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Summer Returns!

by Scott Carroll

Summer has returned to Northwest California, and with it, longer days and warmer temperatures. In fact, temperatures can occasionally get downright hot, especially in the interior valleys. Remember to stay hydrated as temperatures soar. During the summer, it's not safe to leave pets or children in a parked car, even if the outside air temperature is in the 70s and the windows cracked open. Stay safe and enjoy the weather!



Upcoming Summer Events

Date	Event
Jun 1	Meteorological summer begins
	Crescent City Water Safety Day outreach
	Redwood Environmental Education Fair outreach
Jun 2	Pony Express Days outreach (McKinleyville)
Jun 17	Trinidad Fish Festival outreach
Jun 21	Astronomical summer begins at 3:07am
Sep 1	Meteorological autumn begins

Busy Spring for NWS Eureka Community Outreach

by William Iwasko

Our office has participated in numerous outreach and educational events over the past several months. During the spring, over 100 students visited our office to learn more about meteorology and to see the tools that we use to develop our forecasts. A group of college students also learned how to properly fill and stack sandbags.

On Earth Day, meteorologist William Iwasko attended an event at the Manila Community Center where he discussed tsunami and earthquake preparedness with local residents. William, along with Hydrologist Kathleen Lewis, attended the 16th annual Klamath-Trinity Joint Unified School District Fish Fair. They talked to several groups of elementary school students about the water cycle, how a watershed's flow changes based on land cover, and different types of rain gauges. They also discussed the hazards of cold and fast moving rivers and demonstrated how to properly wear a life jacket.

Science and Operations Officer Mel Nordquist, along with meteorologists Ricky Lam and William Iwasko, presented at the 30th annual Redwood Environmental Education Fair (REEF) where they presented hands on weather experiments for kids in third through sixth grade. This year's presentation called "Hands on Weather" discussed the scientific method, the water cycle, rain gauges, air pressure, and clouds.

Hydrologist Kathleen Lewis and hydrologist intern Andre Meza attended the Crescent City Water Safety Day where they described the hazards of the ocean and how students can remain safe while visiting the beach. Lastly, meteorologist Tony Ashford and William Iwasko set up a booth at the 50th annual Pony Express Days in McKinleyville where they talked to local residents about weather and earthquake safety.



If you have an event that you would like a NWS meteorologist to attend or to setup an office visit you can send an email to debbie.richie@noaa.gov or call us at (707)443-6484 Monday through Friday 8 am to 5 pm.

Heavy Rain in Mendocino County: April 5-7, 2018

by Matthew Kidwell

During the first week of April, an atmospheric river brought unseasonably heavy rain to much of Northwest California. Most areas of Northwest California saw significant rainfall, and Mendocino county saw record breaking amounts.

An atmospheric river is a narrow band of concentrated moisture in the atmosphere. These features transport significant moisture to the mid-latitudes and are often



responsible for heavy rainfall events. A model depiction of the April 6th precipitable water (a measure of total moisture in the atmospheric column) forecast is shown in the image above. Atmospheric rivers are responsible for a significant portion of the rainfall in northern California. For additional details on what an atmospheric river is, click [here](#).

The relatively dry conditions leading up to this event kept the area from seeing more significant impacts on the main stem rivers. However, rainfall amounts were impressive, especially along the Mendocino Coast. These are shown in the table below. The long term climate sites saw near record or record 2-day rainfall totals for the month of April. For additional details on this event, click [here](#).

Precipitation Totals (April 5-7, 2018)		
Name	Station Type	Total Precip
Albion 4.0 SE	CoCoRaHS	7.09
Laytonville 1.1 SW	CoCoRaHS	6.30
Laytonville 9.8 NNW	CoCoRaHS	6.08
Mendocino 2.7 NNE	CoCoRaHS	5.72
Caspar 1.4 ESE	CoCoRaHS	5.39
Redwood Valley 1.5 ENE	CoCoRaHS	5.21
Fort Bragg 3.5 S	CoCoRaHS	4.89
Fort Bragg 5 N	COOP	4.80*
Elk 1.8 NNE	CoCoRaHS	4.72
Ukiah 8.4 NW	CoCoRaHS	4.70
Potter Valley Powerhouse	COOP	4.58**
Ukiah 1.2 NW	CoCoRaHS	4.40
Ukiah 4 WSW	COOP	4.22†
Ukiah 0.6 ESE	CoCoRaHS	3.73
Ukiah 4.3 S	CoCoRaHS	3.58
Boonville 2.2 WSW	CoCoRaHS	3.41
Ukiah Municipal Airport	ASOS	3.33††

*Highest 2 day total in April (1895- present)

**Highest 2 day total in April (1937- present)

†Second highest 2 day total in April (1951- present)

††Second highest 3 day total in April (1893- present)

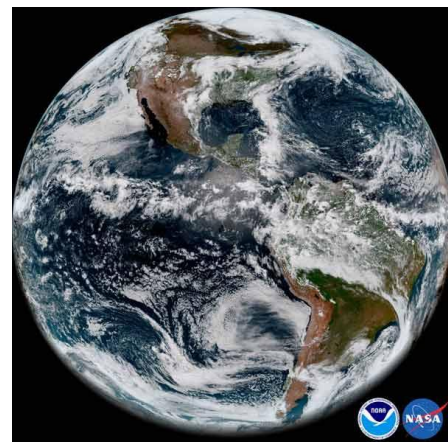
New Satellite Reaches Orbit, Encounters Problems

by William Iwasko

The second in the series of new geostationary operational environmental satellites (GOES) was successfully launched on March 1st, 2018. GOES-17 reached geostationary orbit (22,300 miles above Earth) in late March, at which point scientists began the satellite's on-orbit checkout procedures. This satellite carries the advanced baseline imager (ABI) which provides 16 channels: 2 in the visible wavelength and 14 in the infrared wavelength. These images will regularly update every 5 minutes. During high impact weather, updates as quickly as 30 seconds are possible. These channels will allow meteorologists to better monitor storm severity, water vapor transport across the hemisphere, and coastal marine stratus. In addition to the ABI, this satellite carries a global lightning mapper instrument so that meteorologists can better detect which storms are producing lightning and how much lightning is being produced within the cloud. It also carries space weather instruments to better detect solar particles as they approach the Earth.



Unfortunately, as the on-orbit checkout procedures advanced, an issue with the onboard cooling system was uncovered, which was preventing 13 of the ABI channels from properly working at all times. The visible wavelengths currently appear unaffected, and, when the satellite is out of direct sunlight, the infrared channels are performing closer to what was expected. A team from NOAA, NASA, and the ABI contractor are all working together to attempt to correct this issue. If the cooling system cannot be fixed, then alternative operational modes will be determined to best utilize the ABI instrument. Once deemed operational, this satellite will take the place of GOES-15, which currently covers the western half of the U.S.



First daylight image of Earth's Western Hemisphere from GOES-17 at 12:00 p.m. EDT on May 20, 2018. Credit: NOAA/NASA

Spring Weather Summary

March

Rain and snow returned for the month of March this year with a series of weather systems moving through the area. This brought rain on 18 of the first 24 days of the month and led to above normal rainfall for the month across the area. Weaverville recorded 3 inches of snow for the month. Temperatures across the area were near normal for the month.

April

The most notable weather this month was the unseasonably strong atmospheric river event early in the month ([see article](#)). This brought a significant amount of the monthly rain in just a few days from the 5th to the 7th. For example, in Ukiah, 3.33 inches of rain fell from the 5th to the 7th. The heaviest daily rainfall ever recorded in more than 100 years of observation in April was reported on April 6th in some locations. Both Ukiah's and Fort Bragg's records were broken when 2.40 and 3.20 inches of rain fell respectively. A few other storm systems brought some additional rain, but mainly high pressure and dry conditions prevailed, keeping temperatures generally above normal for the month.

May

The weather in May was influenced by a mix of high pressure and weak upper level troughs moving through the area. The marine layer was very deep and persistent for much of the month. This brought stratus and drizzle to the coastal areas and kept temperatures cool. Onshore flow helped push the marine layer well inland on several occasions. This is shown in the temperatures, with Ukiah averaging nearly 4 degrees cooler than Weaverville. A closed upper level low brought thunderstorms to the interior on several days, and they made it out to the coast on two of those days. Precipitation was generally well below normal except for a few inland areas. For example, Weaverville saw more significant rain associated with the showers and thunderstorms on a couple of days. This was relatively spotty, and Ukiah didn't see any significant rainfall. ↗



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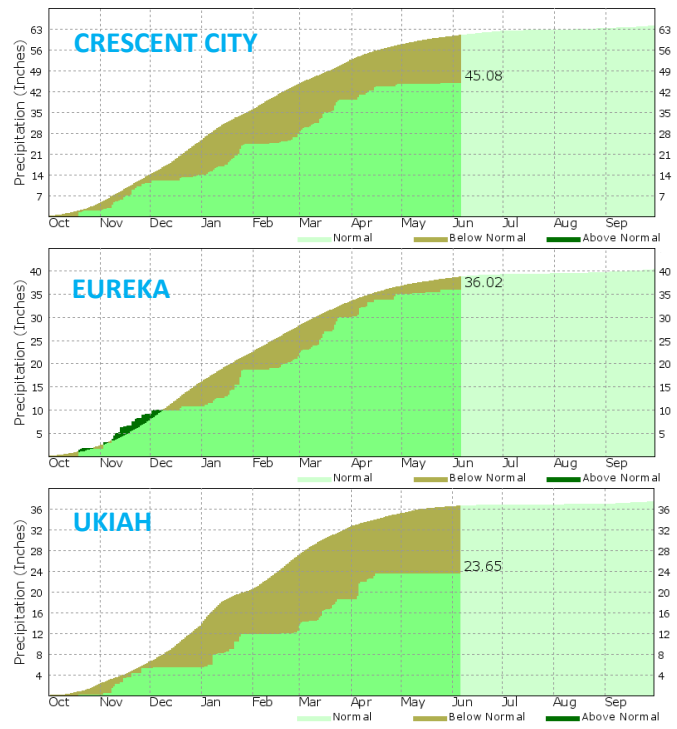
Spring 2018 Monthly Climate Comparison

	Crescent City			Eureka			Ukiah		
	Ave Hi	Ave Lo	Total Rain	Ave Hi	Ave Lo	Total Rain	Ave Hi	Ave Lo	Total Rain
Mar	56.2	44.0	11.41	55.5	41.1	8.50	62.6	39.3	6.12
Apr	58.4	46.5	5.36	57.9	44.7	5.02	69.3	43.8	4.93
May	58.8	49.4	0.48	58.9	49.2	0.79	78.4	49.5	0.05

temperatures in °F, rainfall in inches

Water Year-to-Date Precip Comparison

[click images for links](#)



data through June 5th

Summer Outlook (June-August)

[click images for links](#)

The Climate Prediction Center's summer outlook for NW California is calling for better than even chances of above normal temperatures (figure 1 below) with even chances of below or above normal precipitation (figure 2 below). Chances of below normal precipitation increase going north into the Pacific Northwest.

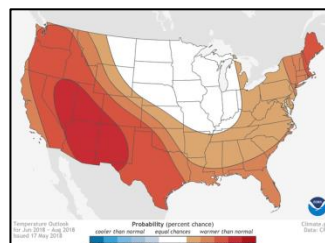


Figure 1 – Temperature Outlook

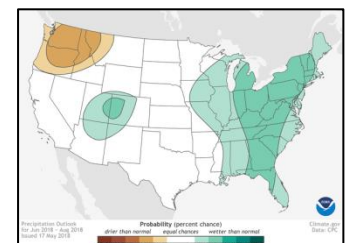


Figure 2 – Precipitation Outlook

Local Spring Records

by Scott Carroll

Only a few record events were recorded during the spring across the official reporting stations of Northwest California. Two of the record temperatures were ties of previous records. However, the record-tying low of 33°F in Eureka on March 26th tied a record that has stood for 130 years! The record rainfall recorded at Ukiah on April 6th was 50% higher than the previous record set just last year. No temperature or rainfall records were tied or broken during the month of May.

Spring Record Events

Date	Location	Record	Value	Previous Record
Mar 26	Eureka	Min Temp	33	33 in 1972*
Apr 6	Ukiah	Rainfall	2.40"	1.60" in 2017
Apr 23	Crescent City	Max Temp	73	71 in 1995
	Eureka	Max Temp	68	68 in 1888*

*record tied

Wet Season 2017-18 Recap

by Matthew Kidwell

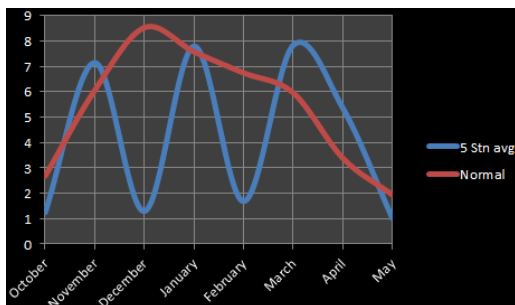
The rainy season in Northwest California varied dramatically from month to month. High pressure built over the area for much of December and again in February. This kept these months quite dry and well below normal. During other periods some moderately strong weather systems moved through bringing rainfall. No significant river flooding occurred this winter. Some of the highest river flows were in early April when an unseasonably strong atmospheric river

Wet Season Rainfall (Oct-May)

Station	Observed	Normal	% Normal
Crescent City	45.08	60.44	75%
Weaverville	25.44	37.03	69%
Eureka	36.02	38.50	94%
Fort Bragg	35.65	42.00	85%
Ukiah	23.54	36.42	65%

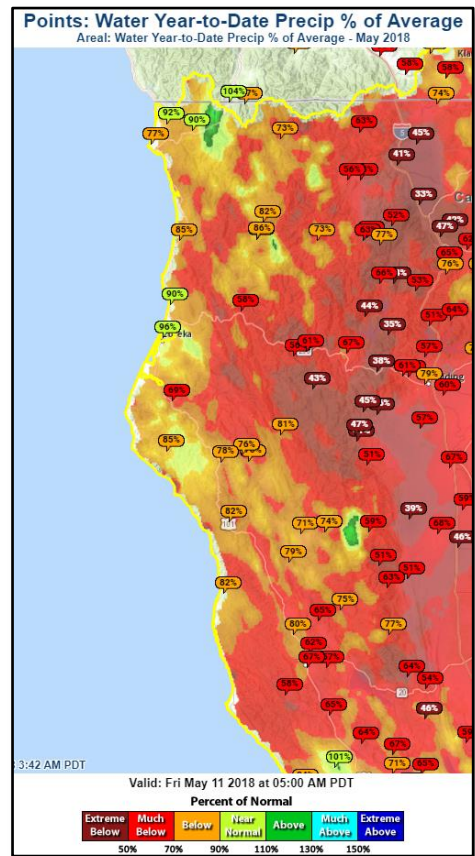
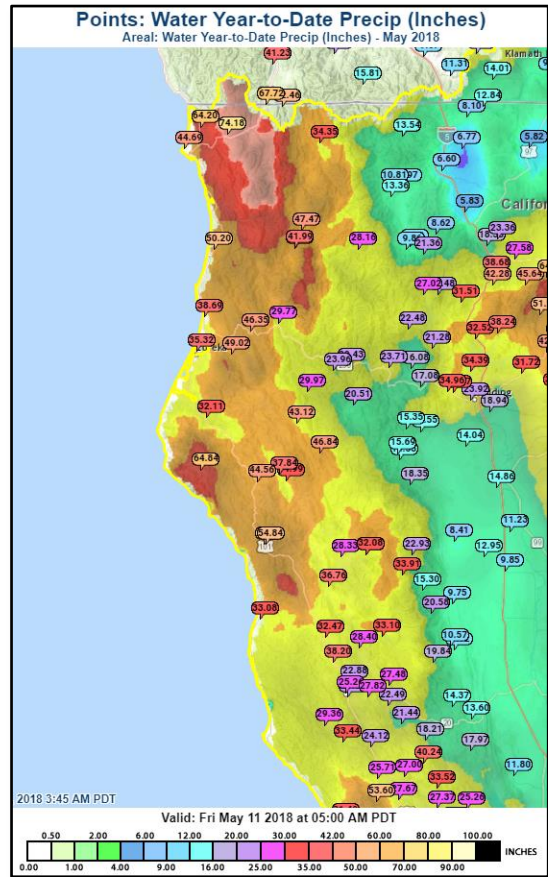
moved through the area.

The graph below shows an average of the five stations mentioned above. These stations were chosen because they have reliable data and a long enough period of record to produce climatological normals.



Wet Season 2017-18 Recap (continued)

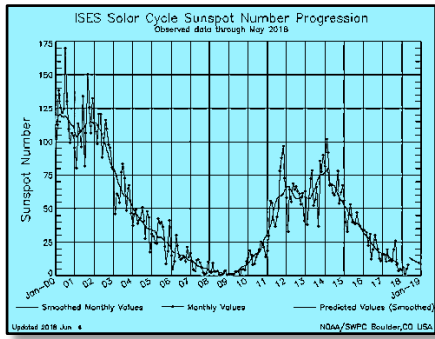
by Matthew Kidwell



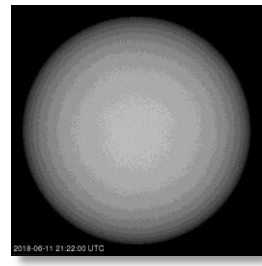
Astronomy Corner

by Scott Carroll

For anyone interested in solar observing, we have entered the period of minimal sunspot activity that comes around in each 11-year sunspot cycle (see the image below).



There will be some days where the solar disk is devoid of sunspots altogether, like in the image to the right. However, on other days, there will still be a few sunspots visible. For those interested in observing the sun, a telescope with either a solar filter or projection screen are typically required. However, you can use a pair of binoculars to project the sun's image onto a white surface (instructions [here](#)). **Remember, never look directly at the sun with your naked eye, binoculars, or a telescope. Permanent eye damage will be the result!** For more information, visit the [Space Weather Prediction Center website](#).



Summer Moon Phases		
June	July	August
☾ 6 th	☾ 8 th	☾ 7 th
● 13 th	● 15 th	● 15 th
☾ 20 th	☾ 22 nd	☾ 21 st
● 27 st	● 29 th	● 29 th

Summer Night Sky Calendar	
Date	Event
Jun 3	Moon-Mars conjunction
Jun 16	Moon-Venus conjunction
Jun 23	Moon-Jupiter conjunction
Jun 27	Saturn opposition Moon-Saturn conjunction
Jul 14	Moon-Mercury conjunction
Jul 15	Moon-Venus conjunction
Jul 20	Moon-Jupiter conjunction
Jul 24	Moon-Saturn conjunction
Jul 26	Mars opposition
Jul 28	Delta Aquarid meteor shower maximum
Aug 12	Perseid meteor shower maximum
Aug 14	Moon-Venus conjunction
Aug 17	Moon-Jupiter conjunction
Aug 21	Moon-Saturn conjunction

moon phase and event information courtesy of NASA

Kids Corner: How to Build a Cloud in a Jar

by Ricky Lam



Materials Needed

- mason jar
- soap
- ice
- food coloring
- hot water
- matches
- small plastic bag

Instructions

1. Coat the inside of a mason jar with dish soap. This will keep the water vapor from sticking to the side of the mason jar.
2. Pour hot water into the jar. **Ask an adult for help!**
3. Add food coloring.
4. Strike a match, and let the burning match produce smoke inside the jar. **Ask an adult for help!**
5. Cover the jar to keep the smoke inside the jar.
6. Place ice in the plastic bag, and place the bag on top of the jar.
7. The smoke will act as a catalyst for clouds to form, and you will see the motion of clouds inside the jar. Air will rise from the hot water, then cool when it hits the ice and sink back down.
8. Once you lift the ice off the top of the jar, you will see clouds streaming out of the mason jar.

Remember, ask an adult for help with the hot water and matches!



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