into the next day).

4) If those temperatures are at levels that pose an elevated risk for heat complications, such as heat stress.

Simply put, the higher the HIL value, the greater the level of concern the heat would be for that location. If both the overnight lows and daytime highs are exceptionally warm for that date, at a given location, over a period of at least 48 hours and at levels that pose an elevated risk for heat complications, the highest level of the HIL is achieved.

The experimental HIL is just one more way the NWS is working toward ensuring that communities have the right information at the right time to be better prepared for upcoming heat events. The HIL is an experimental tool that we are mainly using internally this summer to make decisions. We will take into consideration feedback from our partners in hopes that the HIL will eventually be used by our partners and the public to routinely make important decisions before and during hot weather.

Numerical Value	Meaning	Who/What is at Risk?	How Common is this Heat?	For those at risk, what actions can be taken?
0	Level of heat poses little to no risk	No elevated risk	Very Common	No additional preventative actions should be necessary.
1	• Heat of this type is tolerated by most; however there is a low risk for sensitive groups to experience health effects	• Primarily those who are extremely sensitive to heat	Very Common	• Stay in a cool place during the heat of the day • Reduce time spent outdoors or stay in the shade when the sun is strongest
2	• Moderate risk for members of heat sensitive groups to experience health effects • The general public is not likely to be affected • For those without air conditioning, living spaces can become uncomfortable during the day	• Primarily heat sensitive groups, especially those without effective cooling or hydration • Transportation and utilities sectors	• Fairly common most locations • Very common in southern regions of country	• Reduce time in the sun between 10 a.m. and 4 p.m. • Stay hydrated • Stay in a cool place during the heat of the day • Move outdoor activities to cooler times of the day • Open windows at night
3	• High Risk for much of the population • Dangerous to anyone without proper hydration or adequate cooling • Poor air quality is possible • Power interruptions may occur as electrical demands increase	• Much of the population, especially those who are heat sensitive and anyone without effective cooling or hydration • Transportation and utilities sectors	• Uncommon most locations • Fairly common in southern regions of country	• Try to avoid being outdoors in the sun between 10 a.m. and 4 p.m. • Stay hydrated • Stay in a cool place especially during the heat of the day • Cancel outdoor activities during the heat of the day
4	• Very High Risk for entire population • Very dangerous to anyone without proper hydration or adequate cooling. • This is a multi-day excessive heat event. A prolonged period of heat is dangerous for everyone not prepared. • Poor air quality is likely. • Power outages are increasingly likely as electrical demands may reach critical levels.	• Entire population is at risk. • For heat sensitive groups, especially people without effective cooling, this level of heat can be deadly. • Transportation and utilities sectors	• Rare most locations • Occurs up to a few times a year in southern regions of country	• Avoid being outdoors in the sun between 10 a.m. and 4 p.m. • Stay hydrated • Stay in a cool place, including overnight • Cancel outdoor activities during the heat of the day

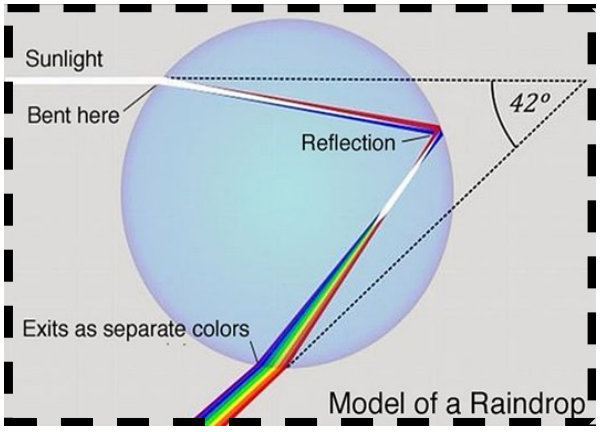
Optical Phenomena - Part 1, Liquid Water

John Lovegrove, *Meteorologist-In-Charge*

There are many times during the year when you can look to the sky and see splashes of color or other optical phenomena. Some of these events are fairly common, such as a rainbow, while some are very rare. Generally, these optical phenomena can be broken down into three categories depending on what they are caused by: liquid water, ice crystals or caused by something else. I'll start off with a few events caused by liquid water.

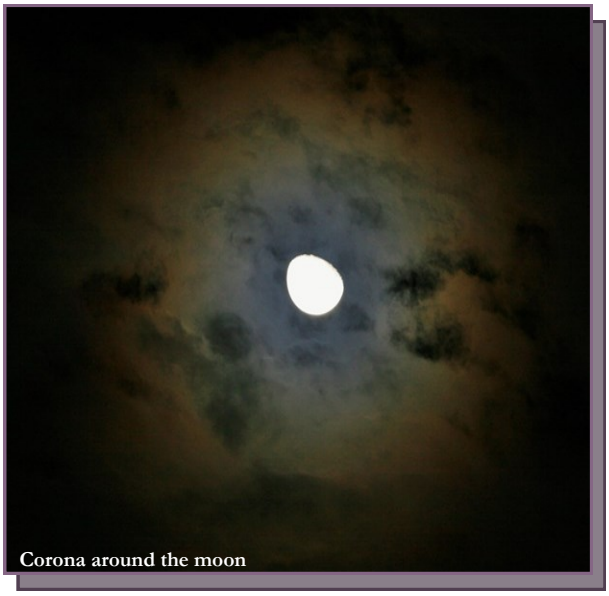
The most common liquid water event is a rainbow. A rainbow is actually a circle. A straight line can be drawn from the sun, through your head or camera, to the center of the rainbow. This means that a rainbow at mid-day will be rather short while a rainbow at sunset can reach high into the sky. The actual size of the bow also depends upon the distance from you to the rain that is causing it. The angle from the center to the rainbow is always 42 degrees.

A rainbow is caused by sunlight reflecting off of raindrops. As the light enters a drop, it is slightly bent (refracted). Longer wavelength light (red) is refracted less than shorter wavelength light (violet), which is why red is the top color you see on a rainbow. This light reflects off the back of the raindrop and is refracted a second time. The two refractions spread the light out into the spectrum of color we see as the rainbow (shown below).



There can be two reflections of the light within the raindrop. This causes a secondary rainbow with the colors reversed from the primary (red is on the bottom). Much less light takes this route so the secondary rainbow is always less bright.

Another common event is a corona which forms immediately around the sun or moon. The colors in a corona can be quite subtle with them fading to white towards the center, especially when seen around the sun. A corona is caused by the diffraction of light around the small liquid cloud droplets. The smaller the cloud droplets are, the larger the corona will be.


Corona around the moon

A less common phenomena is related to the corona - iridescence (shown below). Like the corona, iridescence is caused by diffraction of light through uniformly sized cloud droplets. Ice crystals can also cause iridescence as long as they are uniform in size. Iridescence appears as patches of color in clouds and is most commonly seen in lenticulars.


Iridescence, photo by: John Lovegrove

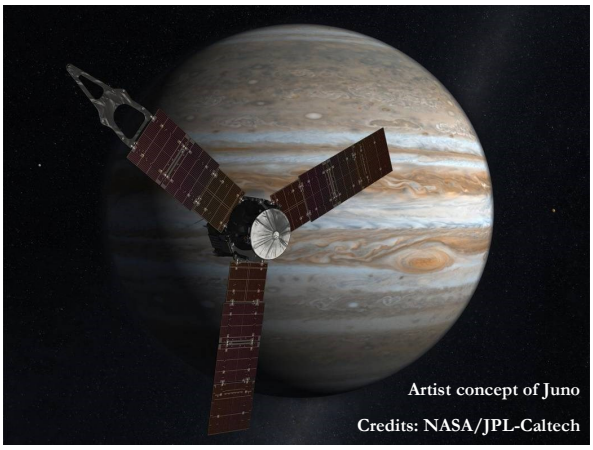
In the next edition: atmospheric optics from ice crystals.

Astronomy Happenings

Misty Duncan, *Meteorologist Intern*

Juno Reaches Jupiter

July 4th – On our country's independence day, a five year journey for the satellite Juno will be over. Juno was launched on August 5th 2011 and began its trek to the biggest planet in our solar system, Jupiter. It's mission is to measure the composition, temperature, cloud motions and other properties of Jupiter's atmosphere as well as to map it's magnetosphere. Juno will spend 20 months orbiting Jupiter until February 2018 when it will deactivate and crash into Jupiter. According to NASA, "In Greek and Roman mythology, Jupiter drew a veil of clouds around himself to hide his mischief. It was Jupiter's wife, the goddess Juno, who was able to peer through the clouds and reveal Jupiter's true nature." For more information on this mission along with videos and pictures, visit Juno's site by NASA.



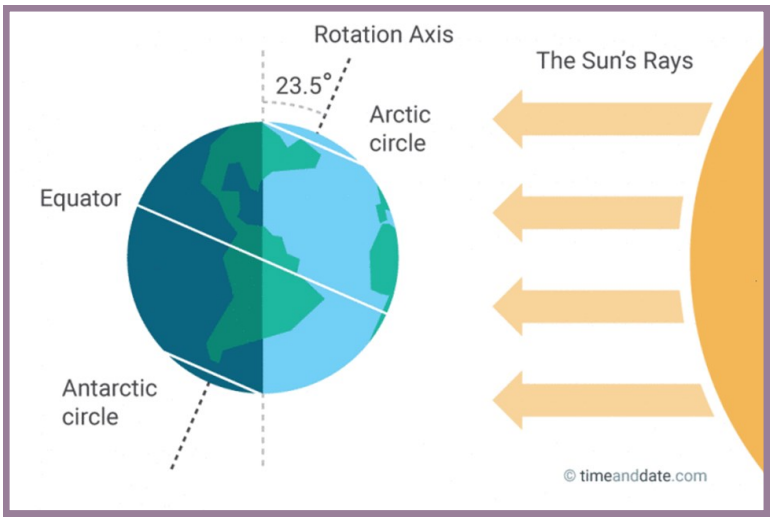
Artist concept of Juno

Credits: NASA/JPL-Caltech

Summer Meteor Showers

Delta Aquarids—This meteor shower typically runs from mid July through mid August and is caused by debris from the comets Marsden and Kracht. This year, the show will peak the night of July 28th and the early morning of the 29th and the thin wanning crescent moon shouldn't interfere with the brightest meteors. The meteors will radiate from the constellation Aquarius and you should expect an average of 20 meteors during the peak of this shower. If weather allows, look to the southeast after midnight and enjoy the show!

Perseids—Debris from this shower is produced by the comet Swift-Tuttle and is probably the better meteor shower of the summer. During the peak of this shower, you could see up to 60 meteors per hour! The Perseids also run from mid July to mid-late August, but peaks on the night of August 11th and morning of the 12th. The radiant point for the Perseids is the constellation Perseus. A waxing gibbous moon will set just after 1 a.m. local time, leaving the sky ideal for star gazing; weather permitting of course. So get away from those city lights, grab a friend and look to the north and northeast for Perseus to deliver some shooting stars!



Summer Solstice

The summer solstice, the astronomical start of summer, falls on June 20th this year at 3:34 p.m. PDT. The word solstice comes from the Latin word "solstitium" which means sun-stopping. The summer solstice marks the time when the Northern Hemisphere has completely tilted toward the sun. The sun's rays are most intense on the northern Hemisphere and the position of the sun in the sky is at its farthest point north of the equator. After the summer solstice, the earth begins to tilt away from the sun until we reach the fall equinox and the beginning of fall. The summer solstice also marks the longest day of the year. On this day, there will be over 15 hours of daylight in southwest Oregon! Compare this to the winter solstice on December 21st when there are only 9 hours of daylight.

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Our Vision

Professionals focusing on science, teamwork, and customer service to design and deliver the best decision-support information to our community.

Our Mission

Our team at the National Weather Service Office in Medford strives to deliver the best observational, forecast, and warning information through exceptional customer service, extensive training and education, maintaining quality electronic systems, and relying upon an outstanding team of weather spotters and cooperative observers. We do this within the overall mission of the NWS to build a Weather-Ready Nation:

To provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

Our Values

Trust, Integrity, Professionalism, Service, Teamwork, Ingenuity, Expertise, and Enthusiasm.

About Us

The Weather Forecast Office in Medford, Oregon, is one of more than 120 field offices of the National Weather Service, an agency under the National Oceanic and Atmospheric Administration and the United States Department of Commerce. The Weather Forecast Office in Medford serves 7 counties in southwestern Oregon and 2 counties in northern California, providing weather and water information to more than a half-million citizens. We are also responsible for the coastal waters of the Pacific Ocean from Florence, Oregon, to Point St. George, California, extending 60 miles offshore. The office is staffed 24 hours a day, 7 days a week, and 365 days a year by a team of 26 meteorologists, hydrologists, electronic technicians, hydrometeorological technicians, and administrative assistants, under the direction of Meteorologist-In-Charge John Lovegrove.