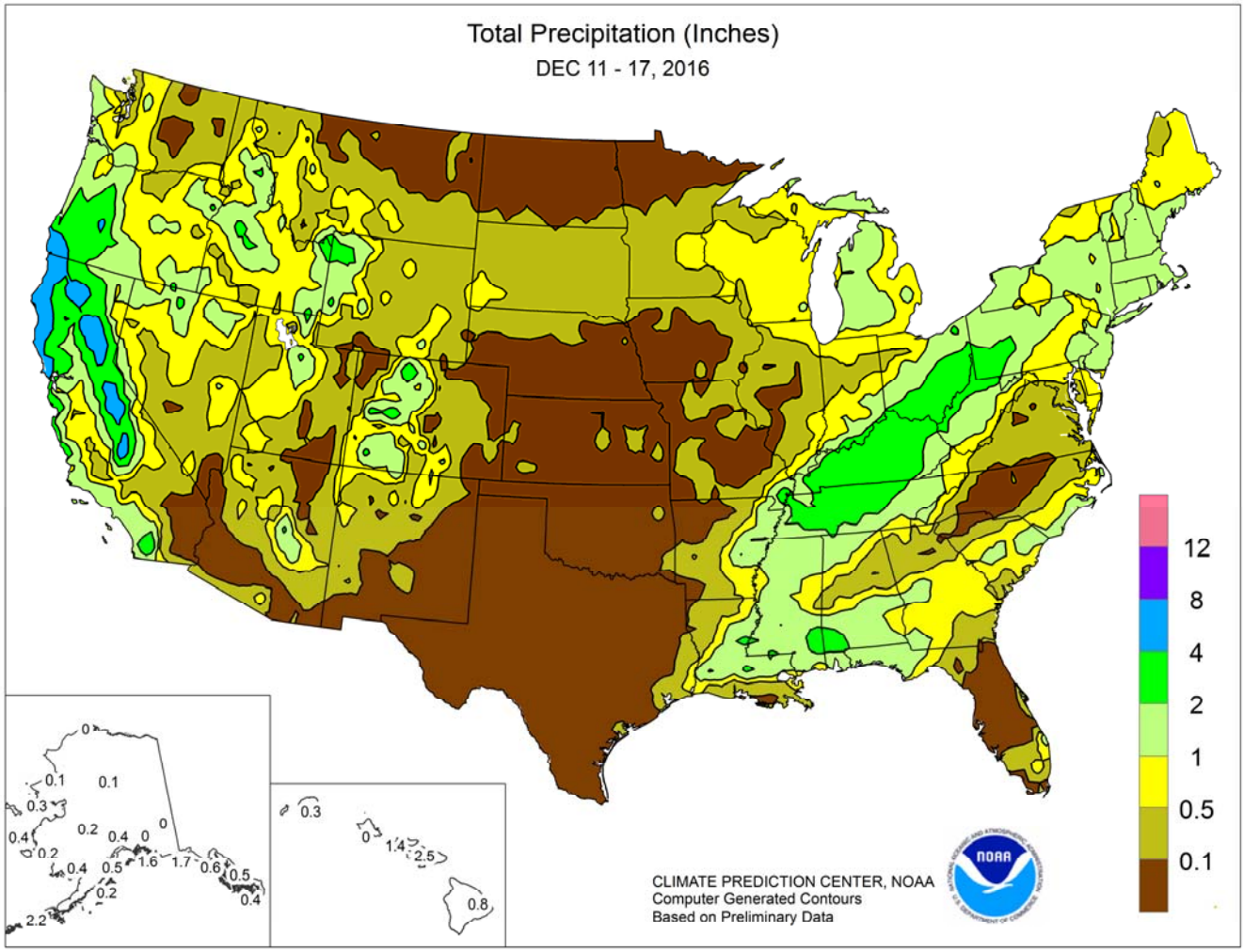
Volume 103, No. 51 http://www.usda.gov/oce/weather December 20, 2016

WEEKLY WEATHER AND CROP BULLETIN

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

U.S. DEPARTMENT OF AGRICULTURE
National Agricultural Statistics Service
and World Agricultural Outlook Board



HIGHLIGHTS

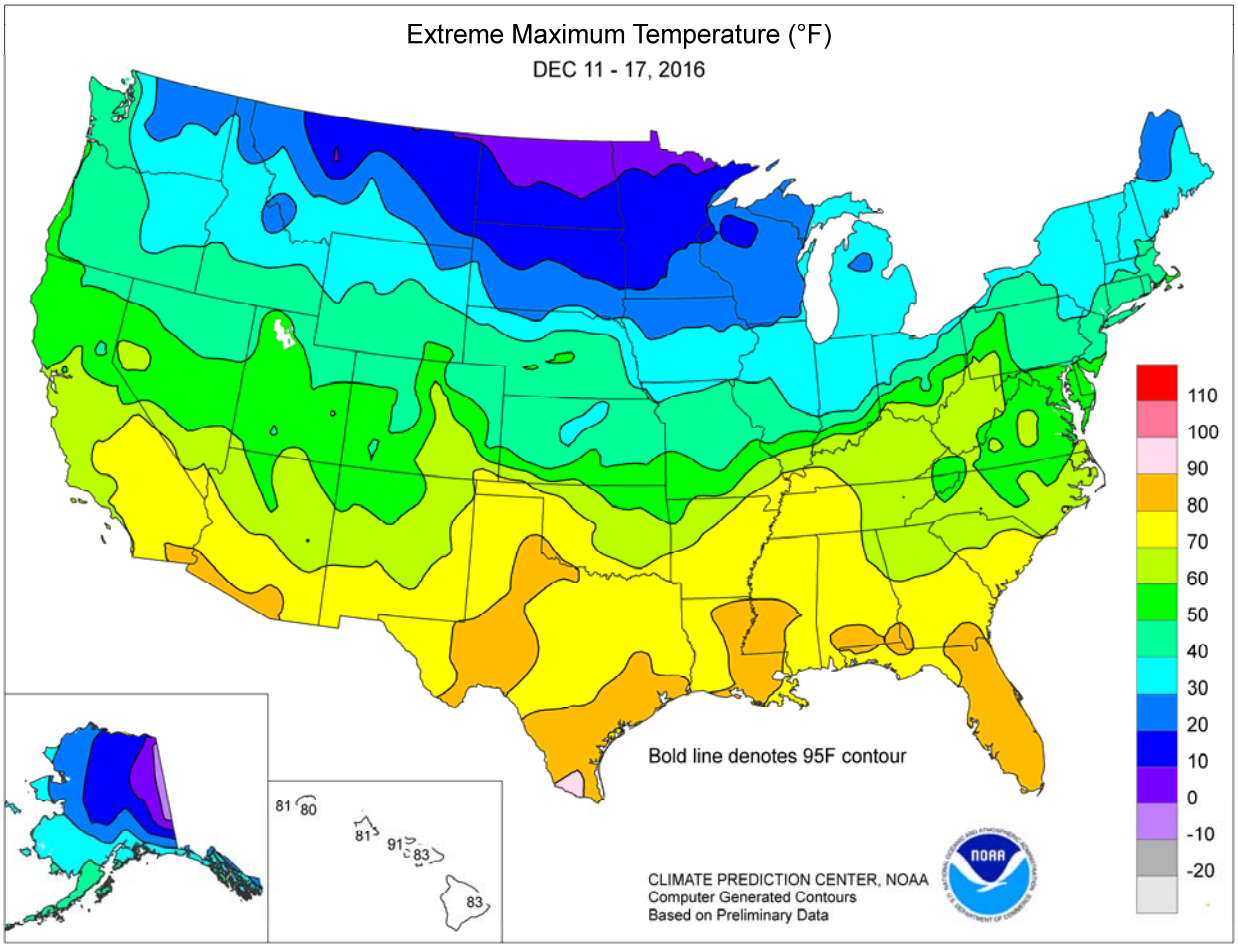
December 11 – 17, 2016

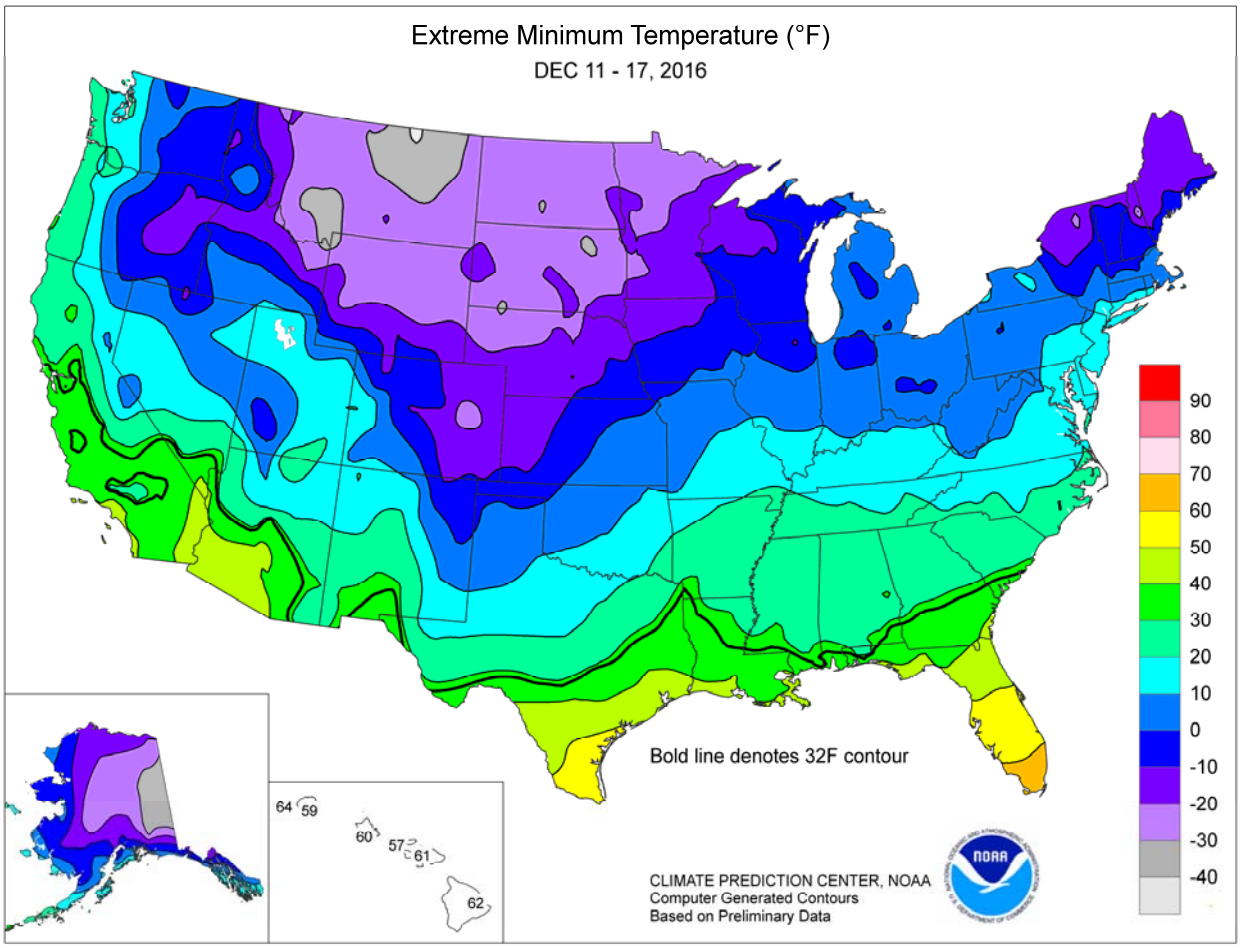
Highlights provided by USDA/WAOB

A series of fast-moving storms brought widespread precipitation to the **eastern, western, and northern U.S.** Some of the heaviest rain and snow fell in **northern and central California**, providing additional relief from a multi-year drought. Significant high-elevation snow spread inland as far east as the **Rockies**. In advance of a late-week Arctic blast, snow blanketed the **northern and central Plains**. Winter wheat production areas such as the **central Plains** greatly benefited from a protective snow cover, albeit shallow, as a portion of the crop had been

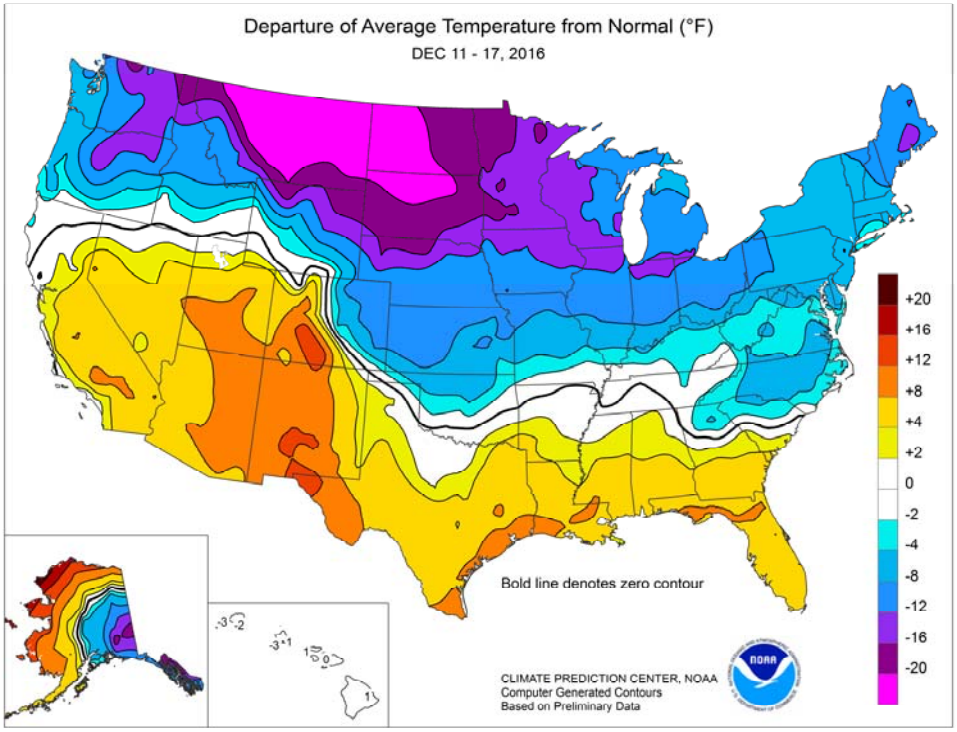
(Continued on page 3)

Contents


Extreme Maximum Temperature (°F)
DEC 11 - 17, 2016
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
Bold line denotes 95F contour
81
80
81
91
83
83
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data


Extreme Minimum Temperature (°F)
DEC 11 - 17, 2016
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
Bold line denotes 32F contour
64
59
60
57
61
62
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data

(Continued from front cover)

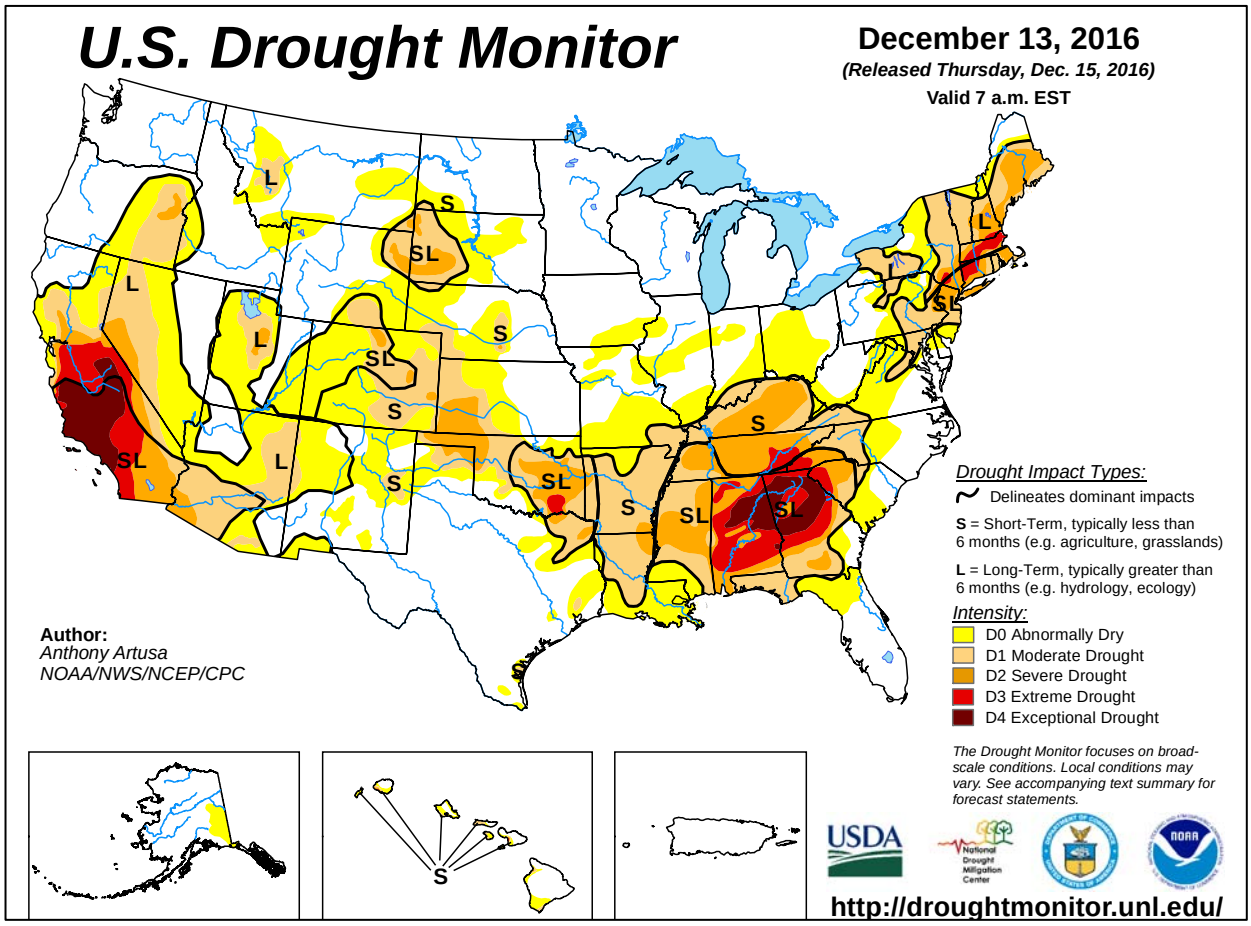


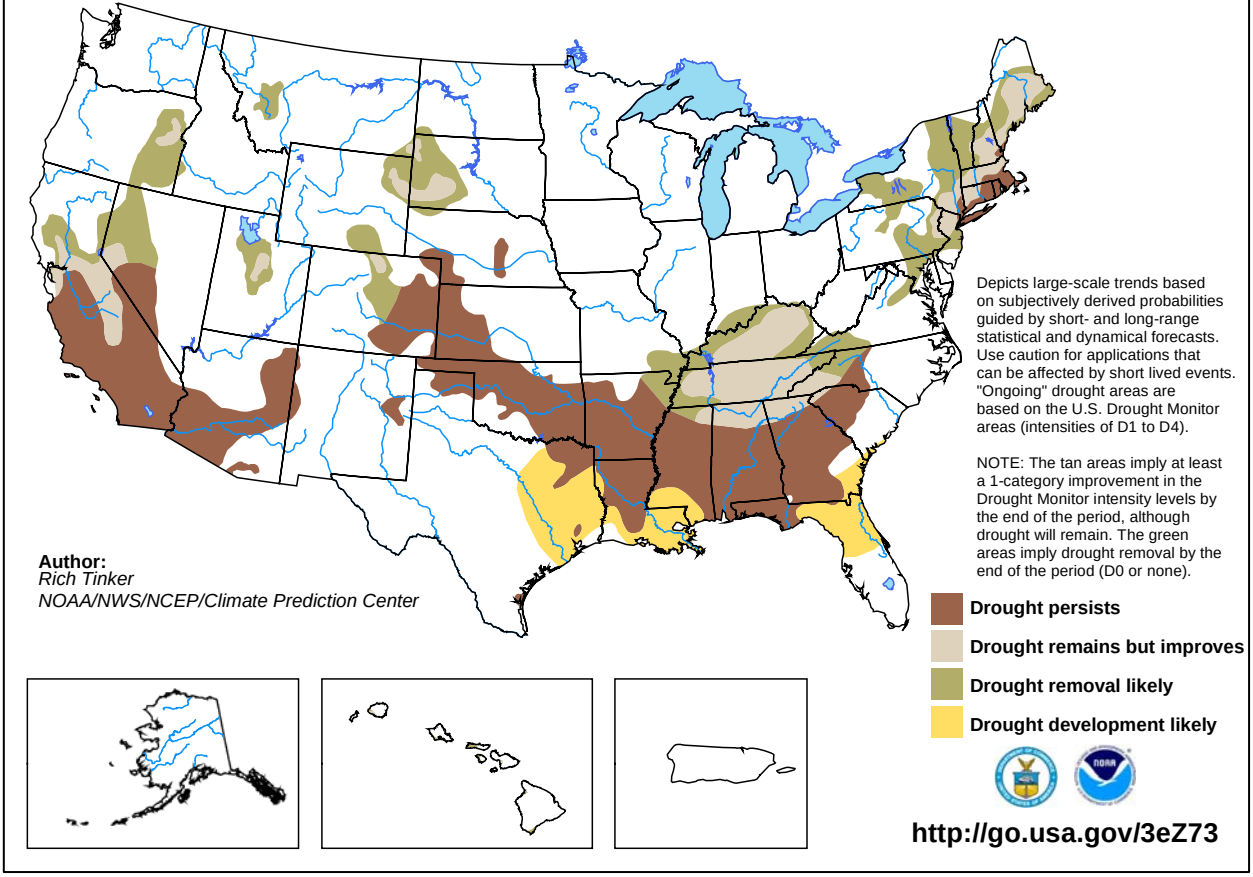
poorly established (due to drought) and devoid of insulation prior to the storm. Meanwhile, wintry precipitation frequently fell in the **Midwest** and **Northeast**, boosting topsoil moisture but causing occasional travel disruptions. Similarly significant precipitation fell from the **Ohio Valley southward to the Gulf Coast**. However, pockets of unfavorable dryness persisted in the **southern Atlantic States**. Along with the precipitation, bitter cold dominated the **northern U.S.**, increasing livestock stress. Weekly temperatures were 20 to 30°F below normal across portions of the **northern Plains** and averaged more than 10°F below normal from the **northern Rockies to the Great Lakes region**. In contrast, mild weather prevailed across the **Southwest** and the **Deep South**. Weekly temperatures averaged at least 10°F above normal in the **southern Rockies** and along portions of the **Gulf Coast**. Late-week temperatures plunged to -30°F or below across portions of the **northern Plains** and **upper Midwest**. For much of the **central U.S.**, the coldest weather arrived on the night of December 17-18, sending temperatures below 0°F as far south as the **panhandles of Texas and Oklahoma**.

Snow fell across parts of the **northern U.S.** as the week began. Record-setting snowfall totals for December 11 reached 8.2 inches in **Duluth, MN**, and 6.3 inches in **Fort Wayne, IN**. The following day in **Maine**, **Bangor** netted a daily-record snowfall (4.8 inches) for December 12. Farther south, a daily-record rainfall of 1.03 inches occurred on the 12th in **Jackson, KY**. At mid-week, stormy weather overspread the **Northwest**. With cold air in place, daily-record snowfall totals for December 14 included 1.9 inches in **Boise, ID**, and 2.3 inches in **Portland, OR**. Elsewhere in **Oregon**, **Pendleton** collected 8.3 inches of snow from December 14-16. Meanwhile in **Montana**, December 15-16 snowfall totaled 16.9 inches in **Billings** and 6.6 inches in **Helena**. Due to earlier snow, **Helena's** weekly total climbed to 15.2 inches. Farther east, periods of snow and squalls downwind of the **Great Lakes** contributed to weekly totals of 19.4 inches in **Rochester, NY**, and 18.0 inches in **Marquette, MI**. Both locations reported daily-record totals—10.6 inches in **Rochester** on December 15 and 13.7 inches in **Marquette** on December 17. Late in the week, snow overspread large sections of the **western, central, and northern U.S.** in advance of an Arctic outbreak. Record-setting snowfall totals for December 16 included 9.5 inches in **Pocatello, ID**; 6.2 inches in **Sioux Falls, SD**; and 5.2 inches in **Casper, WY**. By December 17, snow, sleet, and freezing rain spread into the **Northeastern and Mid-Atlantic States**. Daily-record snowfall amounts for December 17 reached 6.5 inches in **Hartford, CT**, and 3.0 inches in **Newark, NJ**. Farther south, daily-record precipitation totals for the 17th included 2.22 inches in **Louisville, KY**, and 1.76 inches in **Cincinnati, OH**. Elsewhere, much of **California** experienced a late-week soaking. With a 2.28-inch total on the 15th, downtown **Sacramento, CA**, noted its seventh-wettest December day in the last 140 years. In **southern California**, record-setting amounts for December 16 totaled 5.20 inches on **Palomar Mountain** and 3.00 inches in **Idyllwild**.

For much of the week, warm weather prevailed across the **Deep South**. On December 12-13, **New Orleans, LA**, posted consecutive daily-record highs (82 and 81°F, respectively). With a high of 81°F on the 13th, **Galveston, TX**, achieved a monthly record (previously, 80°F on December 10, 1918, and December 20, 2007). In the **Southwest**, daily-record highs included 84°F (on December 15) in **Tucson, AZ**, and 78°F (on December 14) in **Needles, CA**. By December 16, a burst of warmth in advance of a strong cold front led to daily-record highs in **Texas** locations such as **Childress** (85°F) and **Midland** (82°F). Warmth lingered across the **South** into December 17, resulting in daily records in locations such as **McAllen, TX** (93°F); **Vicksburg, MS** (82°F); and **Monroe, LA** (81°F). In the **Ohio Valley**, **Paducah, KY** (72°F), and **Evansville, IN** (70°F), also notched daily-record highs for December 17. In stark contrast, temperatures plummeted across the **nation's mid-section**. Consecutive daily-record lows were set on December 17-18 in numerous communities, with many reporting records just before midnight on the 17th and again before daybreak on the 18th. In **South Dakota**, consecutive records on those dates were set in locations such as **Aberdeen** (-32 and -37°F); **Watertown** (-29 and -37°F); and **Mobridge** (-28 and -26°F). Other places on the **Plains** setting consecutive record lows included **Valentine, NE** (-27 and -31°F); **Pueblo, CO** (-19°F both days); **Tribune, KS** (-14 and -13°F); and **Dalhart, TX** (0 and -8°F). **Dalhart's** record-setting lows followed a daily-record high of 73°F on December 16. Similarly and elsewhere in **Texas**, December 16 daily-record highs of 85°F in **Childress**, 78°F in **Lubbock**, and 76°F in **Borger** were followed 2 days later by daily-record lows of 7°F, 4°F, and -3°F, respectively.

Mild weather returned to **western and northern Alaska**, but cold conditions lingered farther south and east. Daily-record highs were set in locations such as **Cold Bay** (44°F on December 13) and **King Salmon** (42°F on December 16). Widespread precipitation accompanied the return to mild conditions, with **Cold Bay** reporting a weekly precipitation total of 2.08 inches. In **southeastern Alaska**, December 16-18 precipitation totals reached 2.56 inches in **Yakutat** and 2.33 inches in **Sitka**. Farther south, **Hawaii** experienced occasional showers, especially early and late in the week. In fact, the week began in the midst of a heavy rain event on parts of **Maui**, where **Kahului** netted 3.05 inches on December 10-11. On the **Big Island**, **Hilo's** month-to-date rainfall through December 17 totaled 13.15 inches (194 percent of normal).


U.S. Drought Monitor
December 13, 2016
(Released Thursday, Dec. 15, 2016)
Valid 7 a.m. EST
Author:
Anthony Artusa
NOAA/NWS/NCEP/CPC
Drought Impact Types:
Delineates dominant impacts
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)
Intensity:
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
USDA
http://droughtmonitor.unl.edu/


U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period
Valid for December 15 - March 31, 2017
Released December 15, 2016
Author:
Rich Tinker
NOAA/NWS/NCEP/Climate Prediction Center
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).
NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).
Drought persists
Drought remains but improves
Drought removal likely
Drought development likely
http://go.usa.gov/3eZ73

National Weather Data for Selected Cities

Weather Data for the Week Ending December 17, 2016

Data Provided by Climate Prediction Center

STATES AND STATIONS		TEMPERATURE °F						PRECIPITATION							RELATIVE HUMIDITY PERCENT		NUMBER OF DAYS TEMP. °F		NUMBER OF DAYS PRECIP	
		AVERAGE MAXIMUM	AVERAGE MINIMUM	EXTREME HIGH	EXTREME LOW	AVERAGE	DEPARTURE FROM NORMAL	WEEKLY TOTAL, IN.	DEPARTURE FROM NORMAL	GREATEST IN 24-HOUR, IN.	TOTAL, IN., SINCE DEC 1	PCT. NORMAL SINCE DEC 1	TOTAL, IN., SINCE JAN 1	PCT. NORMAL SINCE JAN 1	AVERAGE MAXIMUM	AVERAGE MINIMUM	90 AND ABOVE	32 AND BELOW	.01 INCH OR MORE	.50 INCH OR MORE
AL	BIRMINGHAM	59	39	71	29	49	3	0.17	-0.77	0.15	1.57	66	39.50	76	89	51	0	3	3	0
	HUNTSVILLE	56	36	73	24	46	2	0.49	-0.75	0.42	3.53	114	42.05	76	79	60	0	3	4	0
	MOBILE	70	49	79	34	59	6	1.65	0.65	1.65	4.87	185	59.14	92	84	69	0	0	1	1
	MONTGOMERY	66	45	78	29	56	7	1.03	-0.10	0.79	2.94	103	40.46	77	78	53	0	2	3	1
AK	ANCHORAGE	20	9	37	1	15	-3	0.34	0.09	0.22	0.88	154	15.84	102	87	82	0	7	3	0
	BARROW	16	-2	23	-16	7	17	0.01	0.01	0.01	0.01	100	5.06	126	84	71	0	7	1	0
	FAIRBANKS	-5	-19	13	-27	-12	-7	0.10	-0.07	0.08	0.28	76	14.36	144	81	76	0	7	3	0
	JUNEAU	25	8	36	2	16	-13	0.55	-0.67	0.52	3.76	130	60.95	109	90	78	0	7	2	1
	KODIAK	39	28	43	20	33	2	0.16	-1.52	0.15	1.63	41	79.49	111	95	83	0	6	2	0
	NOME	27	18	32	-6	23	14	0.28	0.06	0.17	0.29	51	15.26	95	85	78	0	7	5	0
AZ	FLAGSTAFF	50	27	57	17	38	8	1.12	0.73	1.11	1.12	118	22.50	102	97	45	0	6	2	1
	PHOENIX	73	52	76	44	63	9	0.10	-0.09	0.09	0.10	23	5.35	69	64	40	0	0	2	0
	PRESCOTT	58	35	66	25	47	9	0.38	0.10	0.38	0.38	57	15.23	82	88	34	0	1	1	0
	TUCSON	76	47	84	38	62	10	0.20	-0.02	0.19	0.20	43	11.00	95	59	31	0	0	2	0
AR	FORT SMITH	50	33	62	20	42	1	0.00	-0.79	0.00	0.66	31	31.10	73	85	53	0	3	0	0
	LITTLE ROCK	56	34	77	25	45	1	0.85	-0.24	0.41	1.84	65	53.57	109	96	59	0	3	4	0
CA	BAKERSFIELD	64	47	73	35	55	8	0.36	0.22	0.26	0.40	121	5.12	85	83	69	0	0	2	0
	FRESNO	60	46	67	33	53	8	1.64	1.38	1.09	2.03	333	13.16	125	92	81	0	0	3	2
	LOS ANGELES	64	55	66	49	59	1	0.80	0.43	0.40	0.80	96	8.28	68	90	74	0	0	3	0
	REDDING	54	39	58	32	46	1	2.96	1.99	2.00	5.09	220	48.42	155	88	73	0	2	3	2
	SACRAMENTO	56	43	62	34	49	3	2.13	1.63	2.04	3.33	273	21.91	131	100	71	0	0	3	1
	SAN DIEGO	66	54	71	50	60	3	1.32	1.07	1.31	1.32	232	7.33	73	86	69	0	0	2	1
	SAN FRANCISCO	56	48	62	38	52	2	1.56	0.97	1.48	4.00	282	20.76	111	82	69	0	0	4	1
	STOCKTON	57	43	64	32	50	5	0.82	0.46	0.66	1.41	155	17.58	136	95	82	0	1	3	1
CO	ALAMOSA	50	18	60	3	34	16	0.34	0.28	0.23	0.41	273	8.50	120	83	50	0	6	2	0
	CO SPRINGS	45	11	65	-14	28	-1	0.29	0.21	0.28	0.42	247	15.31	89	77	32	0	7	2	0
	DENVER INTL	39	11	57	-15	25	-4	0.72	0.66	0.39	0.78	557	12.57	93	82	48	0	7	3	0
	GRAND JUNCTION	45	26	57	21	36	7	0.35	0.26	0.31	0.36	164	8.46	97	89	72	0	7	2	0
	PUEBLO	47	10	69	-18	29	-2	0.23	0.16	0.23	0.23	135	11.38	94	79	51	0	7	1	0
CT	BRIDGEPORT	40	27	48	18	34	-2	1.50	0.76	0.91	2.00	109	37.97	89	69	49	0	5	3	2
	HARTFORD	35	18	42	5	26	-5	1.29	0.51	0.72	1.65	85	31.64	71	73	54	0	7	4	2
DC	WASHINGTON	45	30	56	17	37	-3	0.44	-0.22	0.28	1.87	116	30.97	82	72	44	0	4	2	0
DE	WILMINGTON	39	25	50	14	32	-5	1.04	0.30	0.73	1.85	101	40.23	98	82	48	0	6	2	1
FL	DAYTONA BEACH	79	54	83	46	66	5	0.03	-0.55	0.03	0.63	44	44.57	93	100	54	0	0	1	0
	JACKSONVILLE	76	51	81	41	63	8	0.09	-0.46	0.09	2.08	155	38.31	75	100	56	0	0	1	0
	KEY WEST	83	73	85	71	78	6	0.10	-0.36	0.10	0.56	51	36.16	95	96	77	0	0	1	0
	MIAMI	83	70	87	66	76	6	0.22	-0.27	0.18	2.17	172	65.78	114	90	65	0	0	2	0
	ORLANDO	81	58	85	53	70	7	0.02	-0.48	0.02	0.78	61	52.55	111	91	55	0	0	1	0
	PENSACOLA	68	55	77	42	62	8	0.96	0.13	0.94	4.82	233	59.82	96	88	66	0	0	2	1
	TALLAHASSEE	72	52	79	41	62	8	0.51	-0.34	0.36	3.42	167	59.03	97	97	67	0	0	3	0
	TAMPA	79	62	83	56	71	8	0.04	-0.48	0.04	0.24	19	52.37	120	90	62	0	0	1	0
	WEST PALM BEACH	81	67	84	61	74	5	0.44	-0.23	0.39	2.36	122	49.95	83	87	64	0	0	2	0
GA	ATHENS	51	33	63	25	42	-3	0.09	-0.70	0.09	1.96	102	36.41	79	80	57	0	3	1	0
	ATLANTA	55	36	67	28	46	0	0.06	-0.75	0.06	2.06	100	37.75	78	83	59	0	3	1	0
	AUGUSTA	63	41	76	25	52	5	0.89	0.24	0.79	3.63	247	37.48	87	76	66	0	2	2	1
	COLUMBUS	63	42	75	30	52	3	1.40	0.44	1.21	3.37	141	35.15	75	88	54	0	2	3	1
	MACON	63	40	75	27	51	3	0.43	-0.41	0.36	3.80	188	31.54	73	88	57	0	3	3	0
	SAVANNAH	68	45	79	36	57	5	0.49	-0.08	0.24	3.89	299	55.04	114	85	65	0	0	3	0
HI	HILO	79	66	83	62	73	1	0.78	-1.60	0.38	13.60	206	121.64	99	90	80	0	0	5	0
	HONOLULU	79	65	81	60	72	-3	0.04	-0.59	0.03	0.64	44	12.95	77	85	70	0	0	2	0
	KAHULUI	81	67	83	61	74	0	2.53	1.88	1.38	4.04	269	16.31	95	87	75	0	0	4	2
	LIHUE	79	64	80	59	71	-2	0.31	-0.74	0.25	0.90	35	13.14	35	90	76	0	0	2	0
ID	BOISE	35	21	42	1	28	-3	0.46	0.16	0.26	1.28	168	7.97	69	93	76	0	7	3	0
	LEWISTON	28	18	38	0	23	-11	0.72	0.50	0.28	1.11	198	14.58	119	90	79	0	7	5	0
	POCATELLO	33	17	45	0	25	-1	3.70	3.48	2.40	4.68	836	17.72	147	88	77	0	7	4	2
IL	CHICAGO/O'HARE	23	8	33	-2	15	-13	0.68	0.12	0.44	1.31	91	35.50	101	80	68	0	7	3	0
	MOLINE	23	10	36	2	17	-10	0.25	-0.18	0.23	0.94	78	35.78	97	72	65	0	6	2	0
	PEORIA	28	14	40	4	21	-8	0.20	-0.36	0.13	0.60	41	36.62	104	87	54	0	7	3	0
	ROCKFORD	20	6	32	-6	13	-12	0.75	0.27	0.43	1.38	110	35.16	98	78	68	0	7	3	0
	SPRINGFIELD	31	17	43	7	24	-7	0.16	-0.43	0.08	0.60	40	42.47	123	84	53	0	6	3	0
IN	EVANSVILLE	43	23	70	14	33	-3	1.38	0.57	0.97	2.25	105	47.91	112	68	57	0	6	3	1
	FORT WAYNE	26	9	34	-2	18	-12	0.78	0.14	0.64	1.25	78	36.31	103	84	67	0	7	4	1
	INDIANAPOLIS	29	14	38	3	22	-10	0.80	0.11	0.42	1.23	69	45.64	115	86	65	0	7	4	0
	SOUTH BEND	24	8	33	-3	16	-14	0.89	0.18	0.65	1.52	84	46.13	120	85	77	0	7	6	1
IA	BURLINGTON	26	12	39	3	19	-10	0.13	-0.36	0.09	0.64	50	32.25	87	89	55	0	7	3	0
	CEDAR RAPIDS	20	4	31	-4	12	-12	0.05	-0.29	0.05	0.54	59	42.98	131	91	72	0	7	1	0
	DES MOINES	25	7	35	-4	16	-10	0.08	-0.22	0.07	0.69	87	33.81	99	69	56	0	7	2	0
	DUBUQUE	17	2	29	-9	10	-13	0.36	-0.02	0.15	0.96	93	40.39	116	83	71	0	7	4	0
	SIOUX CITY	24	3	37	-11	14	-9	0.16	0.03	0.09	0.29	78	31.06	121	72	61	0	7	2	0
	WATERLOO	17	1	30	-7	9	-14	0.27	0.03	0.17	1.01	144	40.92	125	77	65	0	7	3	0
KS	CONCORDIA	30	13	38	-3	22	-9	0.07	-0.10	0.07	0.55	115	30.33	108	78	58	0	7	1	0
	DODGE CITY	33	12	43	-8	23	-11	0.08	-0.09	0.08	0.42	105	23.20	106	88	56	0	7	1	0
	GOODLAND	29	7	46	-15	18	-12	0.14	0.08	0.12	0.21	117	16.99	87	81	62	0	7	2	0
	TOPEKA	33	17	46	2	25	-7	0.18	-0.14	0.17	0.78	90	42.96	122	76	54	0	7	2	0

Based on 1971-2000 normals

***** Not Available**

Weather Data for the Week Ending December 17, 2016

STATES AND STATIONS		TEMPERATURE °F						PRECIPITATION							RELATIVE HUMIDITY PERCENT		NUMBER OF DAYS TEMP. °F		NUMBER OF DAYS PRECIP	
		AVERAGE MAXIMUM	AVERAGE MINIMUM	EXTREME HIGH	EXTREME LOW	AVERAGE	DEPARTURE FROM NORMAL	WEEKLY TOTAL, IN.	DEPARTURE FROM NORMAL	GREATEST IN 24-HOUR, IN.	TOTAL, IN., SINCE DEC 1	PCT. NORMAL SINCE DEC 1	TOTAL, IN., SINCE JAN01	PCT. NORMAL SINCE JAN01	AVERAGE MAXIMUM	AVERAGE MINIMUM	90 AND ABOVE	32 AND BELOW	.01 INCH OR MORE	.50 INCH OR MORE
	WICHITA	38	19	49	4	28	-6	0.11	-0.19	0.08	0.48	63	50.42	169	81	61	0	7	2	0
KY	JACKSON	46	27	65	12	36	-3	1.17	0.19	0.83	2.00	81	48.74	102	82	48	0	4	3	1
	LEXINGTON	44	25	65	11	34	-3	2.14	1.23	1.35	3.00	136	41.85	95	71	52	0	6	4	2
	LOUISVILLE	44	26	67	13	35	-3	2.99	2.16	2.52	4.00	190	42.25	98	73	48	0	6	4	1
	PADUCAH	47	27	72	17	37	0	2.90	1.87	2.58	3.72	141	51.20	108	82	48	0	5	4	1
LA	BATON ROUGE	72	50	82	34	61	8	1.58	0.42	1.05	6.18	220	86.08	142	94	63	0	0	2	2
	LAKE CHARLES	71	54	78	41	62	9	0.33	-0.64	0.17	8.82	361	72.65	132	93	73	0	0	4	0
	NEW ORLEANS	72	53	82	37	63	8	0.32	-0.82	0.32	3.63	125	66.49	107	93	76	0	0	1	0
	SHREVEPORT	65	44	79	35	55	6	0.26	-0.76	0.12	2.88	115	58.75	119	94	63	0	0	4	0
ME	CARIBOU	17	-3	29	-13	7	-10	0.67	-0.03	0.39	1.95	115	41.70	116	83	65	0	7	3	0
	PORTLAND	28	11	39	-3	19	-10	1.19	0.25	0.64	2.44	104	39.24	89	79	48	0	7	4	2
MD	BALTIMORE	40	25	53	13	33	-4	0.75	0.03	0.58	1.95	110	39.69	98	75	55	0	5	2	1
MA	BOSTON	37	21	44	4	29	-7	0.97	0.14	0.53	1.41	69	31.22	76	79	45	0	6	3	1
	WORCESTER	31	16	38	-1	23	-7	1.16	0.33	0.63	1.81	89	38.93	82	81	43	0	7	4	1
MI	ALPENA	24	13	32	6	18	-7	0.64	0.25	0.28	1.09	112	28.98	105	83	66	0	7	6	0
	GRAND RAPIDS	24	14	34	4	19	-9	1.12	0.50	0.63	1.87	113	45.41	126	87	66	0	7	6	1
	HOUGHTON LAKE	20	9	29	4	15	-10	0.89	0.50	0.32	1.45	148	32.95	119	86	75	0	7	5	0
	LANSING	25	12	34	3	19	-9	1.13	0.63	0.59	1.57	118	34.75	113	80	67	0	7	6	1
	MUSKEGON	27	17	36	10	22	-7	0.94	0.35	0.54	1.66	108	38.99	123	82	67	0	7	4	1
	TRAVERSE CITY	25	14	33	8	20	-7	0.35	-0.23	0.17	0.87	62	29.71	92	85	63	0	7	4	0
MN	DULUTH	9	-7	20	-15	1	-14	0.45	0.26	0.35	0.83	136	32.42	106	79	67	0	7	4	0
	INT'L FALLS	3	-15	8	-23	-6	-15	0.03	-0.11	0.03	0.77	188	27.92	118	79	64	0	7	1	0
	MINNEAPOLIS	12	-2	21	-11	5	-15	0.80	0.60	0.35	1.11	191	39.28	135	79	65	0	7	4	0
	ROCHESTER	12	-3	23	-13	4	-14	0.66	0.44	0.29	1.29	205	42.77	138	86	77	0	7	4	0
	ST. CLOUD	10	-7	19	-17	2	-13	0.59	0.45	0.24	0.74	195	33.02	123	85	65	0	7	5	0
MS	JACKSON	65	45	81	31	55	7	0.35	-0.84	0.28	3.34	115	60.98	114	87	60	0	2	3	0
	MERIDIAN	64	43	80	27	54	5	0.99	-0.18	0.71	2.43	84	44.26	79	85	63	0	3	3	1
	TUPELO	57	35	72	24	46	2	0.54	-0.85	0.49	3.06	91	44.42	84	79	58	0	3	3	0
MO	COLUMBIA	34	18	47	10	26	-7	0.17	-0.40	0.10	0.56	36	39.62	101	82	53	0	7	3	0
	KANSAS CITY	31	15	44	2	23	-9	0.20	-0.17	0.14	0.86	86	48.32	129	77	47	0	7	3	0
	SAINT LOUIS	36	22	49	15	29	-6	0.09	-0.56	0.06	0.36	20	40.65	108	65	50	0	6	3	0
	SPRINGFIELD	43	25	53	11	34	-2	0.10	-0.65	0.09	0.27	13	35.90	82	83	62	0	6	2	0
MT	BILLINGS	13	-2	31	-19	6	-21	1.03	0.90	0.64	1.31	437	14.53	101	87	68	0	7	4	1
	BUTTE	18	-5	31	-36	6	-12	0.31	0.20	0.26	0.34	126	10.50	84	83	59	0	7	3	0
	CUT BANK	6	-17	11	-28	-6	-28	0.00	-0.06	0.00	0.01	8	10.86	88	84	63	0	7	0	0
	GLASGOW	6	-15	14	-29	-4	-21	0.09	0.03	0.04	0.35	250	20.92	190	80	69	0	7	4	0
	GREAT FALLS	5	-14	9	-26	-4	-29	0.35	0.22	0.23	0.57	197	14.13	97	86	70	0	7	4	0
	HAVRE	8	-14	14	-31	-3	-23	0.25	0.14	0.10	0.44	191	19.25	172	80	71	0	7	4	0
	MISSOULA	22	8	34	-16	15	-8	0.47	0.22	0.43	0.96	163	13.48	102	90	76	0	7	4	0
NE	GRAND ISLAND	28	5	48	-13	16	-10	0.01	-0.12	0.01	0.12	29	23.54	92	81	63	0	7	1	0
	LINCOLN	29	7	43	-6	18	-9	0.01	-0.17	0.01	0.54	106	28.82	103	77	56	0	7	1	0
	NORFOLK	24	1	45	-16	13	-11	0.10	-0.03	0.06	0.23	56	30.81	117	75	65	0	7	4	0
	NORTH PLATTE	29	5	51	-17	17	-9	0.04	-0.04	0.03	0.05	25	22.48	116	75	38	0	7	2	0
	OMAHA	26	8	35	-6	17	-9	0.02	-0.18	0.01	0.51	86	33.69	113	70	53	0	7	2	0
	SCOTTSBLUFF	28	3	44	-21	15	-11	0.19	0.08	0.08	0.25	83	15.43	96	77	54	0	7	4	0
	VALENTINE	18	-7	26	-27	5	-19	0.25	0.19	0.23	0.44	232	27.68	143	76	64	0	7	3	0
NV	ELY	45	23	55	2	34	8	0.49	0.41	0.31	0.49	245	10.66	110	81	55	0	6	3	0
	LAS VEGAS	62	46	70	39	54	7	0.00	-0.08	0.00	0.00	0	3.94	92	53	41	0	0	0	0
	RENO	53	32	64	19	43	9	0.64	0.45	0.59	1.03	219	8.86	125	69	46	0	3	2	1
	WINNEMUCCA	40	22	47	9	31	1	0.99	0.82	0.44	1.99	498	9.16	116	91	75	0	7	4	0
NH	CONCORD	30	9	41	-4	19	-8	1.05	0.40	0.51	1.99	121	31.76	88	77	46	0	7	4	2
NJ	NEWARK	38	25	46	16	32	-5	1.22	0.45	0.71	1.88	96	38.18	86	73	51	0	6	3	2
NM	ALBUQUERQUE	58	35	60	29	46	10	0.15	0.07	0.15	0.15	75	6.32	69	75	40	0	2	1	0
NY	ALBANY	33	17	40	1	25	-4	0.62	0.03	0.28	1.05	70	32.67	89	82	50	0	7	5	0
	BINGHAMTON	27	14	41	1	21	-7	1.31	0.62	0.58	2.56	145	35.47	95	90	66	0	7	6	1
	BUFFALO	29	18	39	9	24	-7	2.06	1.19	0.86	2.94	135	32.75	84	86	61	0	7	5	2
	ROCHESTER	30	19	39	11	25	-5	1.23	0.61	0.44	2.00	129	29.80	91	82	65	0	7	6	0
	SYRACUSE	30	16	37	-2	23	-6	1.04	0.33	0.49	1.87	100	39.45	102	89	59	0	7	5	0
NC	ASHEVILLE	46	26	61	19	36	-3	0.15	-0.57	0.08	2.00	109	33.09	73	82	62	0	6	3	0
	CHARLOTTE	47	29	59	22	38	-7	0.05	-0.62	0.05	1.63	101	32.28	77	89	47	0	5	1	0
	GREENSBORO	46	28	58	18	37	-4	0.04	-0.62	0.02	1.21	75	39.15	94	91	47	0	4	2	0
	HATTERAS	59	40	67	29	50	0	1.49	0.55	0.71	3.31	146	71.54	129	92	59	0	3	3	1
	RALEIGH	48	29	62	19	38	-5	0.05	-0.58	0.02	1.34	86	50.38	121	87	61	0	4	4	0
	WILMINGTON	57	36	70	23	47	-2	1.77	0.97	1.02	4.26	215	70.77	128	98	64	0	3	5	1
ND	BISMARCK	5	-14	12	-31	-5	-21	0.20	0.12	0.09	4.73	2252	26.15	157	77	69	0	7	4	0
	DICKINSON	4	-10	11	-25	-3	-22	0.02	-0.04	0.01	0.07	39	17.45	108	82	67	0	7	2	0
	FARGO	7	-8	13	-18	-1	-15	0.29	0.18	0.23	0.49	181	22.73	109	73	63	0	7	2	0
	GRAND FORKS	3	-14	8	-22	-5	-17	0.17	0.06	0.15	0.64	237	26.26	136	74	62	0	7	2	0
	JAMESTOWN	3	-11	10	-20	-4	-19	0.04	-0.04	0.03	0.23	115	25.36	139	81	68	0	7	2	0
	WILLISTON	2	-9	11	-15	-4	-18	0.01	-0.08	0.00	0.41	152	16.99	123	***	***	0	6	1	0
OH	AKRON-CANTON	30	14	44	3	22	-10	1.61	0.93	0.89	2.22	130	37.87	102	80	68	0	7	4	1
	CINCINNATI	37	21	62	6	29	-6	2.47	1.73	1.89	3.16	174	43.16	105	75	59	0	7	5	1
	CLEVELAND	31	19	39	8	25	-7	1.10	0.38	0.67	1.79	96	35.59	95	76	59	0	7	5	1
	COLUMBUS	33	17	54	4	25	-9	1.80	1.14	1.08	2.42	142	38.10	102	89	74	0	7	5	1
	DAYTON	29	14	39	1	22	-10	1.46	0.76	0.99	2.25	129	36.03	94	87	67	0	7	5	1
	MANSFIELD	28	14	38	4	21	-10	1.54	0.80	1.13	2.18	114	34.27	82	90	65	0	7	5	1

Based on 1971-2000 normals

***** Not Available**

Weather Data for the Week Ending December 17, 2016

STATES AND STATIONS		TEMPERATURE °F						PRECIPITATION							RELATIVE HUMIDITY PERCENT		NUMBER OF DAYS TEMP. °F		NUMBER OF DAYS PRECIP	
		AVERAGE MAXIMUM	AVERAGE MINIMUM	EXTREME HIGH	EXTREME LOW	AVERAGE	DEPARTURE FROM NORMAL	WEEKLY TOTAL, IN.	DEPARTURE FROM NORMAL	GREATEST IN 24-HOUR, IN.	TOTAL, IN., SINCE DEC 1	PCT. NORMAL SINCE DEC 1	TOTAL, IN., SINCE JAN01	PCT. NORMAL SINCE JAN01	AVERAGE MAXIMUM	AVERAGE MINIMUM	90 AND ABOVE	32 AND BELOW	.01 INCH OR MORE	.50 INCH OR MORE
	TOLEDO	24	11	34	3	18	-12	1.04	0.43	0.89	1.55	101	33.40	104	93	77	0	7	4	1
	YOUNGSTOWN	29	14	45	2	22	-9	1.74	1.06	0.72	2.32	133	43.08	117	85	73	0	7	6	2
OK	OKLAHOMA CITY	50	26	68	9	38	-2	0.04	-0.37	0.03	0.66	66	26.16	75	87	52	0	5	2	0
	TULSA	49	25	61	11	37	-3	0.01	-0.55	0.01	0.19	13	27.93	67	84	66	0	5	1	0
OR	ASTORIA	44	34	51	27	39	-4	1.10	-1.27	0.55	5.60	94	82.10	131	80	71	0	3	3	2
	BURNS	31	11	38	-16	21	-4	0.72	0.44	0.59	1.89	282	8.20	82	87	75	0	7	3	1
	EUGENE	***	***	***	***	***	***	2.18	0.55	1.45	4.22	93	40.44	86	***	***	***	***	3	2
	MEDFORD	44	33	48	22	38	0	2.40	1.74	1.38	3.44	205	20.58	120	96	73	0	3	5	2
	PENDLETON	26	12	40	-5	19	-15	0.84	0.52	0.50	1.33	162	12.63	104	87	79	0	7	5	1
	PORTLAND	39	32	47	25	36	-4	0.49	-0.81	0.29	2.60	80	41.34	119	85	73	0	4	4	0
	SALEM	39	28	49	16	33	-7	1.25	-0.23	0.66	3.55	95	45.39	122	89	79	0	6	4	2
PA	ALLENTOWN	35	21	43	12	28	-5	0.91	0.17	0.55	1.72	91	37.01	85	72	53	0	7	3	1
	ERIE	31	21	40	12	26	-7	0.92	0.05	0.64	3.20	145	45.98	111	83	64	0	7	5	1
	MIDDLETOWN	36	23	44	14	30	-4	1.06	0.32	0.65	1.99	105	40.60	104	82	48	0	6	3	1
	PHILADELPHIA	39	27	50	16	33	-5	1.15	0.43	0.72	2.09	117	35.29	87	68	50	0	5	3	1
	PITTSBURGH	35	18	61	5	27	-6	1.84	1.20	1.03	2.33	143	33.91	93	86	63	0	7	4	1
	WILKES-BARRE	32	20	39	8	26	-6	0.56	-0.01	0.27	1.25	83	30.60	84	84	55	0	7	4	0
	WILLIAMSPORT	32	19	42	9	26	-6	0.72	0.06	0.24	1.37	79	33.49	83	79	57	0	7	4	0
RI	PROVIDENCE	37	20	46	8	29	-5	1.02	0.11	0.57	1.42	63	38.29	86	73	52	0	7	3	1
SC	BEAUFORT	66	45	78	34	55	4	0.28	-0.36	0.13	3.64	246	51.92	108	93	62	0	0	3	0
	CHARLESTON	64	43	73	31	54	3	0.22	-0.46	0.11	4.35	274	59.21	119	91	60	0	2	4	0
	COLUMBIA	55	36	69	25	46	-1	1.08	0.38	1.00	2.64	163	38.84	84	82	61	0	2	2	1
	GREENVILLE	48	32	66	24	40	-4	0.04	-0.79	0.03	1.47	73	33.19	69	84	44	0	4	2	0
SD	ABERDEEN	10	-17	16	-32	-4	-21	0.35	0.29	0.09	0.46	354	19.27	96	71	65	0	7	5	0
	HURON	13	-12	18	-28	0	-20	0.44	0.38	0.31	0.78	411	20.30	98	85	66	0	7	3	0
	RAPID CITY	16	-4	23	-23	6	-19	0.35	0.27	0.30	0.38	238	12.88	79	82	60	0	7	2	0
	SIOUX FALLS	16	-6	22	-20	5	-14	0.40	0.30	0.37	0.67	216	30.97	127	81	68	0	7	2	0
TN	BRISTOL	46	27	54	17	36	-2	1.24	0.49	1.02	2.99	161	34.30	86	86	51	0	3	3	1
	CHATTANOOGA	51	33	63	24	42	-1	0.54	-0.51	0.38	3.43	128	33.96	65	76	60	0	3	3	0
	KNOXVILLE	49	30	69	21	40	-1	1.44	0.45	1.15	3.50	143	41.70	90	82	55	0	3	3	1
	MEMPHIS	53	34	76	28	44	0	1.90	0.57	1.06	4.22	124	58.47	112	86	57	0	3	5	2
	NASHVILLE	50	30	73	20	40	-1	1.40	0.37	0.88	2.44	94	38.21	83	81	54	0	4	4	1
TX	ABILENE	61	33	74	16	47	1	0.00	-0.28	0.00	1.19	189	36.81	159	85	66	0	4	0	0
	AMARILLO	55	23	74	0	39	2	0.03	-0.08	0.03	0.20	83	17.13	89	78	40	0	6	1	0
	AUSTIN	67	45	79	37	56	4	0.04	-0.51	0.03	3.07	234	53.82	165	91	74	0	0	2	0
	BEAUMONT	72	56	81	43	64	10	0.61	-0.53	0.35	9.04	329	74.02	129	92	68	0	0	4	0
	BROWNSVILLE	79	66	84	51	73	12	0.04	-0.20	0.04	1.46	232	22.61	84	95	78	0	0	1	0
	CORPUS CHRISTI	75	60	88	54	67	9	0.05	-0.34	0.05	2.05	225	32.58	104	97	87	0	0	1	0
	DEL RIO	65	48	79	40	57	5	0.00	-0.17	0.00	2.49	623	32.47	182	99	84	0	0	0	0
	EL PASO	72	46	76	41	59	14	0.00	-0.17	0.00	0.24	62	8.41	93	53	21	0	0	0	0
	FORT WORTH	61	38	74	22	49	2	0.00	-0.58	0.00	0.55	41	35.43	106	95	62	0	1	0	0
	GALVESTON	72	62	81	47	67	9	0.01	-0.75	0.01	7.36	385	52.79	125	94	75	0	0	1	0
	HOUSTON	71	53	81	43	62	8	0.19	-0.62	0.11	2.97	147	60.37	131	88	73	0	0	2	0
	LUBBOCK	62	27	78	8	44	4	0.00	-0.14	0.00	0.43	130	13.40	73	78	40	0	5	0	0
	MIDLAND	69	35	82	18	52	7	0.00	-0.14	0.00	0.36	109	15.13	104	80	46	0	2	0	0
	SAN ANGELO	68	37	84	22	53	6	0.00	-0.22	0.00	0.74	151	35.72	175	91	60	0	2	0	0
	SAN ANTONIO	67	48	77	40	57	4	0.05	-0.39	0.03	5.88	550	43.58	136	94	69	0	0	2	0
	VICTORIA	72	53	83	43	62	7	0.04	-0.51	0.04	2.68	200	38.92	100	93	79	0	0	1	0
	WACO	63	41	78	26	52	3	0.01	-0.62	0.01	1.13	74	38.42	120	96	74	0	1	1	0
	WICHITA FALLS	58	29	81	14	43	0	0.00	-0.39	0.00	0.83	92	37.17	133	78	52	0	5	0	0
UT	SALT LAKE CITY	44	29	57	19	36	6	0.47	0.22	0.31	1.12	178	13.98	88	86	58	0	7	4	0
VT	BURLINGTON	31	14	39	-3	22	-4	0.51	0.03	0.27	1.27	98	26.66	76	79	56	0	7	5	0
VA	LYNCHBURG	46	25	59	13	36	-3	0.48	-0.21	0.45	2.10	123	42.08	101	82	44	0	5	3	0
	NORFOLK	49	34	61	22	42	-3	0.41	-0.22	0.27	2.04	135	68.36	155	84	54	0	3	3	0
	RICHMOND	46	28	55	15	37	-4	0.41	-0.25	0.41	2.12	134	52.04	123	77	57	0	4	1	0
	ROANOKE	45	28	62	14	36	-3	0.14	-0.48	0.12	2.01	128	46.03	112	66	47	0	4	2	0
	WASH/DULLES	43	24	53	9	33	-4	0.28	-0.40	0.16	1.58	94	34.54	85	71	49	0	6	2	0
WA	OLYMPIA	38	28	45	15	33	-5	0.92	-0.87	0.66	3.37	74	54.44	115	94	88	0	4	4	1
	QUILLAYUTE	41	29	45	24	35	-6	1.32	-1.98	1.05	6.40	78	115.56	121	88	76	0	6	2	1
	SEATTLE-TACOMA	38	31	42	23	35	-6	0.23	-1.05	0.14	1.62	50	42.92	124	87	74	0	4	2	0
	SPOKANE	21	7	30	-7	14	-13	0.13	-0.38	0.08	0.45	35	17.26	110	93	77	0	7	2	0
	YAKIMA	29	15	32	0	22	-7	0.27	-0.03	0.25	0.60	82	9.71	128	82	72	0	7	2	0
WV	BECKLEY	42	22	63	5	32	-4	0.77	0.08	0.59	1.56	93	46.48	116	76	61	0	6	4	1
	CHARLESTON	48	25	69	9	36	-2	0.72	-0.02	0.64	1.11	58	42.24	99	81	47	0	4	3	1
	ELKINS	42	20	66	1	31	-2	1.20	0.44	0.61	2.25	118	43.42	97	82	48	0	6	4	1
	HUNTINGTON	45	25	70	11	35	-3	0.92	0.18	0.41	1.50	81	43.87	108	80	46	0	4	3	0
WI	EAU CLAIRE	12	-2	21	-10	5	-14	0.44	0.22	0.22	0.70	113	39.84	126	85	64	0	7	3	0
	GREEN BAY	19	8	30	-3	14	-8	0.78	0.47	0.32	1.15	134	32.02	112	81	63	0	7	3	0
	LA CROSSE	16	4	26	-4	10	-13	0.64	0.37	0.30	1.15	151	45.84	144	79	59	0	7	3	0
	MADISON	18	6	28	-5	12	-12	0.85	0.47	0.35	1.48	147	49.44	153	77	64	0	7	3	0
	MILWAUKEE	22	10	33	0	16	-11	1.02	0.51	0.47	1.41	108	32.12	95	69	59	0	7	3	0
WY	CASPER	26	-1	46	-30	12	-12	0.43	0.30	0.36	0.84	255	16.32	128	84	66	0	7	3	0
	CHEYENNE	36	9	53	-11	22	-5	0.32	0.24	0.21	0.43	179	16.65	109	74	59	0	7	3	0
	LANDER	31	6	49	-21	18	-4	0.52	0.39	0.50	0.57	168	22.96	175	79	46	0	7	2	1
	SHERIDAN	20	-4	37	-25	8	-15	0.39	0.25	0.30	0.60	182	18.73	130	78	63	0	7	4	0

Based on 1971-2000 normals ***** Not Available**

Autumn Weather Review

Weather summary provided by USDA/WAOB

Highlights: La Niña returned, albeit weakly, replacing the near-record-strength El Niño that had been in place early in the year. Still, some of the lingering atmospheric warmth related to El Niño may have contributed to the nation's warmest autumn on record, easily surpassing the record set just last year.

Meanwhile, autumn precipitation was scarce in much of the Southeast, leading to rapid drought expansion and intensification. Some of the harshest drought conditions existed in a broad area centered on the southern Appalachians, where the effects longer-term precipitation deficits were exacerbated by a hot, dry autumn. The drought culminated in a rash of November fires, highlighted by chronically poor air quality and a deadly late-month wildfire in the Great Smoky Mountains. In stark contrast, Hurricane Matthew and other tropical systems led to heavy precipitation in the southern Atlantic region. Matthew's rain in early October triggered record flooding in eastern North Carolina and environs.

Farther north, mid- to late-autumn precipitation provided varying degrees of relief from the worst Northeastern drought since 2002. Another area of drought concern was focused across the central High Plains, leading to poor establishment for a portion of the winter wheat crop. Much more favorable moisture conditions existed from northern California and the Pacific Northwest to the northern Plains, in part due to record-setting October precipitation. Elsewhere, southern California was mired in a 5-year drought, despite occasional autumn showers, while harvest activities were completed on or ahead of schedule in the Midwest, despite a few rain-related delays.

According to the Drought Monitor, U.S. drought covered nearly one-third (31.46%) of the country by the end of November, up from 18.34% in mid-September. Most of the expansion occurred in the Southeast, with smaller net increases in drought coverage occurring across the Northeast and the central High Plains. In contrast, autumn precipitation eased or eradicated drought in northern California, the Northwest, and the Intermountain West.

Historical Perspective: According to preliminary information provided by the National Centers for Environmental Information, the contiguous U.S. experienced its warmest autumn, surpassing last year's record. The nation's autumn average temperature of 57.6°F was 4.1°F above the 20th century mean, toppling the September-November 2015 standard of 56.8°F. Seven of the nine warmest autumns on record (in order: 2016, 2015, 1998, 2005, 2001, 1999, and 2007) have occurred in the last 20 years; previously, records had been set in 1931 with 56.0°F (currently, the fifth-warmest autumn) and 1963 with 56.6°F (now third warmest). All states ranked in the warmest one-fifth of the historical distribution; the "coolest" state, Oregon, experienced its 18th-warmest autumn (figure 1). It was the warmest autumn on record in eight states (CO, IA, KS, MI, MN, NM, TX, and WI), and among the ten warmest in all other states except Nevada and the Pacific Coast States.

Meanwhile, September-November precipitation averaged 6.88 inches across the contiguous U.S., matching the 1901-2000 mean. However, it was among the ten driest autumn periods in Colorado and five Southeastern States (AL, KY, LA, MS, and TN). In Alabama, where autumn rainfall averaged just 4.09 inches (39% of normal), the only drier September-November periods occurred in 1897, with 3.81 inches, and 1924, with 3.83 inches. In contrast, Washington noted its wettest autumn on record (18.78 inches, or 160% of normal), eclipsing 18.05 inches in 1995. In addition, it was the sixth-wettest autumn in Montana and ninth-wettest autumn in Idaho (figure 2).

Figure 1 Statewide Average Temperature Ranks
September–November 2016
Period: 1895–2016

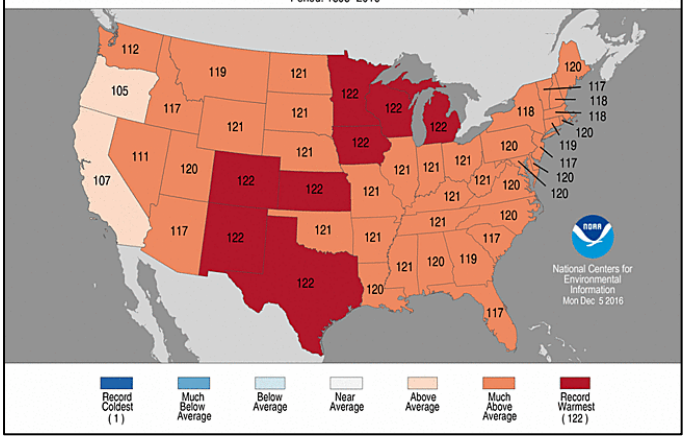
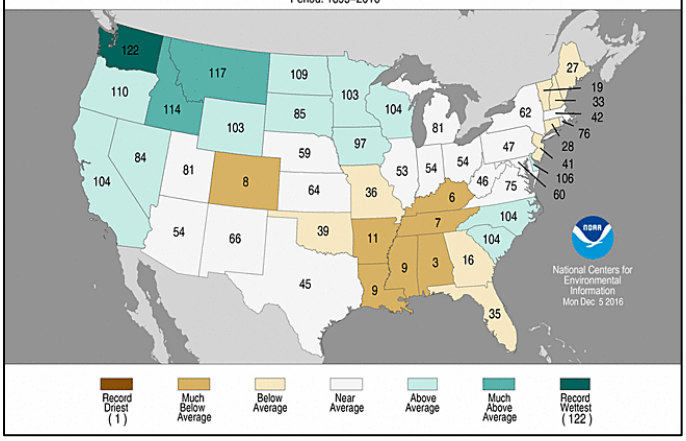


Figure 2 Statewide Precipitation Ranks
September–November 2016
Period: 1895–2016



September: September opened with minimal Hurricane Hermine making landfall on Florida's Gulf coast southeast of Tallahassee and ended with powerful Hurricane Matthew—bound for the southeastern U.S.—crossing the Caribbean Sea. Also, Tropical Storm Julia contributed to locally heavy rain along the middle and southern Atlantic Coast. Meanwhile over the eastern Pacific Ocean, remnant moisture from several tropical cyclones—including Tropical Storm Roslyn and Hurricanes Newton and Paine—reached the southwestern U.S.

In early September, Hermine's heavy rain and gusty winds briefly threatened the quality of unharvested crops, including open-boll cotton, in the southern Atlantic region. Farther inland, however, most of the Southeast experienced a hot, dry September, promoting summer crop maturation and harvesting but depleting soil moisture and curtailing pasture growth. Late-season warmth extended northward, where the Northeast—despite occasional showers—continued to endure its worst drought since 2002.

By October 2, five New England States—Massachusetts, New Hampshire, Rhode Island, Maine, and Connecticut—topped the nation in pastures rated in very poor to poor condition: 81, 65, 60, 59, and 56%. Elsewhere, New Mexico (59% very poor to poor) led the western U.S., while Georgia (45%) paced the Southeast. On the same date, Rhode Island led the U.S. in topsoil moisture rated very short or short (90%), closely followed by Massachusetts (78%) and Connecticut (76%). Topsoil moisture was at least one-half very short to short in seven other Southern and Eastern States.

In contrast, September downpours impeded fieldwork across the upper Midwest and resulted in lowland flooding. At the height of the wet spell, on September 25, Minnesota led the nation in surplus topsoil moisture (42%), followed by Wisconsin (40%) and Iowa (30%). In late September, the Cedar River rose to its second-highest level on record in Iowa locations such as Waterloo and Cedar Rapids, behind only June 2008.

Conditions were somewhat less wet across the remainder of the Plains and Corn Belt, although showers periodically slowed fieldwork. Nevertheless, weather conditions across the nation's mid-section—excluding the upper Midwest—were often warm enough and sometimes dry enough to promote summer crop maturation and fieldwork, including early-season harvest efforts and winter wheat planting.

Elsewhere, alternating periods of cool and warm weather prevailed in the western U.S., with a general tendency toward cooler-than-normal conditions in the Desert Southwest (due to clouds and tropically enhanced showers) and the Northwest (due to the passage of several strong cold fronts). Cool weather and occasional showers caused minor fieldwork delays in the Northwest, while late-month heat favored crop maturation and fieldwork in California.

According to NCEI, the contiguous U.S. experienced its ninth-warmest, 40th-wettest September during the 122-year period of record. September's average temperature of 67.2°F was 2.4°F above the 1901-2000 mean. Only four states (AZ, ID, OR, and WA) had a September temperature in the "cool" half of the historical distribution. Meanwhile, top-ten rankings for September warmth covered Iowa, Louisiana, and all 26 states east of the Mississippi River except for South Carolina and Tennessee. For Ohio, it was the warmest September on record. Nationally, September precipitation averaged 2.70 inches, 108% of normal. Statewide rankings ranged from the fifth-driest September in Maine to the tenth-wettest September in North Dakota and South Carolina.

October: During October, stunning, late-season warmth dominated the country. In fact, near- or slightly below-normal temperatures were mostly limited to northern and central California and the Pacific Northwest, while record-setting warmth stretched across the Southwest and portions of the Plains, mid-South, Midwest, and Southeast. The warmth promoted summer crop maturation and fieldwork, including harvest activities and winter wheat planting.

However, dry weather accompanied the warmth across vast stretches of the southern U.S., encompassing the Southwest, central and southern High Plains and much of the Southeast. In particular, intensifying Southeastern drought resulted in poor pasture conditions and planting delays for winter grains and cover crops, while dryness on the central and southern High Plains hampered winter wheat establishment.

In stark contrast, Hurricane Matthew drenched the southern Mid-Atlantic region in early October, unleashing historic floods, damaging hog and poultry operations, and destroying some unharvested summer crops such as cotton and soybeans. Warm, dry weather later returned to eastern North Carolina and environs, favoring flood recovery.

Meanwhile, wet weather persisted throughout the month in northern California and the Northwest, setting numerous October precipitation records and easing or eradicating the lingering effects of long-term drought. Precipitation fell nearly every day during October in parts of the Pacific Northwest, limiting fieldwork but generally benefiting rangeland, pastures, and winter grains. Some of the wetness extended across the northern Rockies to the High Plains, where mid-month snow in advance of a brief cold spell helped to insulate emerging winter wheat.

Elsewhere, occasional October showers stretched from the Midwest into the Northeast. Despite the rain, Midwestern corn and soybean harvesting remained mostly on schedule, with no major delays. In the Northeast, October storms provided varying degrees of drought relief, with some of the most significant rain (and wet snow) falling along the northern Atlantic Coast and in western sections of New York and Pennsylvania.

The contiguous U.S. experienced its third-warmest, 49th-wettest October on record. The October average temperature of 57.7°F was 3.6°F above the 1901-2000 mean. Only October 1963 (59.4°F) and 1947 (58.8°F) were warmer. State temperature rankings ranged from the 53rd-coolest October in Oregon to the warmest October on record in New Mexico. Oregon was the only state in the "cool" half of the historical distribution. In addition to New Mexico, 22 states from the Four Corners region to the middle and southern Atlantic Coast noted one of their ten highest October average temperature values on record. Meanwhile, October precipitation averaged 2.33 inches, 108% of the long-term mean. Contrasting precipitation values (e.g. wet in the Northwest and dry across the South) nearly balanced each other. State precipitation rankings ranged from the second-driest October in Alabama to record-setting wetness in Idaho, Montana, and Washington. Additionally, top-ten rankings for October dryness included Colorado, Louisiana, Mississippi, Tennessee, and Texas, while top-ten rankings for wetness occurred in California, Oregon, and South Carolina.

November: Punishing Southeastern drought culminated in a late-November wildfire disaster in Gatlinburg, TN, just as rain began to fall across the Great Smoky Mountains. However, before rain helped to douse the flames, howling southerly winds in advance of a cold front on November 28-29 downed power lines and spread embers from the Chimney Tops 2 fire across more than 17,000 acres, resulting in the tragic loss of 14 lives and nearly 2,500 structures, according to preliminary reports. Dozens of other large Southeastern fires burned in November before rain arrived, causing reductions in air quality and charring well over 100,000 acres of timber and brush.

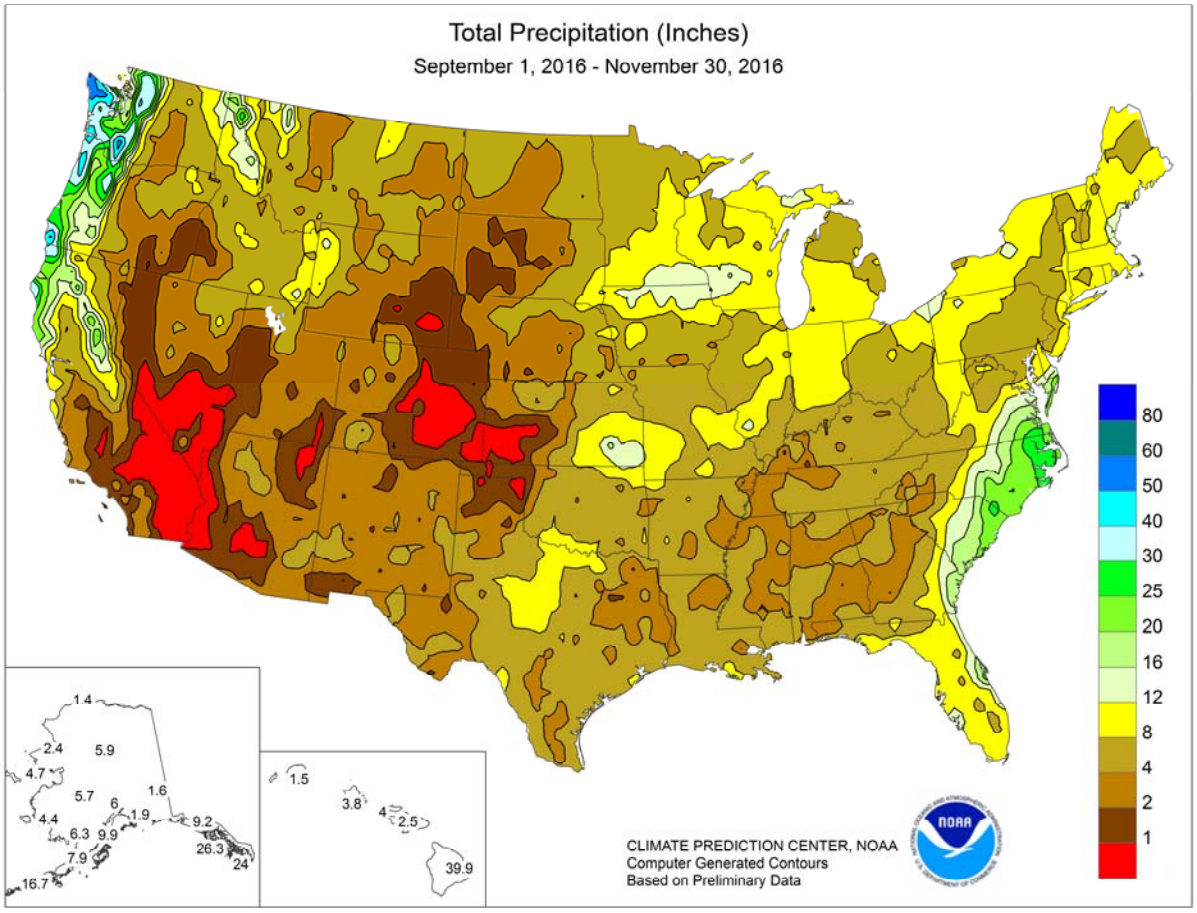
Effects of the Southeastern drought extended to agriculture and included supplemental feed requirements for livestock due to abysmal pasture conditions; surface water shortages such as dried-up ponds and creeks; and a lack of soil moisture for germination of winter grains and cover crops. By November 27, pastures were rated at least three-quarters very poor to poor in Alabama (95%), Georgia (81%) and Tennessee (79%). Only 12% of Alabama's winter wheat had emerged, compared to the 5-year average of 54%. And, topsoil moisture in Alabama was 100% very short to short, along with 98% in Georgia, 81% in Tennessee, and 76% in Kentucky and Mississippi.

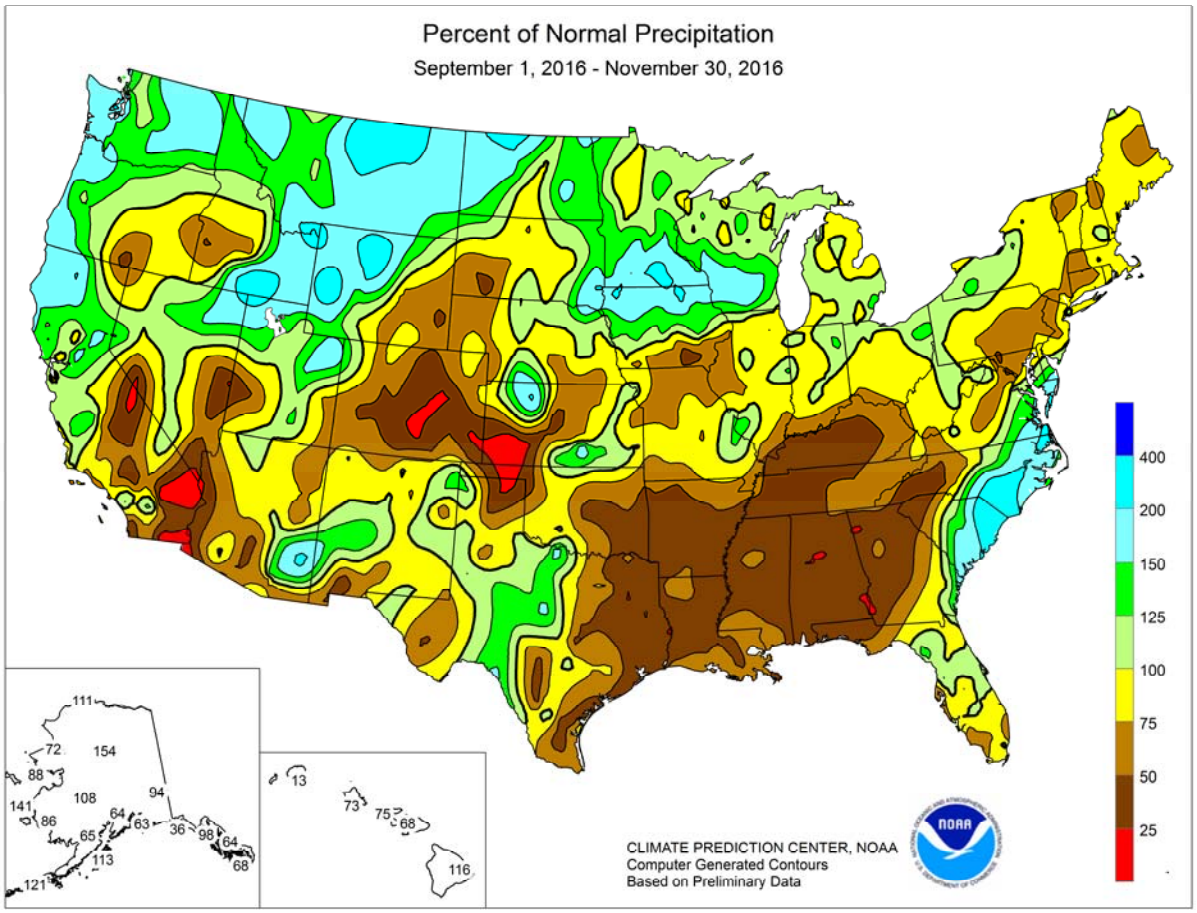
Meanwhile, developing drought was a concern with respect to winter wheat establishment across portions of the central and southern Plains. By November 27, wheat rated very poor to poor ranged from 12 to 16% in all of the Plains States from Nebraska southward. Topsoil moisture was more than one-half very short to short in Colorado (60%) and Oklahoma (55%), and ranged from 61 to 80% very short to short across the western one-third of Kansas.

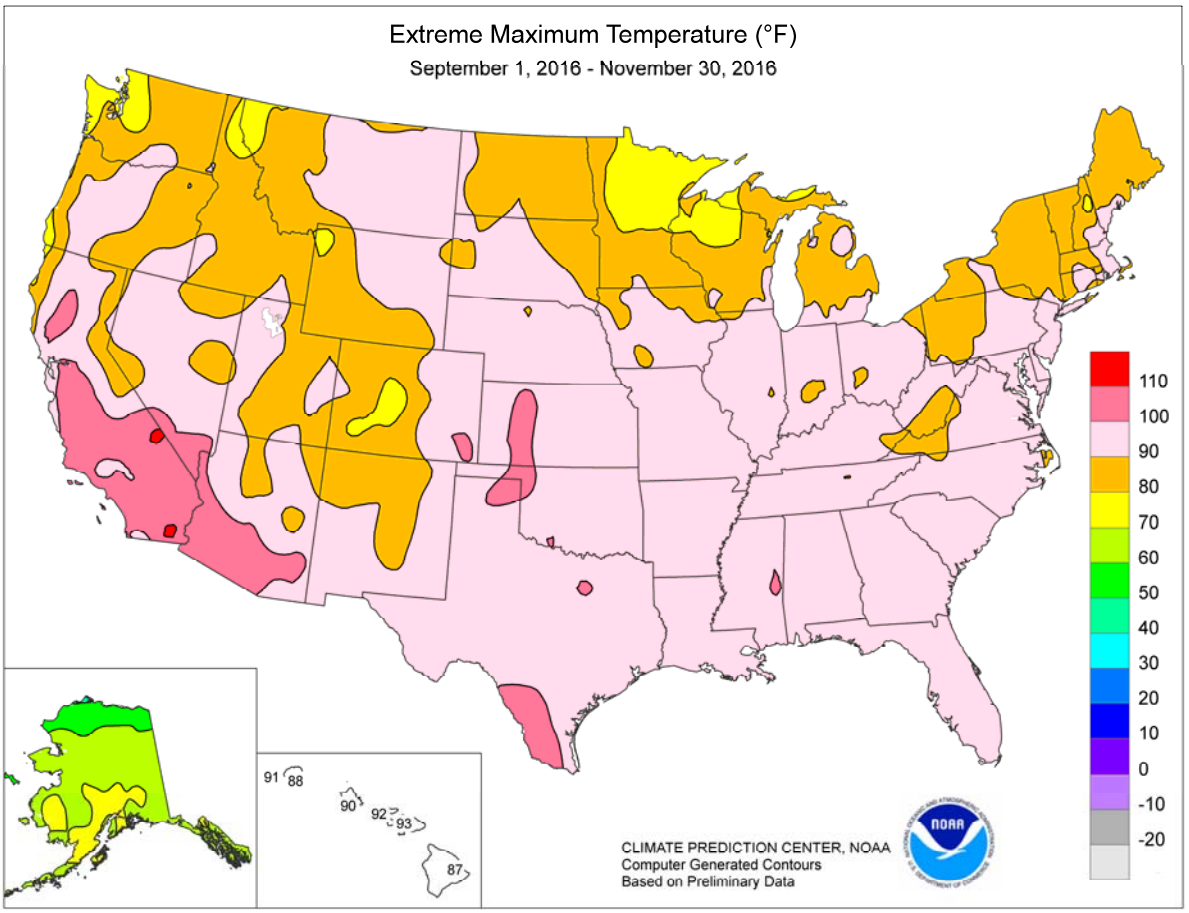
Farther north, however, ample moisture benefited winter wheat but limited late-season fieldwork. Specifically, at least two-thirds of the winter wheat was rated in good to excellent condition on November 27 in the Great Lakes States and the Northwest, ranging from 68% in Indiana and Michigan to 91% in Washington. Meanwhile, Northern fieldwork was largely complete by the end of autumn, despite sporadic delays. Among Midwestern States, harvest progress by the 27th was slowest in Michigan—88% complete for corn and 94% for soybeans.

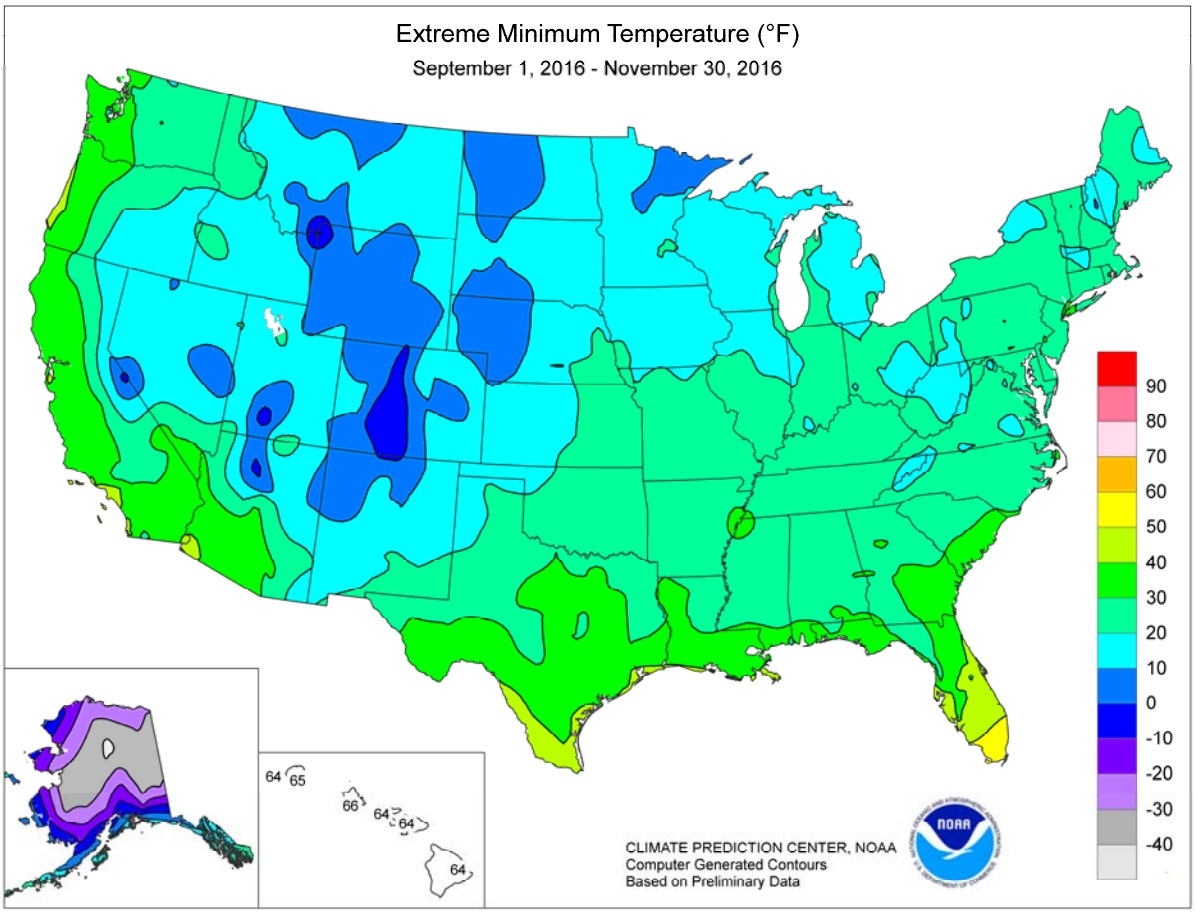
Elsewhere, somewhat drier weather prevailed across the Northwest, following record-setting October wetness, while beneficial precipitation fell in parts of the Southwest. Still, Western snowpack was lacking in many areas due to unusual warmth, which dominated not only the western U.S. but also nearly the entire country. In fact, parts of the central and northwestern U.S. experienced record-setting November warmth, with monthly temperatures averaging 5 to 10°F above normal across a large area.

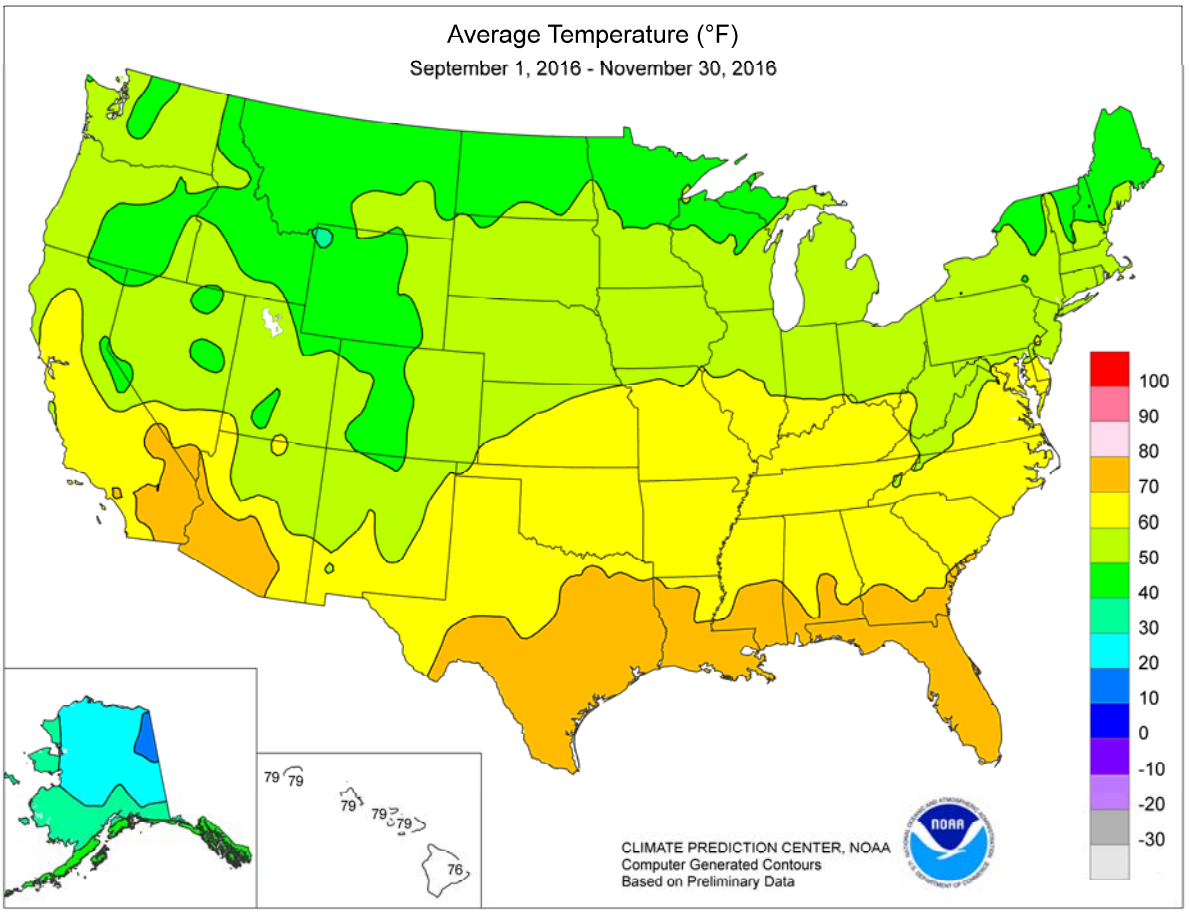
The U.S. experienced its second-warmest, 25th-driest November during the 122-year period of record. The nation's monthly average temperature of 48.0°F was 6.3°F above the 1901-2000 mean, ranking behind only 48.1°F in November 1999. All states ranked in the warmest one-third of the distribution; the "coolest" state, North Carolina, experienced its 31st-warmest November. Temperatures were among the ten highest November values in 25 states, with Idaho, North Dakota, and Washington reporting their warmest November. Meanwhile, November precipitation averaged just 1.73 inches (78% of normal) across the Lower 48 states. Dryness was prominent across the eastern U.S., where it was the driest November in Florida. Other states in the top ten for November dryness were Delaware, Georgia, Maryland, and South Carolina. In contrast, November wetness affected portions of the north-central and southwestern U.S. New Mexico, with its 12th-wettest November, achieved the highest rank of any state.

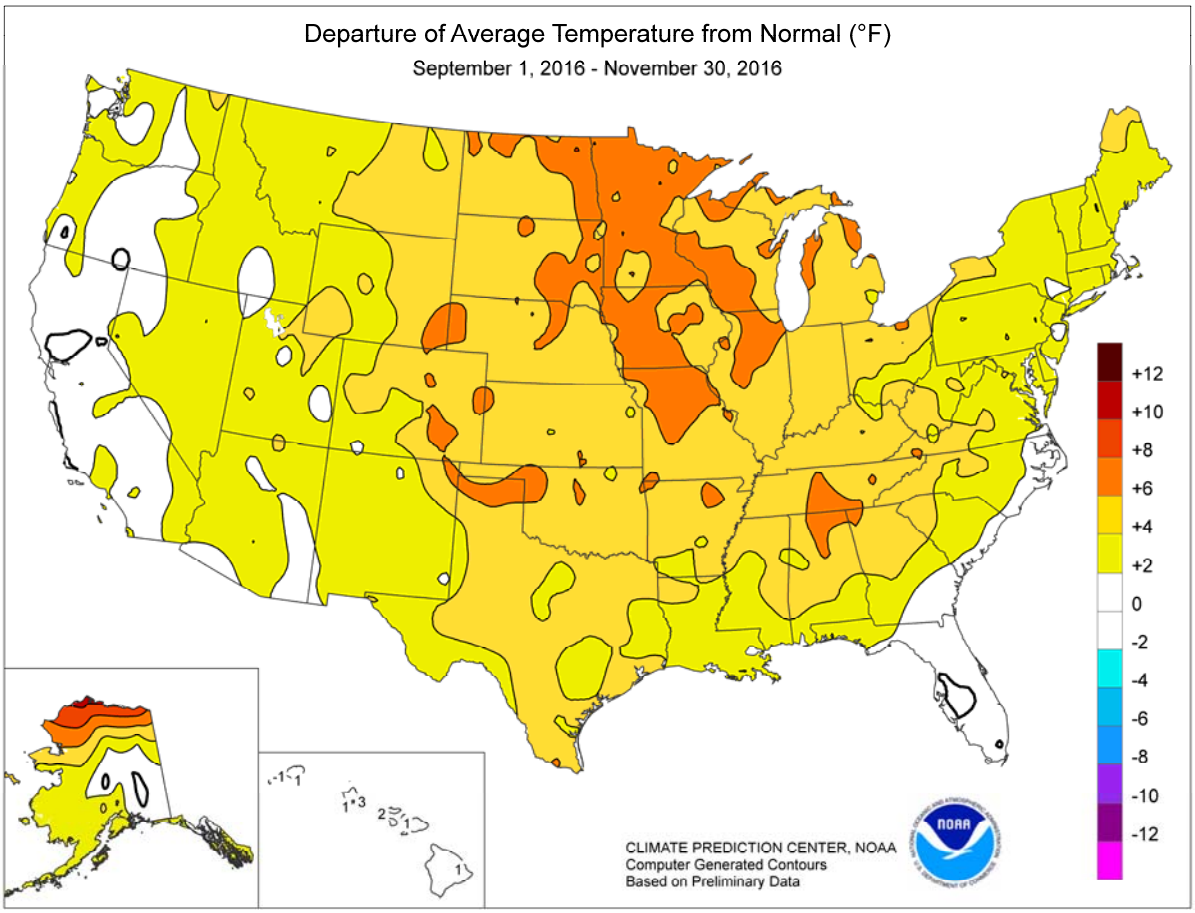

Total Precipitation (Inches)
September 1, 2016 - November 30, 2016
80
60
50
40
30
25
20
16
12
8
4
2
1
1.4
2.4
5.9
4.7
5.7
6
1.6
1.9
4.4
6.3
9.9
9.2
26.3
24
7.9
16.7
1.5
3.8
4
2.5
39.9
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data
NOAA


Percent of Normal Precipitation
September 1, 2016 - November 30, 2016
400
200
150
125
100
75
50
25
111
72
154
88
108
94
141
86
64
63
36
98
64
65
113
68
121
13
73
75
68
116
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data
NOAA


Extreme Maximum Temperature (°F)
September 1, 2016 - November 30, 2016
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
91
88
90
92
93
87
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data


Extreme Minimum Temperature (°F)
September 1, 2016 - November 30, 2016
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
64
65
66
64
64
64
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data


Average Temperature (°F)
September 1, 2016 - November 30, 2016
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
79
79
79
79
79
76
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data


Departure of Average Temperature from Normal (°F)
September 1, 2016 - November 30, 2016
+12
+10
+8
+6
+4
+2
0
-2
-4
-6
-8
-10
-12
-1
1
3
2
1
1
CLIMATE PREDICTION CENTER, NOAA
Computer Generated Contours
Based on Preliminary Data

National Weather Data for Selected Cities

Autumn 2016

Data Provided by Climate Prediction Center

STATES AND STATIONS	TEMP, °F		PRECIP.	
	AVERAGE	DEPARTURE	TOTAL	DEPARTURE
AL BIRMINGHAM	70	7	2.75	-9.16
HUNTSVILLE	69	7	6.02	-7.03
MOBILE	71	3	7.29	-7.38
MONTGOMERY	71	5	4.35	-6.98
AK ANCHORAGE	38	3	3.17	-2.87
BARROW	26	11	1.38	0.14
COLD BAY	44	3	16.70	2.86
FAIRBANKS	26	3	2.39	-0.33
JUNEAU	43	1	20.87	-0.40
KING SALMON	39	4	7.87	1.43
KODIAK	44	3	25.87	3.04
NOME	33	4	4.70	-0.67
AZ FLAGSTAFF	49	2	4.19	-1.72
PHOENIX	78	4	1.20	-1.07
TUCSON	74	4	2.20	-1.13
AR FORT SMITH	68	6	3.78	-8.57
LITTLE ROCK	67	4	5.78	-7.91
CA BAKERSFIELD	69	3	0.62	-0.42
EUREKA	55	1	17.91	8.91
FRESNO	67	3	2.05	0.04
LOS ANGELES	68	2	1.48	-0.27
REDDING	64	1	12.70	6.01
SACRAMENTO	63	0	5.83	2.39
SAN DIEGO	69	2	1.00	-0.72
SAN FRANCISCO	62	2	4.32	0.59
STOCKTON	64	0	4.05	1.13
CO ALAMOSA	46	4	0.74	-1.30
CO SPRINGS	56	8	0.23	-2.38
DENVER	56	7	1.06	-1.45
GRAND JUNCTION	57	5	1.85	-0.77
PUEBLO	58	6	0.83	-1.23
CT BRIDGEPORT	59	4	11.21	0.44
HARTFORD	55	3	7.65	-4.48
DC WASHINGTON	64	5	4.16	-5.88
DE WILMINGTON	60	4	8.93	-1.35
FL DAYTONA BEACH	74	0	16.31	2.19
FT LAUDERDALE	79	1	9.13	-10.14
FT MYERS	77	0	10.14	-2.02
JACKSONVILLE	71	1	13.89	-0.21
KEY WEST	81	1	10.26	-2.17
MELBOURNE	76	1	20.76	5.68
MIAMI	80	1	16.61	-1.39
ORLANDO	76	1	10.09	-0.72
PENSACOLA	74	4	4.22	-10.12
ST PETERSBURG	77	1	5.13	-7.14
TALLAHASSEE	73	4	8.31	-3.81
TAMPA	78	2	5.70	-4.75
WEST PALM BEACH	79	1	13.41	-5.70
GA ATHENS	67	5	3.49	-7.22
ATLANTA	69	6	6.57	-4.73
AUGUSTA	67	3	7.28	-2.19
COLUMBUS	70	4	3.85	-5.52
MACON	68	4	3.53	-5.32
SAVANNAH	70	3	16.78	6.18
HI HILO	76	1	39.91	5.55
HONOLULU	79	-1	3.78	-1.40
KAHULUI	79	1	2.46	-1.15
LIHUE	79	1	1.51	-10.13
ID BOISE	56	4	1.72	-1.18
LEWISTON	55	3	3.84	0.87
POCATELLO	50	3	5.79	2.80
IL CHICAGO/O'HARE	58	6	7.22	-1.77
MOLINE	59	7	5.42	-3.27
PEORIA	60	7	11.01	2.14
ROCKFORD	57	7	7.36	-1.31
SPRINGFIELD	61	6	6.01	-2.31
IN EVANSVILLE	63	6	7.20	-2.75
FORT WAYNE	57	5	11.25	2.83
INDIANAPOLIS	60	5	9.40	0.15
SOUTH BEND	57	5	10.20	-0.25
IA BURLINGTON	59	5	7.37	-1.86
CEDAR RAPIDS	56	5	12.05	4.33
DES MOINES	60	8	7.79	-0.08
DUBUQUE	55	6	10.27	1.72
SIOUX CITY	56	6	6.42	0.61
WATERLOO	55	6	11.28	3.74
KS CONCORDIA	60	5	3.57	-2.22
DODGE CITY	62	6	0.77	-3.39
GOODLAND	57	6	2.74	-0.25
HILL CITY	59	5	9.28	5.03
TOPEKA	62	6	9.29	0.28
WICHITA	64	6	13.60	6.37
KY JACKSON	63	5	5.74	-5.41
LEXINGTON	62	5	3.84	-5.41
LONDON-CORBIN	61	4	4.66	-5.41
LOUISVILLE	65	6	4.58	-5.06
PADUCAH	64	6	3.82	-7.72
LA BATON ROUGE	73	5	5.68	-7.73
LAKE CHARLES	73	4	6.91	-7.59
NEW ORLEANS	76	6	7.45	-6.24
SHREVEPORT	71	4	5.50	-6.84
ME BANGOR	50	2	8.59	-1.97
CARIBOU	47	5	8.65	-0.73
PORTLAND	52	4	13.27	0.78
MD BALTIMORE	60	4	6.65	-3.61
MA BOSTON	56	1	9.54	-1.70
WORCESTER	52	2	13.73	0.45
MI ALPENA	52	6	7.21	0.00
DETROIT	57	5	11.35	3.19
FLINT	54	5	10.30	1.55
GRAND RAPIDS	55	5	11.79	1.36
HOUGHTON LAKE	51	5	7.90	0.39
LANSING	55	6	9.71	1.28
MUSKEGON	56	6	12.18	2.63
TRAVERSE CITY	55	6	9.37	0.18
MN DULUTH	49	7	7.67	-1.04
INT'L FALLS	46	6	6.61	0.24
MINNEAPOLIS	54	7	11.86	5.12
ROCHESTER	53	7	13.21	5.88
ST. CLOUD	50	6	7.45	0.74
MS JACKSON	70	5	4.45	-7.24
MERIDIAN	71	5	4.50	-7.37
TUPELO	68	6	5.52	-6.22
MO COLUMBIA	62	7	10.71	0.64
JOPLIN	64	5	8.86	-4.36
KANSAS CITY	62	6	8.03	-2.24
SPRINGFIELD	63	5	10.01	-2.75
ST JOSEPH	60	4	10.86	1.51
ST LOUIS	64	6	11.82	2.39
MT BILLINGS	52	5	5.47	2.12
BUTTE	43	3	4.10	1.62
GLASGOW	48	5	4.84	2.76
GREAT FALLS	49	5	4.26	1.51
HELENA	49	5	2.67	0.48
KALISPELL	45	3	6.35	2.74
MILES CITY	51	4	4.57	1.73
MISSOULA	47	3	4.30	1.43
NE GRAND ISLAND	56	5	4.02	-1.33
HASTINGS	57	5	3.88	-1.99
LINCOLN	58	5	5.89	-0.55
MCCOOK	56	4	6.26	2.52
NORFOLK	55	5	5.71	0.30
NORTH PLATTE	55	6	3.27	-0.05
OMAHA/EPPLEY	59	7	6.85	-0.35
SCOTTSBLUFF	54	7	1.87	-1.16
VALENTINE	54	6	4.71	1.16
NV ELKO	51	4	3.88	1.44
ELY	48	3	1.31	-1.26
LAS VEGAS	73	5	0.23	-0.63
RENO	56	4	2.58	0.91
WINNEMUCCA	51	2	2.58	0.59
NH CONCORD	52	4	11.56	1.37
NJ ATLANTIC CITY	59	3	9.43	0.17
NEWARK	60	3	11.69	0.63
NM ALBUQUERQUE	61	4	2.81	0.12
NY ALBANY	53	3	8.18	-1.62
BINGHAMTON	50	2	8.96	-0.97
BUFFALO	55	4	11.29	0.34
ROCHESTER	55	5	10.16	1.27
SYRACUSE	53	3	14.17	3.05
NC ASHEVILLE	61	5	2.64	-8.07
CHARLOTTE	65	3	9.10	-1.75
GREENSBORO	64	5	7.15	-3.37
HATTERAS	67	1	15.97	0.05
RALEIGH	64	3	12.31	1.90
WILMINGTON	66	1	24.73	11.47
ND BISMARCK	49	5	2.88	-0.71
DICKINSON	47	3	5.44	1.89
FARGO	51	8	6.79	1.58
GRAND FORKS	49	7	6.60	1.95
JAMESTOWN	48	5	6.30	2.45
MINOT	49	6	6.25	2.33
WILLISTON	48	6	4.83	1.96
OH AKRON-CANTON	57	5	12.05	3.05
CINCINNATI	60	4	6.92	-2.32
CLEVELAND	59	7	10.44	0.56
COLUMBUS	59	4	7.42	-1.00
DAYTON	58	4	6.26	-2.41
MANSFIELD	57	6	8.47	-1.41
TOLEDO	56	4	8.54	0.57
YOUNGSTOWN	55	4	12.26	2.84
OK OKLAHOMA CITY	67	6	5.59	-4.14
TULSA	67	5	7.05	-5.23
OR ASTORIA	57	4	35.65	16.93
BURNS	46	2	1.92	-0.41
EUGENE	56	3	15.26	1.93
MEDFORD	58	3	7.14	2.12
PENDLETON	54	2	3.91	0.66
PORTLAND	57	2	16.83	6.69
SALEM	56	3	19.69	8.84
PA ALLENTOWN	57	5	7.98	-3.42
ERIE	58	5	14.72	2.11
MIDDLETOWN	59	4	7.84	-2.12
PHILADELPHIA	61	3	7.75	-2.04
PITTSBURGH	57	4	8.45	-0.03
WILKES-BARRE	55	3	7.68	-2.32
WILLIAMSPORT	56	4	8.10	-2.69
PR SAN JUAN	83	2	28.95	12.12
RI PROVIDENCE	57	3	11.03	-0.76
SC CHARLESTON	70	3	22.86	11.13
COLUMBIA	68	4	13.26	3.55
FLORENCE	67	2	23.52	14.32
GREENVILLE	66	5	3.51	-8.12
MYRTLE BEACH	68	3	30.33	18.55
SD ABERDEEN	51	6	4.75	0.56
HURON	53	6	3.57	-0.71
RAPID CITY	52	5	1.53	-1.55
SIOUX FALLS	53	6	12.45	6.58
TN BRISTOL	61	5	6.36	-2.10
CHATTANOOGA	67	6	7.19	-5.26
JACKSON	66	5	5.68	-12.05
KNOXVILLE	65	5	7.38	-2.29
MEMPHIS	69	5	4.45	-7.93
NASHVILLE	66	6	4.17	-6.74
TX ABILENE	69	4	8.50	1.39
AMARILLO	63	5	2.05	-2.01
AUSTIN	73	3	5.87	-3.69
BEAUMONT	74	4	7.46	-8.06
BROWNSVILLE	80	5	7.48	-3.36
COLLEGE STATION	74	4	6.88	-4.43
CORPUS CHRISTI	78	5	5.24	-5.47
DALLAS/FT WORTH	73	6	6.21	-2.89
DEL RIO	73	3	8.13	3.11
EL PASO	69	5	2.50	-0.34
GALVESTON	78	4	4.74	-8.15
HOUSTON	75	5	3.83	-9.19
LUBBOCK	65	5	3.05	-1.93
MIDLAND	69	5	4.42	-0.31
SAN ANGELO	70	5	9.46	2.84
SAN ANTONIO	74	4	8.25	-1.19
VICTORIA	74	2	6.66	-5.24
WACO	72	4	5.30	-3.86
WICHITA FALLS	69	5	13.96	5.98
UT SALT LAKE CITY	58	6	4.54	0.24
VT BURLINGTON	53	5	6.18	-3.83
VA LYNCHBURG	61	4	6.27	-4.18
NORFOLK	64	2	23.95	13.44
RICHMOND	62	3	16.50	5.86
ROANOKE	62	5	10.25	0.04
WASH/DULLES	60	4	4.97	-5.53
WA OLYMPIA	53	3	23.44	9.09
QUILLAYUTE	52	2	50.97	22.19
SEATTLE-TACOMA	56	3	17.57	6.85
SPOKANE	51	4	8.01	3.95
YAKIMA	54	5	3.22	1.25
WV BECKLEY	58	5	7.87	-0.88
CHARLESTON	61	5	8.60	-1.18
ELKINS	55	4	10.19	0.09
HUNTINGTON	62	6	6.20	-2.65
WI EAU CLAIRE	52	6	12.08	4.18
GREEN BAY	53	6	9.24	1.69
LA CROSSE	57	7	13.85	6.19
MADISON	54	6	15.59	8.02
MILWAUKEE	57	6	10.07	1.58
WAUSAU	51	5	9.97	1.06
WY CASPER	50	5	2.09	-0.85
CHEYENNE	52	7	1.56	-1.26
LANDER	49	4	4.85	1.35
SHERIDAN	49	5	6.44	2.85

Based on 1971-2000 normals

***** Not Available**

National Agricultural Summary

December 12 – 18, 2016

Weekly National Agricultural Summary provided by USDA/NASS

HIGHLIGHTS

Weekly temperatures were mostly below normal from the Missouri Valley through the Corn Belt—especially in Montana and the Dakotas, where temperatures averaged as much as 8 to 30°F below normal. Conversely, virtually all of the Southwest and Gulf Coast experienced above-average temperatures. Most locations across the nation received near-normal precipitation, except the West Coast, Ohio Valley, and central Gulf Coast. Parts of California and Oregon received weekly precipitation totaling more than 5 inches.

Arizona: Alfalfa conditions were rated mostly good to excellent, depending on location. Harvesting continued on almost three-quarters of the state's alfalfa acreage. Cotton harvest was 95 percent complete, equal to the previous year but ahead of the 5-year average of 88 percent. Central Arizona growers shipped anise, beets, broccoli, cabbage (green and red), cantaloupes, cauliflower, cilantro, collard greens, kale greens, kohlrabi, lemons, green onions, parsley, and Swiss chard. In western Arizona, growers shipped anise, arugula, bok choy, broccoli, Boston lettuce, cantaloupes, cauliflower, celery, Chinese cabbage, cilantro, endive, escarole, frisee, iceberg lettuce, green leaf lettuce, kale greens, processed lettuce, romaine lettuce, red leaf lettuce, parsley, radicchio, and spinach. Roll and Yuma recorded the least precipitation during the week at 0.01 inch, while Payson reported the most at 1.49 inches. The highest temperature was 86°F reported at Sahuarita. The lowest temperature was 1°F at Teec Nos Pos.

California: Dry conditions on Monday turned to moderate to heavy precipitation across the north by Tuesday, spreading southward through Thursday. Tuesday and Wednesday featured nearly 4 inches of rainfall in the northwestern mountains. The heaviest and most widespread precipitation fell on Thursday, with all parts of the state outside of the deserts seeing moderate to very heavy precipitation. Up to 5 inches of additional rain fell in parts of the northern valley, northwestern mountains, and central Sierra foothills late in the week. The heaviest snows fell on Thursday, where higher elevations in the central Sierras and northern mountains saw nearly 2 feet of new snow. Mountain snowpack gained several feet of new cover in the Tahoe area and northern mountains, with up to 3 feet around Mt. Whitney in the south. Fields continued to be prepared and planted for winter wheat and barley forage. Rain helped recently planted field crops. Most cotton fields have been shredded. Table grapes from cold storage continued to be exported. Vineyards continued to be pruned. Persimmons and kiwifruit were being harvested, packed, and exported. Deciduous fruit were pruned and the brush shredded. Wet weather late in the week slowed the citrus harvest. Navel and Mandarin oranges continued to be harvested and exported. Melogold grapefruit and lemons were being packed and exported. Chill hours for the upcoming cherry crop appeared to be adequate for this time of year. Pistachios and almonds were exported. Nut orchards continued to be pruned and shredded. In Fresno County, intermittent rain prevented the windrowed dry beans from being harvested. Sweet basil continued to be harvested and offered for sale at the annual certified farmer's market locations. Fieldwork and ground prep continued as wet fields allowed. Winter forage crops were growing well due to recent rains. In Tulare County, winter vegetables continued to develop; strawberries were growing well; and rangeland forage was germinated and improved with the recent rains. Rangeland quality was fair at the lower elevations. Ranchers were providing supplemental feed for their cattle. In Fresno County, some dairies struggled with wet conditions due to flooding in corrals. Sheep grazed on idle fields, crop stubble, and dormant alfalfa fields.

Florida: There were 6.5 days suitable for fieldwork. Precipitation estimates ranged from no rain in several locations to 2.88 inches in Jay (Santa Rosa County). Average temperatures ranged from 59.7°F in DeFuniak Springs (Walton County) to 76.6°F in Ft. Lauderdale (Broward County). Although rain fell in many parts of the state, counties across the panhandle and northern Florida remain under drought and abnormally dry conditions. Temperatures were very high in the citrus-growing region. Daily highs were in the 80s on most afternoons. Only two of 18 monitored stations had significant rainfall. Canals and ditches in most areas were at low levels due of the lack of rainfall over the past couple of months. Growers were irrigating regularly to keep moisture in the ground and on the trees. Field run fruit has picked up significantly over the past 2 weeks. Early and mid-season orange harvest was in full swing. Grapefruit was being harvested for both the fresh and processed market. White grapefruit harvest is ahead of last season, while red grapefruit harvest is still lagging. Fruit harvested primarily for the fresh market included Sunburst tangerines, Navel oranges, red grapefruit, and tangelos. Growers continued to spray in order to lower the psyllid population. Primarily, growers were performing general grove maintenance in well-kept groves. Growers in Flagler and Putnam Counties reported planting and harvesting leafy greens, cabbage, and broccoli. Foggy mornings in several southern counties were presenting some vegetable disease pressures. Crops coming to market included avocado, bitter melon, boniato, collards, eggplant, green beans, kale, malar, squash, tomato, zucchini, and other tropical fruits. Cattle condition remained mostly good, despite pasture quality deteriorating across the state. Many cattle operators were using supplemental feeding. Cattle in Brevard, Indian River, and St. Lucie Counties were all feeding on hay. Although some rainfall was received, there were still many fields that needed more. Some farmers in Walton County were attempting to plant rye as a cover crop. Reporters in Dixie, Flagler, Putnam, and Jackson Counties indicated that it was still too dry to plant any cover crops. Some winter forages were starting to germinate and grow in Okaloosa County. Sugarcane harvest was ongoing in Glades, Hendry, Martin, and Palm Beach Counties.

International Weather and Crop Summary

December 11-17, 2016

International Weather and Crop Highlights and Summaries provided by USDA/WAOB

HIGHLIGHTS

EUROPE: Sunny, mild weather maintained favorable conditions for dormant winter crops across central and southeastern Europe.

WESTERN FSU: A fresh snowfall improved insulation from bitter cold for dormant winter wheat.

MIDDLE EAST: Rain and snow improved moisture reserves for dormant winter grains in Turkey and provided much-needed moisture for wheat and barley establishment in Iraq.

NORTHWESTERN AFRICA: Widespread showers benefited vegetative winter grains in Morocco and Tunisia.

EASTERN ASIA: Light showers and mild weather benefited overwintering crops in China.

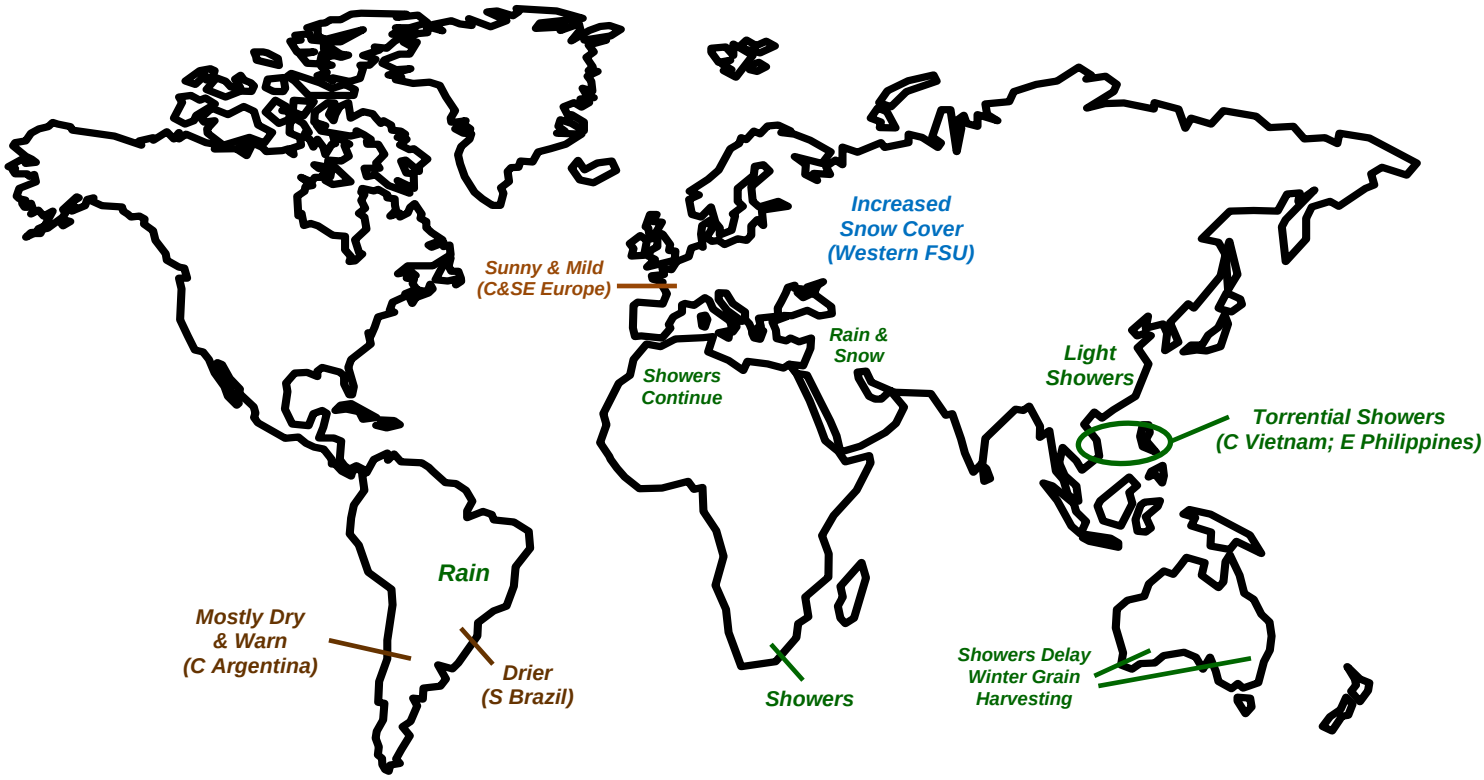
SOUTHEAST ASIA: Torrential showers caused more flooding and fieldwork delays across central Vietnam and portions of the eastern Philippines.

AUSTRALIA: Rain stalled winter crop harvesting in New South Wales and Western Australia.

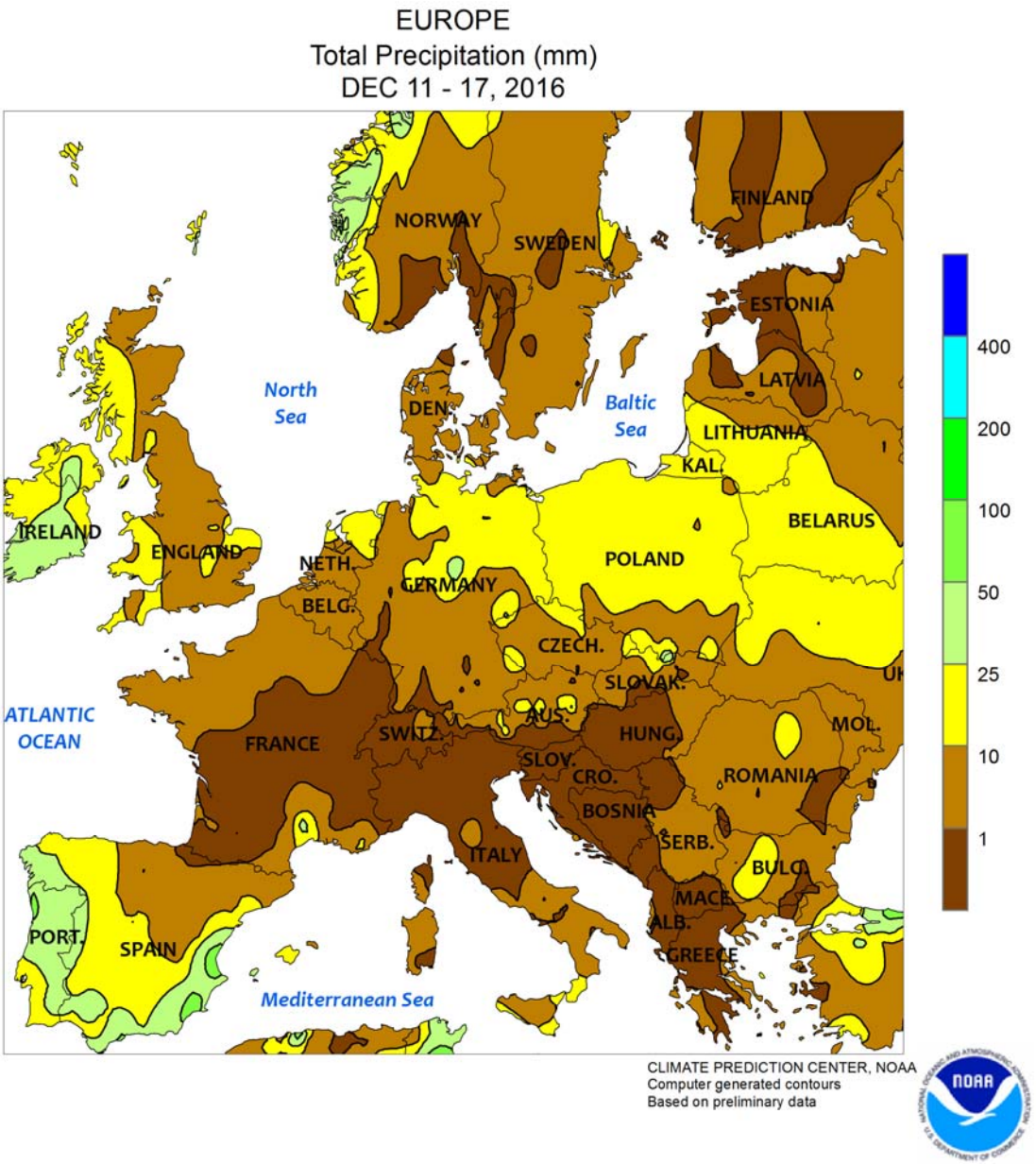
SOUTH AFRICA: Warm, showery weather benefited emerging corn.

ARGENTINA: Unseasonable warmth and dryness limited moisture for normal development of corn and soybeans.

BRAZIL: Beneficial showers continued throughout central Brazil, but drier conditions prevailed in southern corn and soybean areas.



For additional information contact: mbrusberg@oce.usda.gov



EUROPE

A persistent area of high pressure maintained dry, mild weather across much of the continent. From France and southeastern England into Italy and the Balkans, sunny skies and near- to above-normal temperatures were favorable for dormant winter wheat and rapeseed, though chilly conditions (up to 2°C below normal) lingered in southeastern Europe. Rain and wet snow (10-22 mm liquid equivalent, locally more) in northeastern Germany, Poland, and the Baltic States improved moisture reserves for spring growth. However, these typically colder crop areas remained mostly devoid of a protective snow cover at week's end. In Spain and Portugal, variable showers (10-40 mm) sustained favorable moisture supplies for winter wheat and barley establishment.

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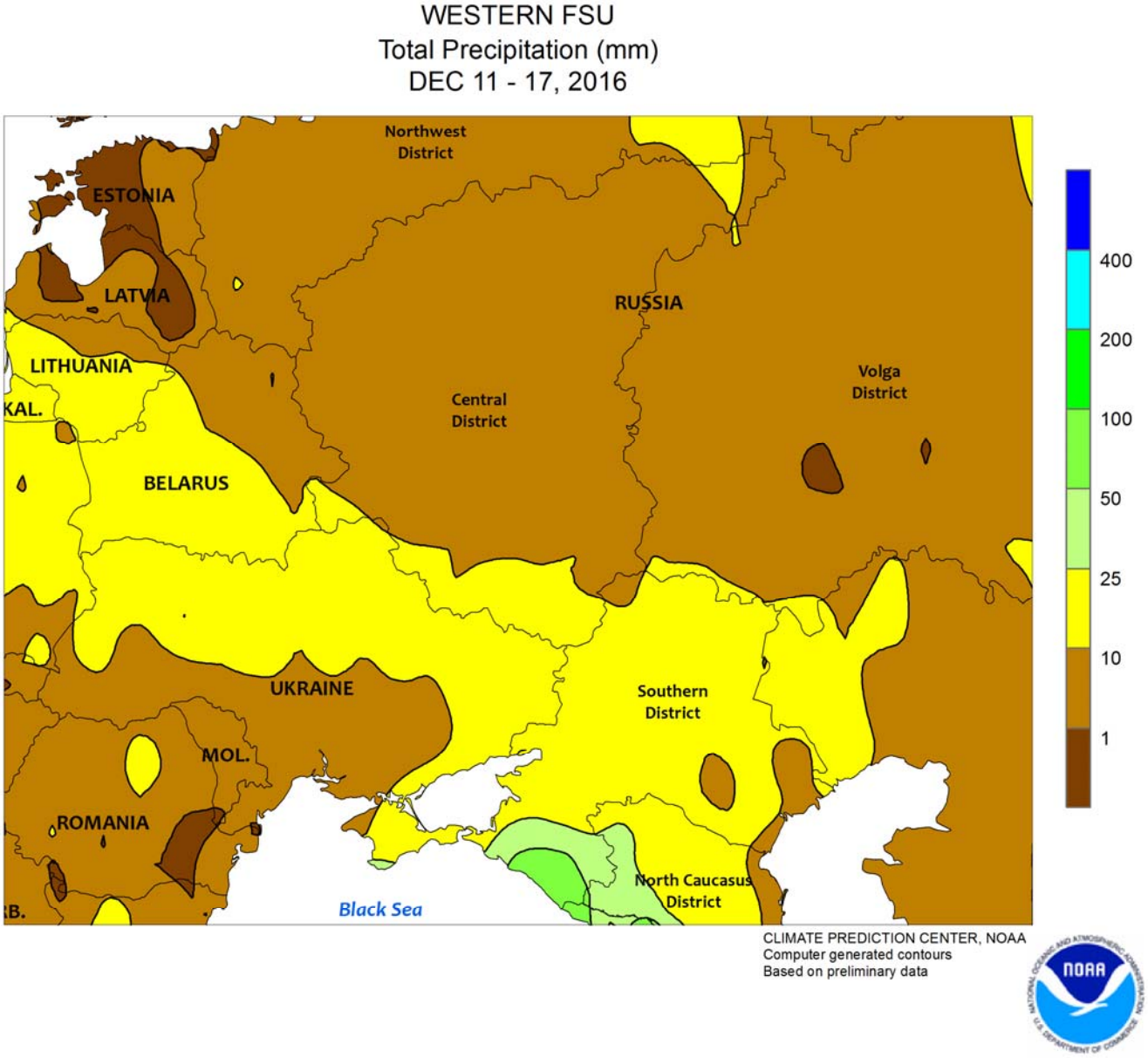

WESTERN FSU

From northern and eastern Ukraine into southern Russia, snow provided timely protection from the coldest air of the season. Snowfall averaged 2 to 15 cm in Ukraine and Belarus, with the deepest snow cover (10 cm or more) noted in eastern Ukraine where readings dipped to -22°C during the period. In Russia's Central and Southern Districts, 5 to 20 cm of snow (locally more) afforded adequate protection from temperatures as low as -27°C. Consequently, this week's arctic blast had little detrimental impact on dormant winter wheat.

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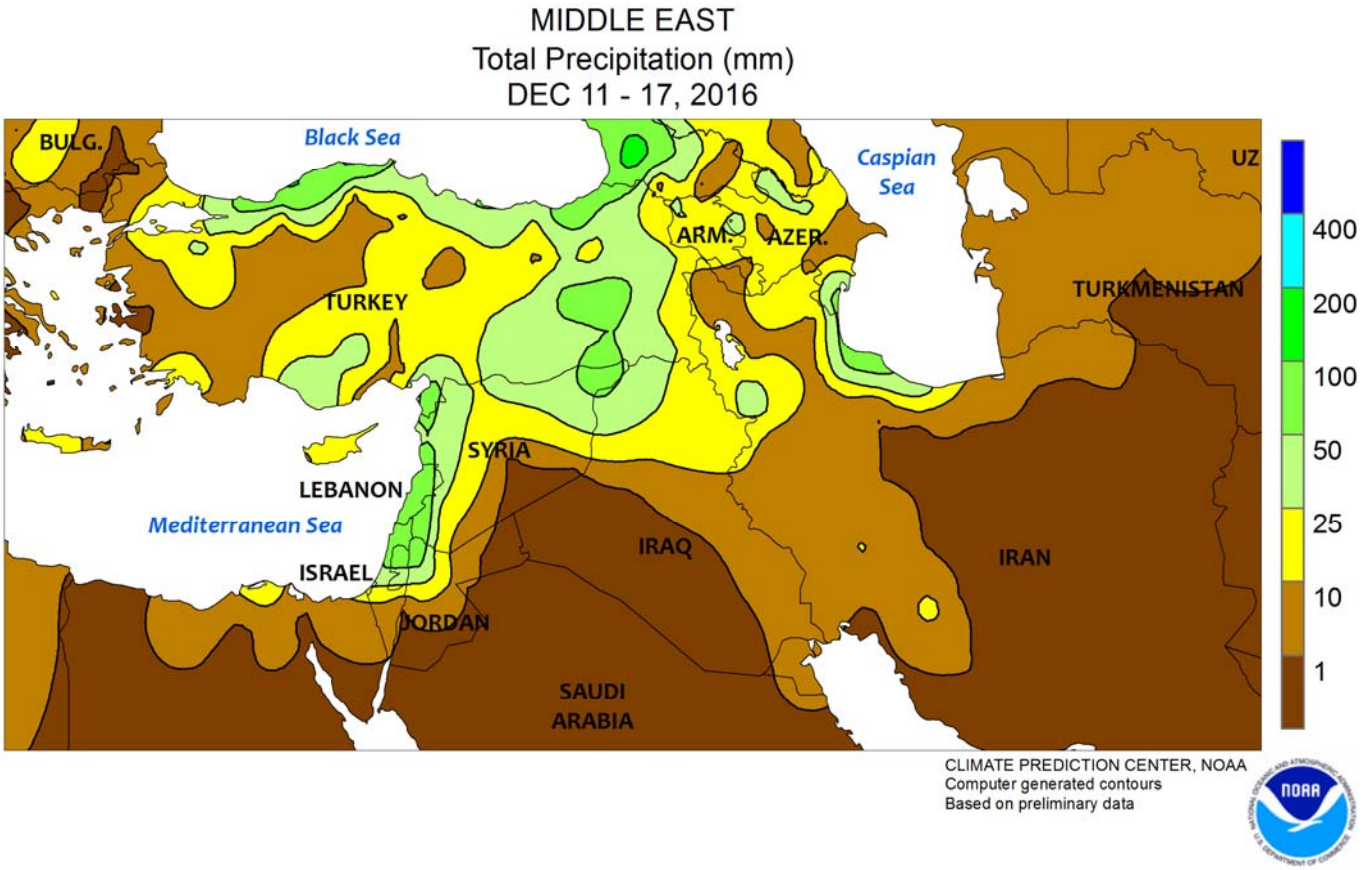

MIDDLE EAST

A slow-moving storm system produced widespread, locally heavy precipitation across central and western portions of the region. Rain and snow totaled 10 to 75 mm (liquid equivalent) across most of Turkey, improving moisture reserves for dormant winter grains on the Anatolian Plateau while boosting mountain snowpacks and spring runoff prospects in the mountains of eastern Turkey. In the climatologically warmer growing areas of the eastern Mediterranean Coast, a soaking rainfall (25-75 mm) provided welcomed soil moisture for winter wheat establishment. In Iraq, the first appreciable rain of the season (10-70 mm) in central and northern crop areas provided much-needed soil moisture for winter grain development. Farther east, precipitation amounts in Iran were highly variable (1-40 mm), affording little significant drought relief from west-central growing areas into northeastern portions of the country. Temperatures averaged 2 to 6°C below normal across the western two thirds of the region, though the coldest readings (as low as -16°C in central Turkey) were coincident with a shallow to moderate snow cover (5-20 cm).

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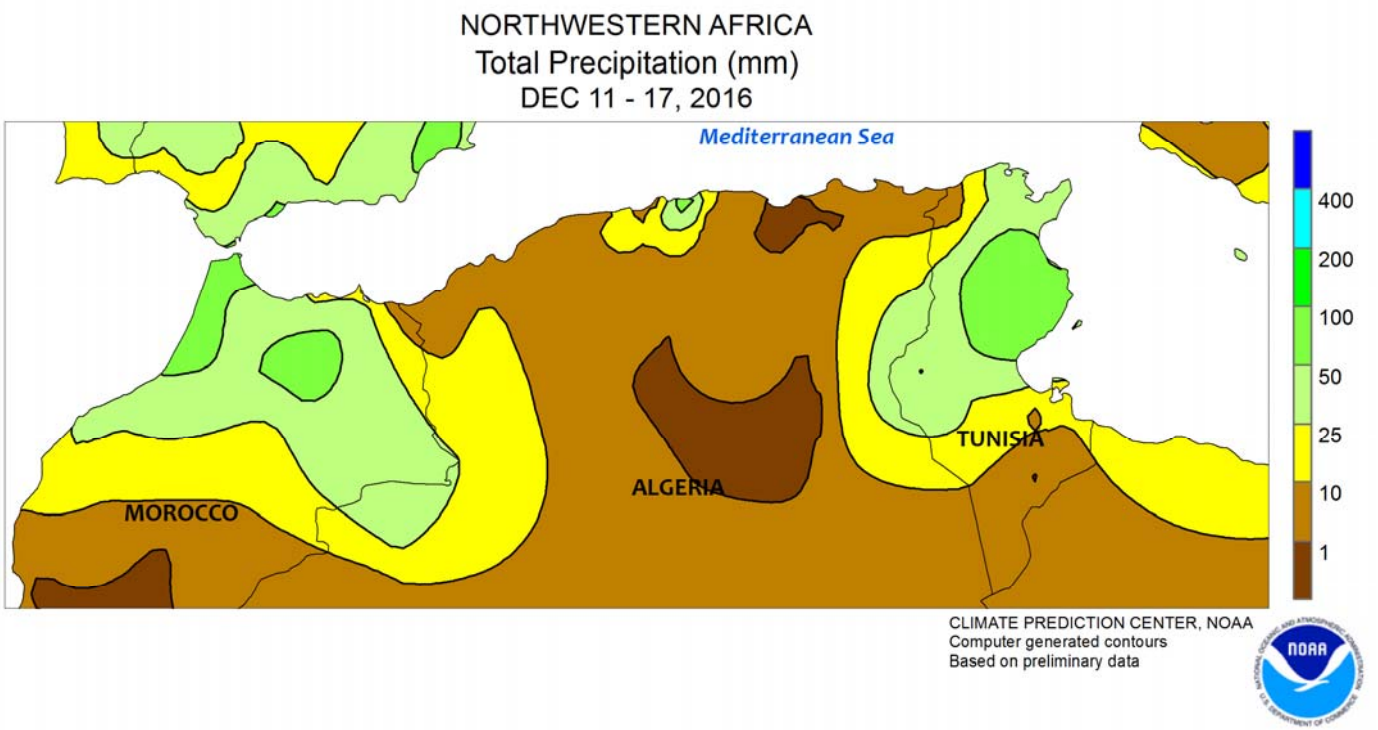

NORTHWESTERN AFRICA

Another round of moderate to heavy showers in Morocco and Tunisia maintained or improved prospects for winter grain development. A slow-moving storm system produced a soaking rainfall (10-74 mm) across central and northern Morocco, boosting moisture supplies for vegetative winter wheat and barley. Farther east, widespread moderate to heavy showers (10-100 mm) in Tunisia sustained good to excellent conditions for winter grain development. In Algeria, showers were also beneficial — albeit highly variable (ranging from a Trace to 101 mm) — for vegetative winter crops. Overall, winter grain prospects in northern Africa have recovered nicely from autumn drought and are vastly improved over last year, when historic drought gripped the region from October to mid-February.

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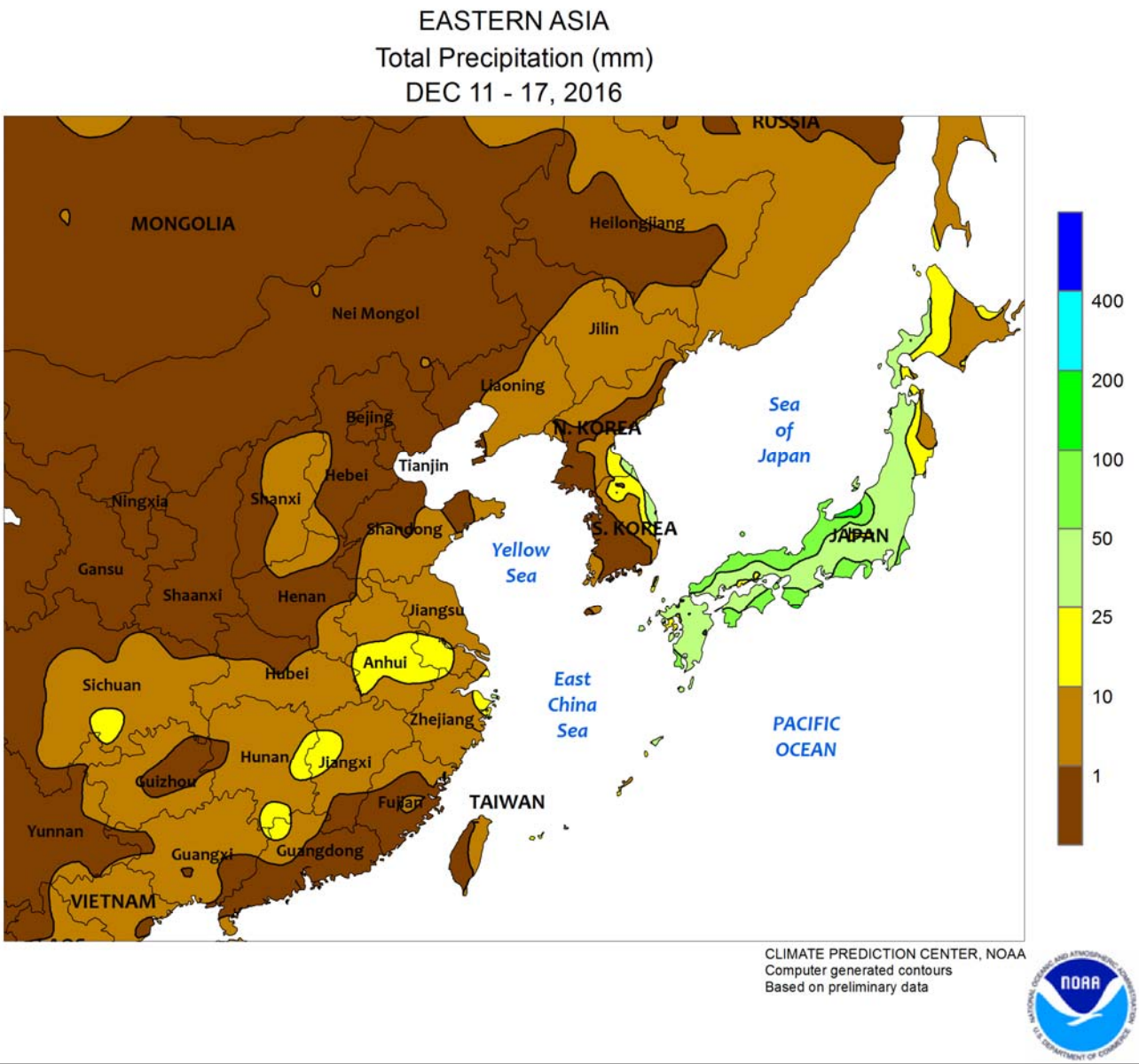
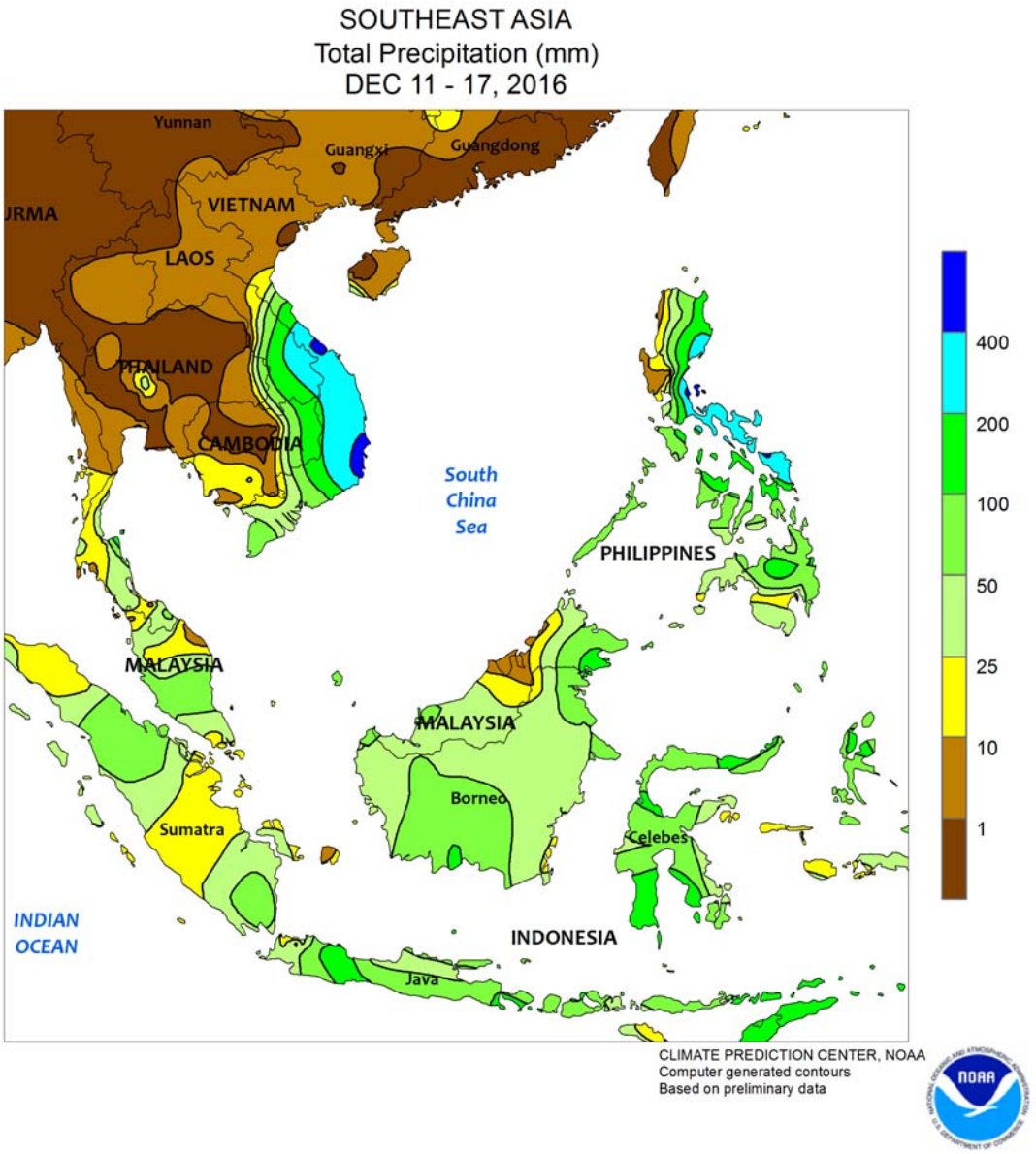


EASTERN ASIA

A brief period of light showers brought 1 to 10 mm (locally up to 20 mm) to much of eastern China's winter crop areas. Temperatures remained unseasonably mild (1-2° above normal), allowing continued vegetative growth of rapeseed in the Yangtze Valley, but conditions were still cool enough to keep wheat dormant on the North China Plain. Freezing temperatures extended well into the southeast, but traditionally warmer sugarcane areas in the far south remained frost free.

This is the final weekly summary of the season; coverage will resume in March 2017.

For additional information contact: mbrusberg@oce.usda.gov



SOUTHEAST ASIA

Easterly winds intensified across northern sections of the region, bringing more flooding rainfall to Vietnam and portions of the eastern Philippines. In Vietnam, over 200 mm of rain was reported across Central Coast regions, with some areas reporting nearly 600 mm for the week. Over the last 30 days many locales have recorded rainfall totals well in excess of 1,000 mm. And while lesser rainfall amounts have occurred in the Central Highlands region, the excessively wet weather has played havoc with coffee harvesting and transport. In the Philippines, reports of 300 mm or more of rainfall were common along the eastern Visayan Islands and eastern Luzon, with some locales reporting nearly 500 mm. The downpours delayed fieldwork and maintained saturated conditions for corn and rice. Meanwhile to the south, seasonably wet weather continued in Malaysia and Indonesia, where 25 to locally over 100 mm sustained adequate soil moisture for oil palm and rice. In particular, rainfall totals in Java, Indonesia, since November 1 remained above normal.

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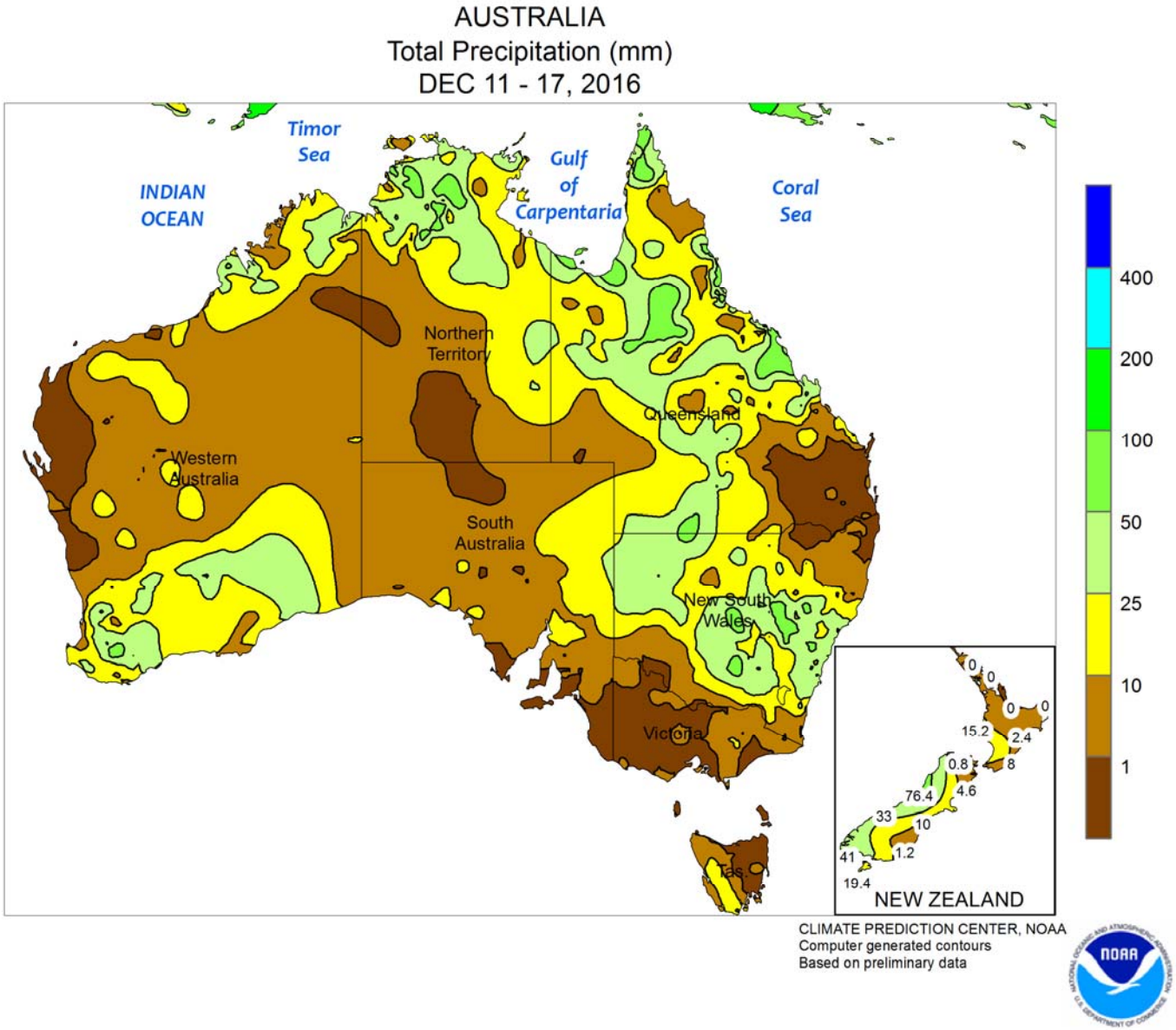

AUSTRALIA

In southern Queensland and northeastern New South Wales, scattered showers (2-10 mm, locally more) benefited vegetative cotton and sorghum. Pockets of dry weather allowed fieldwork to progress, although the majority of the winter wheat in this region reportedly has been harvested. Farther south, soaking rains (10-50 mm or more) throughout the remainder of New South Wales stalled wheat, barley, and canola harvesting. Similarly, widespread showers (generally 10-50 mm) disrupted winter crop harvesting in Western Australia as well. According to Dairy Australia, about 65 to 75 percent of the winter wheat in New South Wales and Western Australia has been harvested as of mid-December. Elsewhere in the wheat belt, mostly dry weather in South Australia and Victoria favored rapid winter crop harvesting and helped maintain the quality of crops waiting to be harvested. Dairy Australia recently reported about 70 percent of the winter wheat crop had been harvested in New South Wales, while approximately 45 percent had been harvested in Victoria. Temperatures averaged near normal in western and southern portions of the wheat belt and about 1 to 2ºC above normal in eastern areas.

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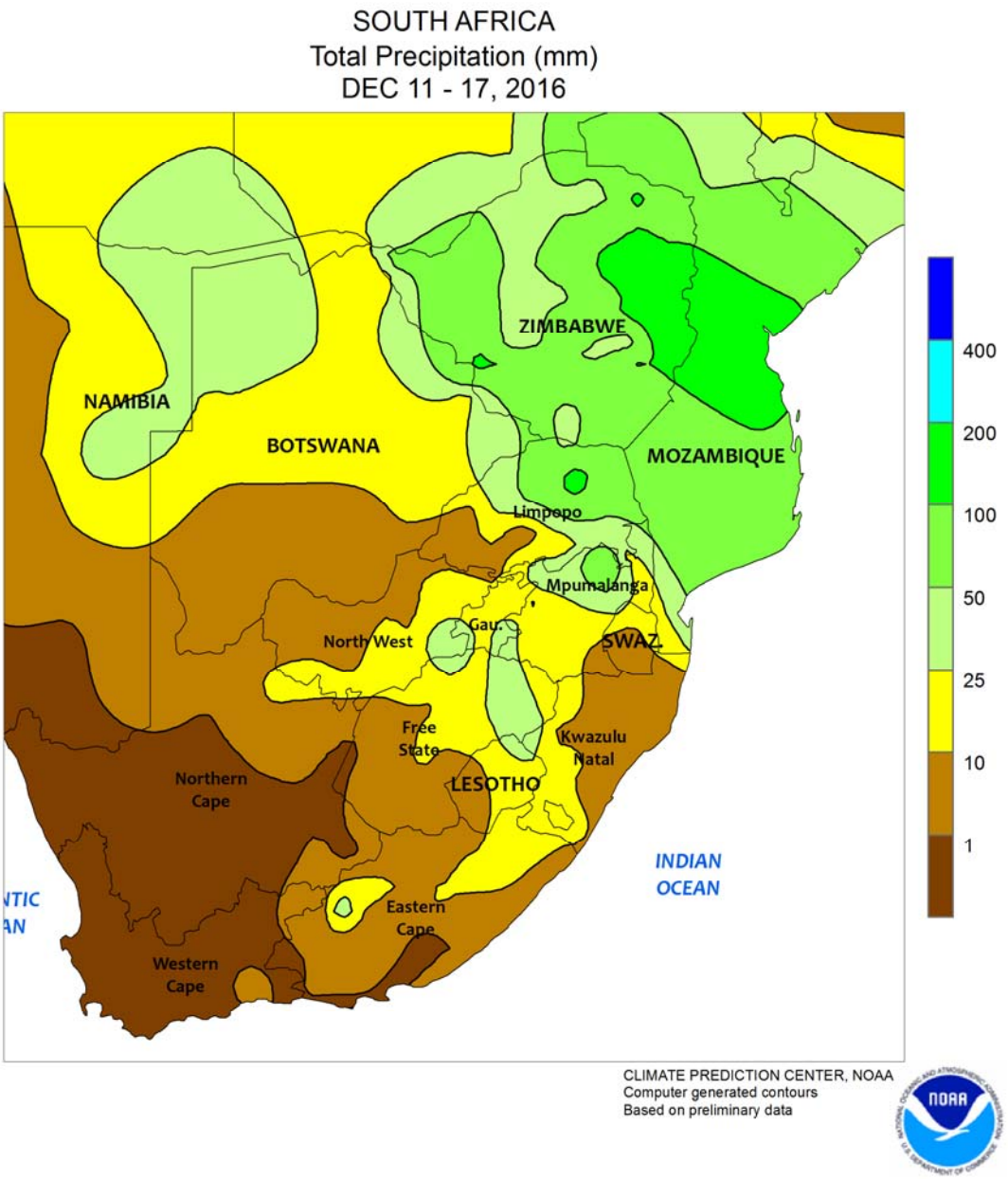

SOUTH AFRICA

Warm, showery weather maintained overall favorable conditions for corn and other emerging summer crops. Moderate rainfall (10-25 mm, locally higher) covered the central and eastern corn belt, including key production areas in southwestern Mpumalanga, Free State, Gauteng, and eastern North West; heavier rain (25-100 mm) fell in outlying production areas of northern Mpumalanga and Limpopo. Weekly temperatures averaged within 1°C of normal in most of the aforementioned areas, with daytime highs reaching the upper 20s and lower 30s (degrees C). Somewhat higher temperatures (35°C) maintained high evaporative losses at the western edge of the corn belt, where planting had likely not yet occurred. Similar temperatures were briefly recorded in irrigated sugarcane areas of eastern Mpumalanga and northern KwaZulu-Natal. Farther south, warm, mostly dry weather reduced moisture for sugarcane in rain-fed production areas of southern KwaZulu-Natal. Mostly dry, warmer-than-normal weather dominating the Cape Provinces promoted rapid growth of corn, cotton, and other row crops in the Orange River Valley, as well as tree and vine crops in Western Cape.

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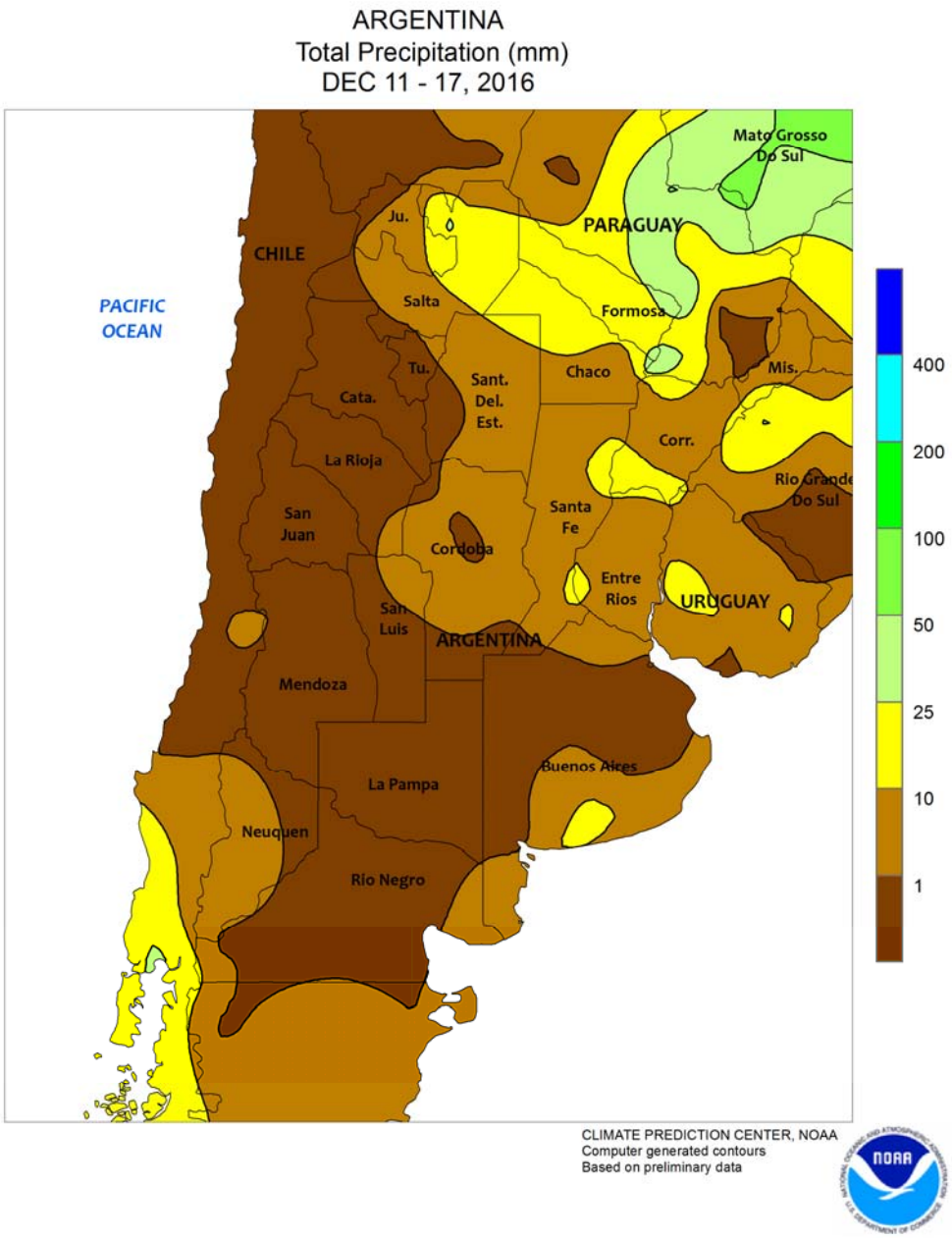

ARGENTINA

Warm, mostly dry weather reduced topsoil moisture for establishment of summer crops, while hastening drydown and harvesting of winter grains. Little to no rain fell across a broad area of central Argentina, including previously wet locations in La Pampa, southern Cordoba and western Buenos Aires; a few locations in southern Buenos Aires, Santa Fe, and southern Entre Rios recorded rainfall in excess of 10 mm. Near- to above-normal temperatures accompanied the dryness, with daytime highs reaching the middle and upper 30s (degrees C) on several days. While early in the growing season, the heat and dryness likely posed some stress on emerged corn and soybeans, necessitating a return to a more normal pattern of summer rain and warmth as earliest-planted crops reach reproduction. Drier conditions also prevailed farther north, with the heaviest rain (greater than 10 mm) generally confined to far northern agricultural areas (eastern Salta through Formosa). Despite several days with daytime highs reaching the middle and upper 30s, weekly temperatures averaged near to slightly below normal across the north. According to the government of Argentina, sunflowers and corn were 99 and 63 percent planted, respectively, as of December 15, slightly lagging last year's pace. Soybeans were 70 percent planted, 8 points behind last year. Meanwhile, wheat was 58 percent harvested versus 54 percent last year, an increase of 15 points from the previous week.

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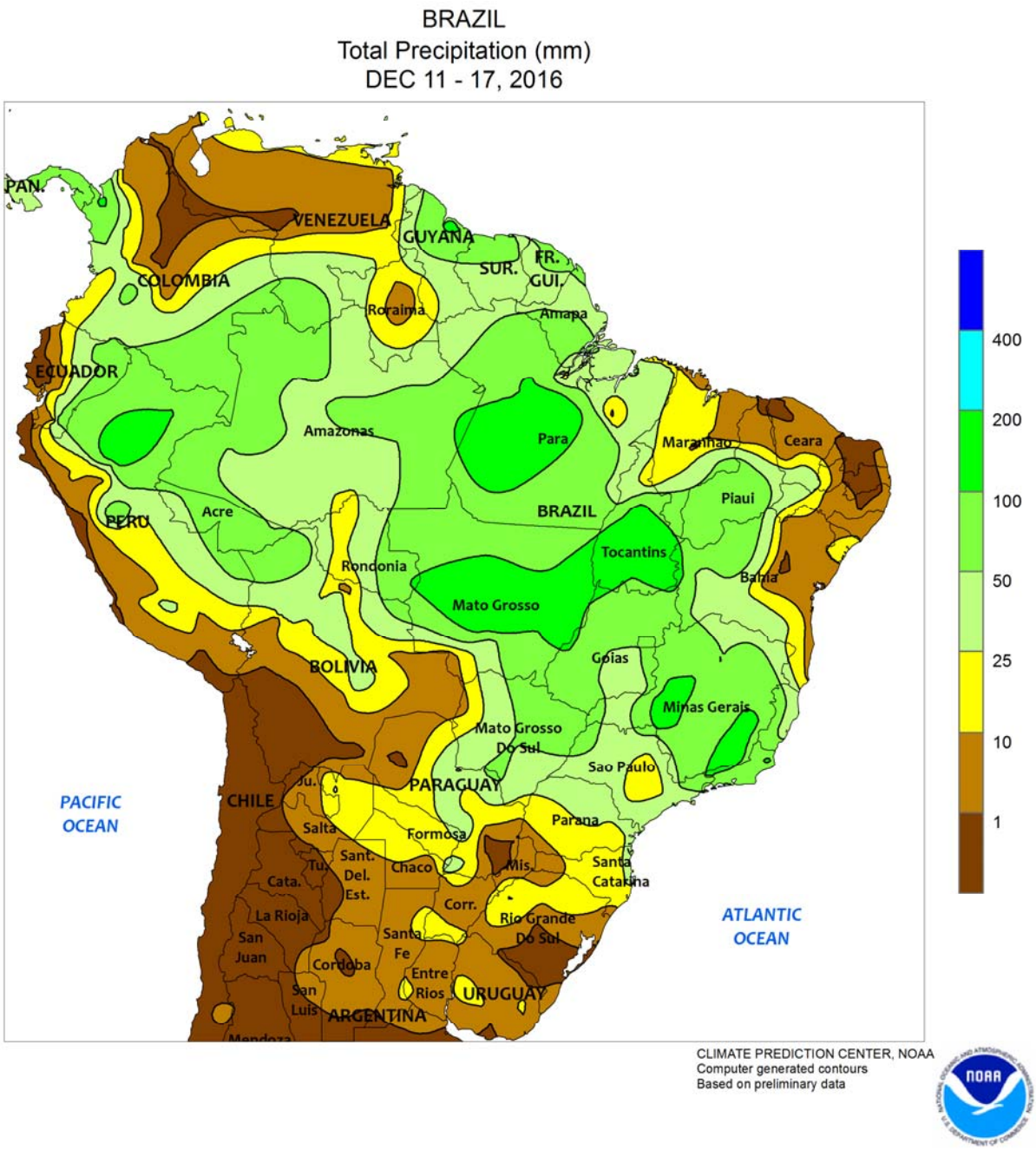
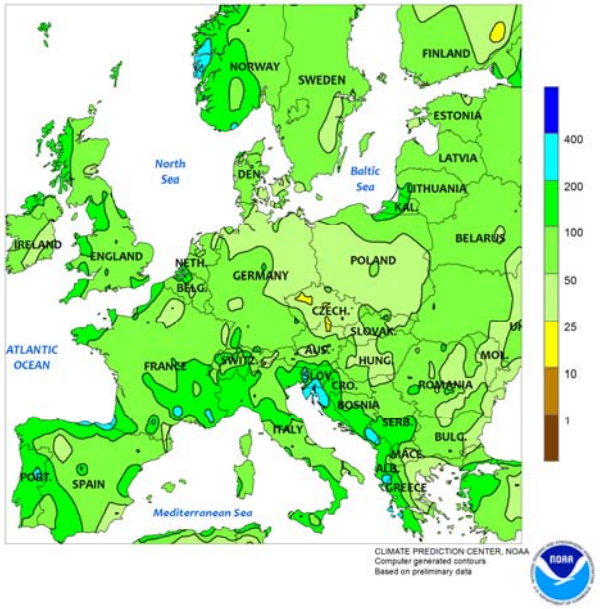


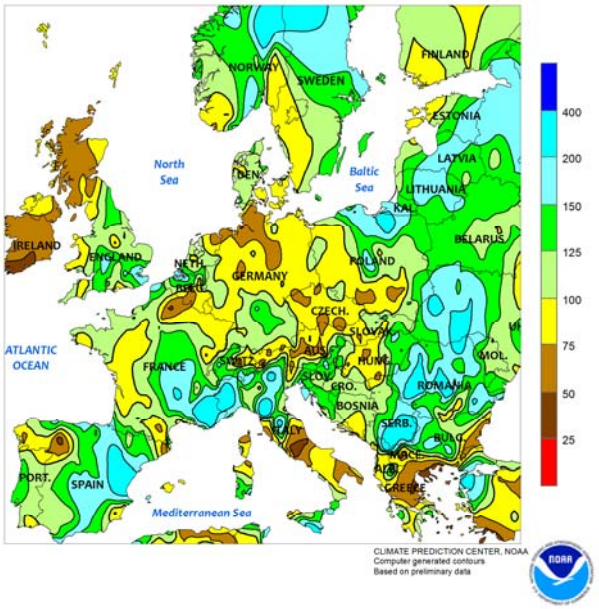
BRAZIL

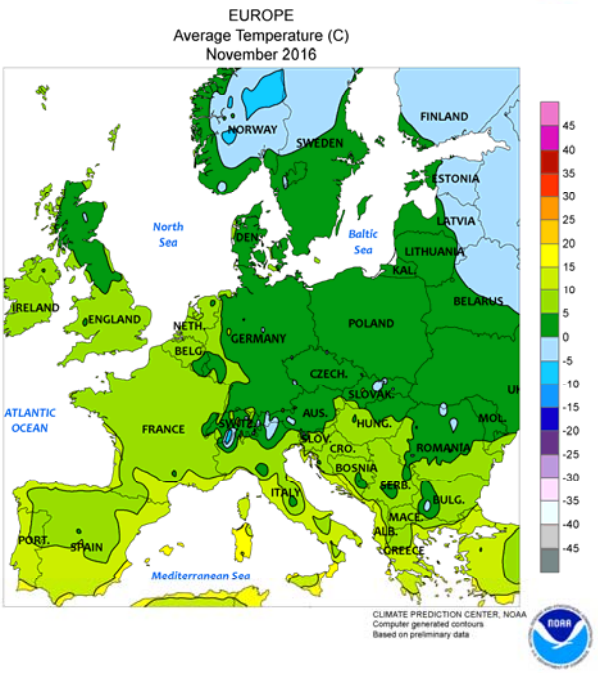
Widespread showers maintained overall favorable prospects of soybeans, cotton, and other summer crops in the main production areas of central Brazil. Rainfall totaled 50 to well over 100 mm throughout the main farming areas of the Center-West Region (Mato Grosso, Goias, and Mato Grosso do Sul) and the northeastern interior (Tocantins, western Bahia, and southern farming areas of Piaui and Maranhao). The rain also extended throughout the southeast (Sao Paulo and Minas Gerais), providing essential moisture for development of sugarcane, citrus, and coffee. The rainfall in the aforementioned areas also helped to keep temperatures down to more seasonable levels, as few locations reported daytime highs in excess of 35°C. In contrast to the abundant northern rains, mostly dry weather prevailed across southern Brazil, with rainfall totaling only 5 to 25 mm from Rio Grande do Sul to southern Parana. Despite the dryness, temperatures were highly variable, though most locations recorded daytime highs in the lower 30s (degrees C) on several days. Corn and soybeans are in or nearing reproductive phases of development in these areas and need rain soon to prevent declines in yield potential. According to the government of Parana, first-crop corn and soybeans were both well over 50 percent in flowering to filling stages of development as of December 12.

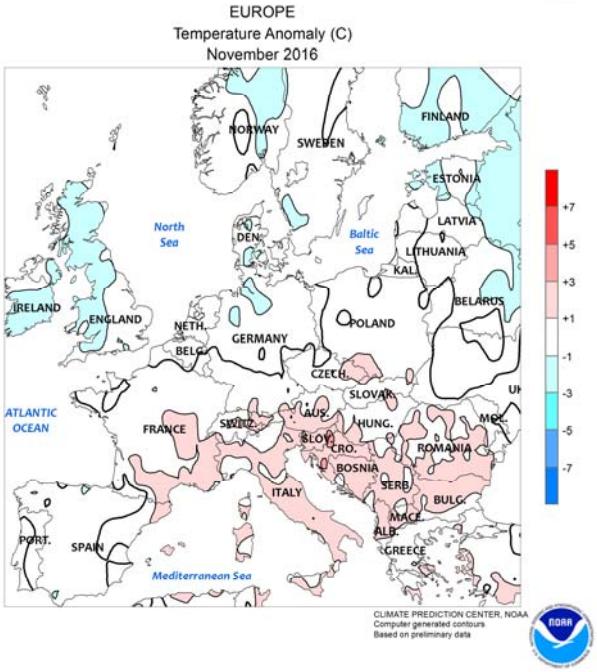
For additional information contact: mbrusberg@oce.usda.gov

November International Temperature and Precipitation Maps





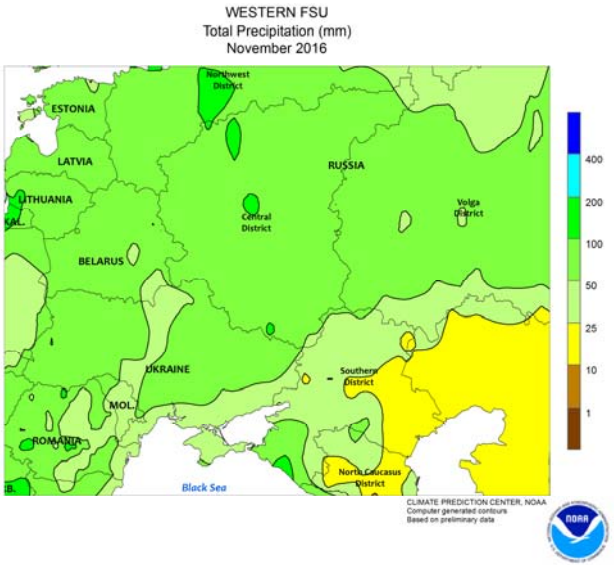


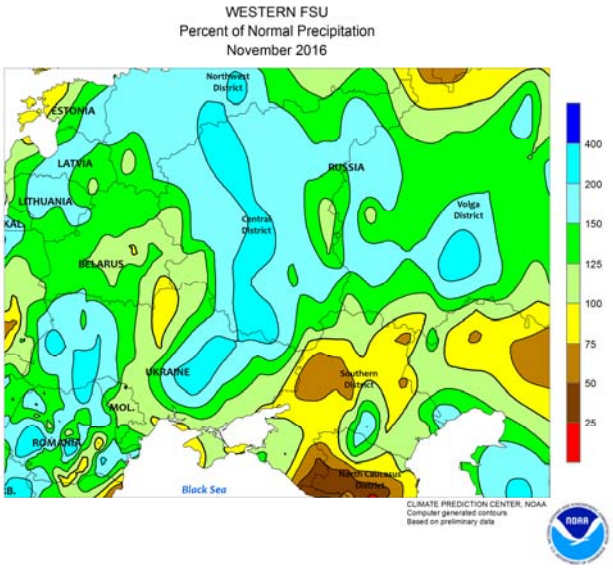


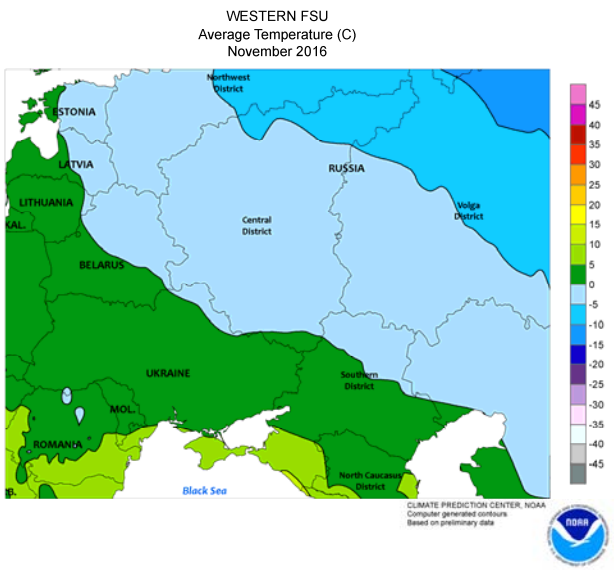
EUROPE

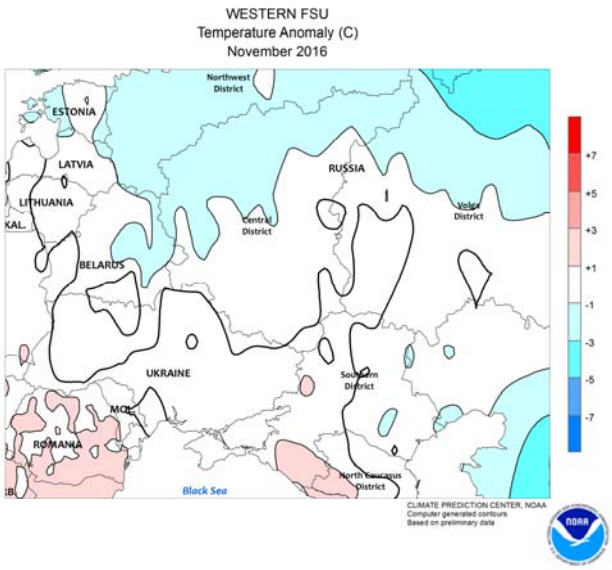
During November, wet weather aided winter wheat and rapeseed establishment across much of the continent, particularly in previously-dry portions of France and England. Winter crops went dormant from eastern Germany into Poland and the northern Balkans by month's end, but remained vegetative in England and northern France. In Spain and Portugal, near- to above-normal rainfall signaled a favorable start to the water year, boosting reservoirs and improving soil moisture for winter grain planting. Persistent wet conditions in the Balkans inhibited late summer crop harvesting and other seasonal fieldwork, though drier weather settled over the region during the latter half of the month. Despite the overall wet weather pattern, drier-than-normal conditions in Greece promoted cotton harvesting.

For additional information contact: mbrusberg@oce.usda.gov





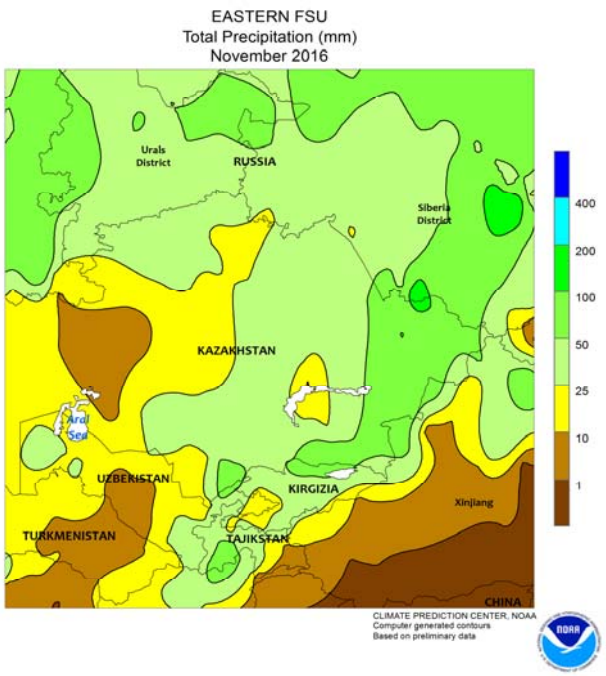


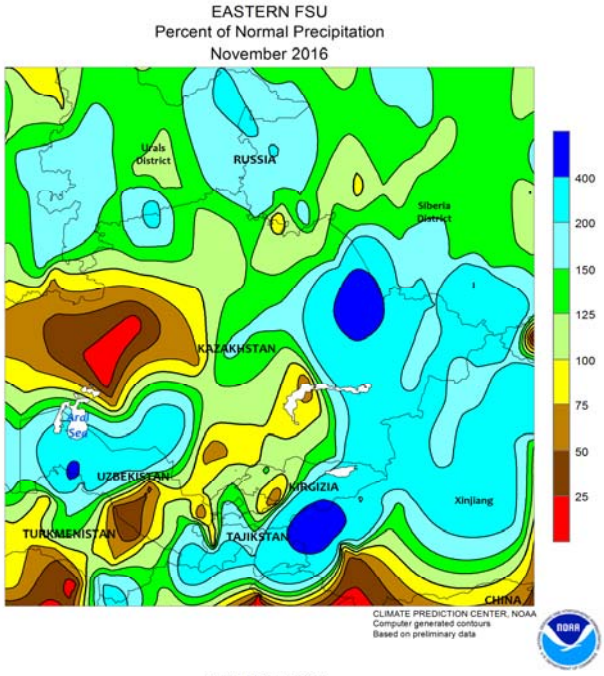


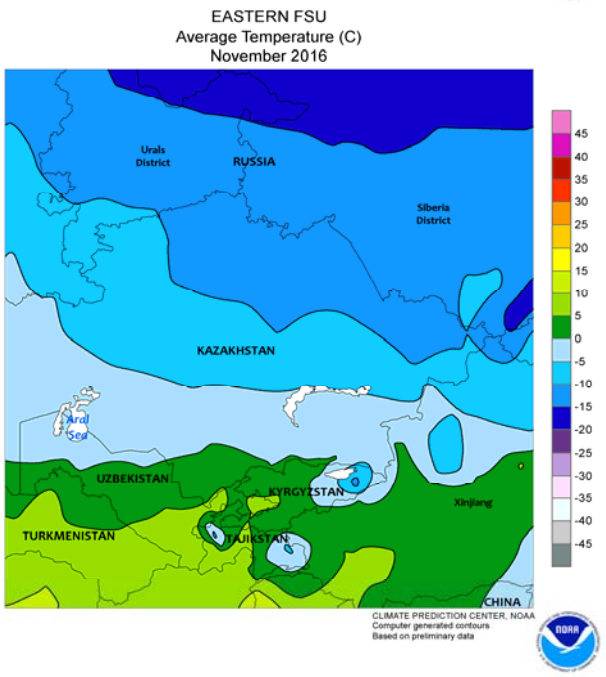
WESTERN FSU

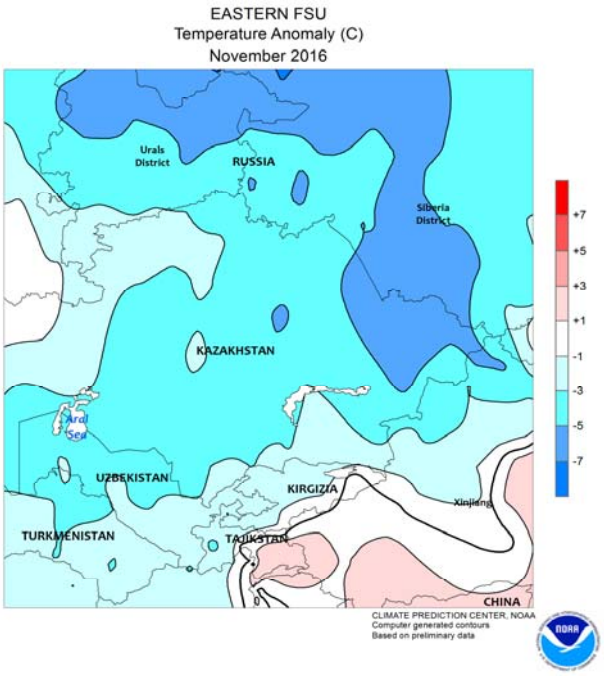
Wet weather prevailed across the region, slowing late-season fieldwork but favoring winter crop establishment. Locally heavy rain (100-250 percent of normal) in central and western Ukraine hampered corn and soybean harvesting. However, the rain was welcome for winter wheat in southern and eastern Ukraine. In Russia, near- to above-normal precipitation favored winter wheat establishment, particularly in the key crop region of Krasnodar Krai in the southwestern Southern District. However, sharply colder weather during the latter half of the month sped winter crops into dormancy up to two weeks ahead of normal.

For additional information contact: mbrusberg@oce.usda.gov



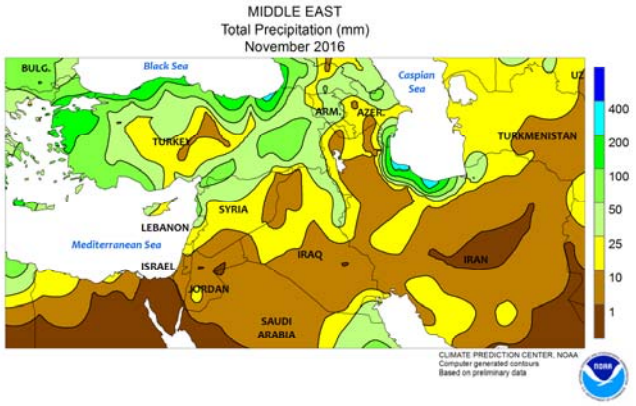


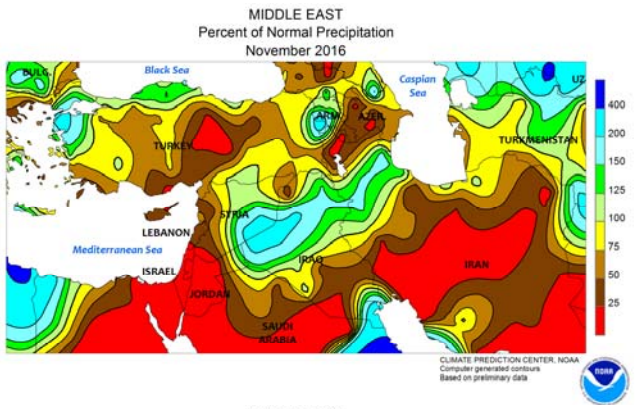


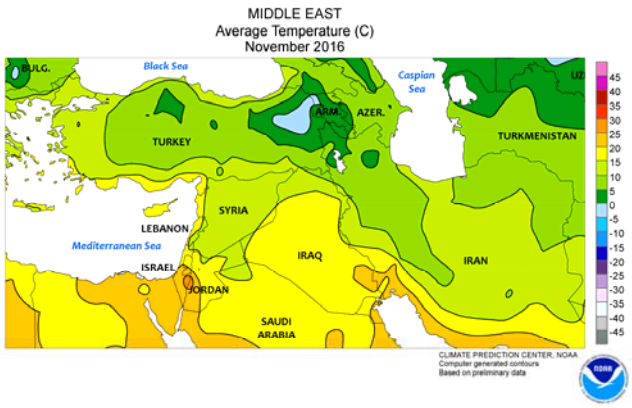


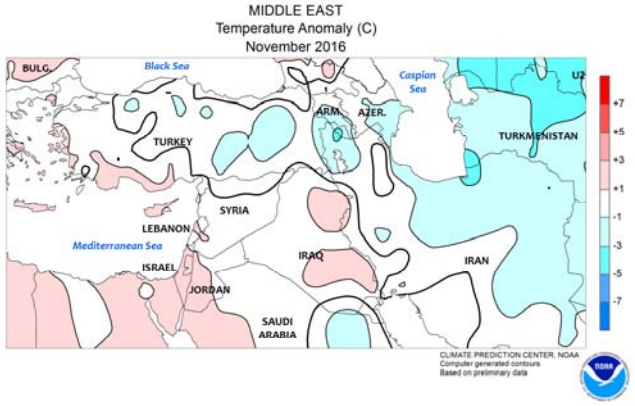
EASTERN FSU

Winter remained firmly entrenched in the north, while rain and snow provided supplemental moisture for winter wheat in the south. In northern Kazakhstan and neighboring portions of central Russia, frigid arctic air settled over the region; temperatures for the month averaged up to 7°C below normal, with nighttime readings plunging as low as -40°C. Farther south, near- to above-normal precipitation (90-200 percent of normal) across eastern Uzbekistan and environs hampered cotton harvesting. However, the rain — along with mountain snow — was beneficial for winter wheat establishment (primarily grown in Uzbekistan) and provided a boost to irrigation reserves (mountain snowpacks and reservoir levels) for next season's summer crops.





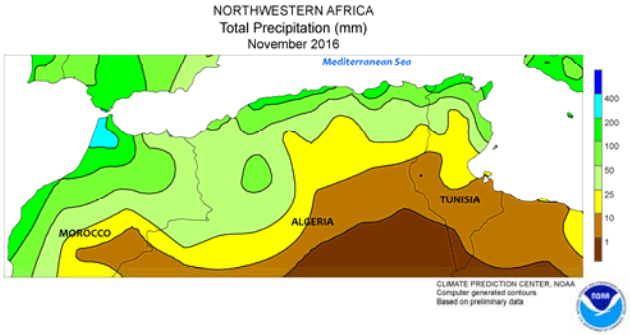


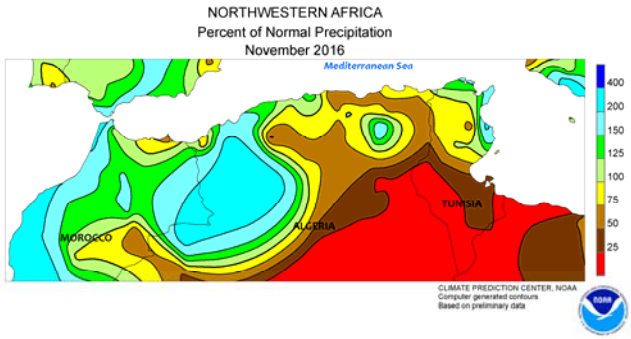


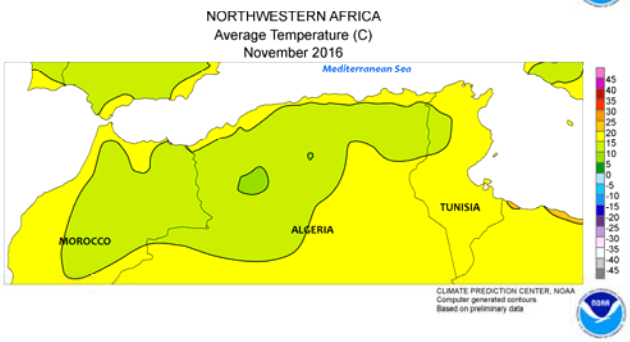
MIDDLE EAST

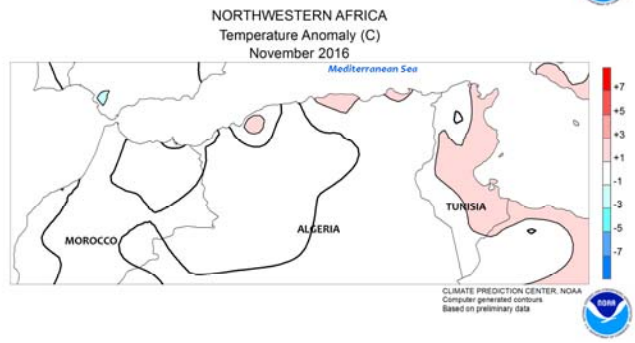
During November, intensifying short-term drought adversely impacted winter grain establishment from central Turkey into Iraq and Iran. Despite beneficial moisture in western and northern Turkey, central Turkey's Anatolian Plateau reported little — if any — precipitation until the last two days of the month. The drought impacts were compounded by sharply colder weather at month's end, which accelerated crops into dormancy. In western Iran, late-month bitter cold (-18 to -10°C) occurred prior to winter wheat being cold hardened, and given the lack of snow cover may have resulted in localized burnback or winterkill. Much-needed rain and snow arrived in early December, though likely too late for wheat establishment except in the warmer Mediterranean growing areas.

For additional information contact: mbrusberg@oce.usda.gov



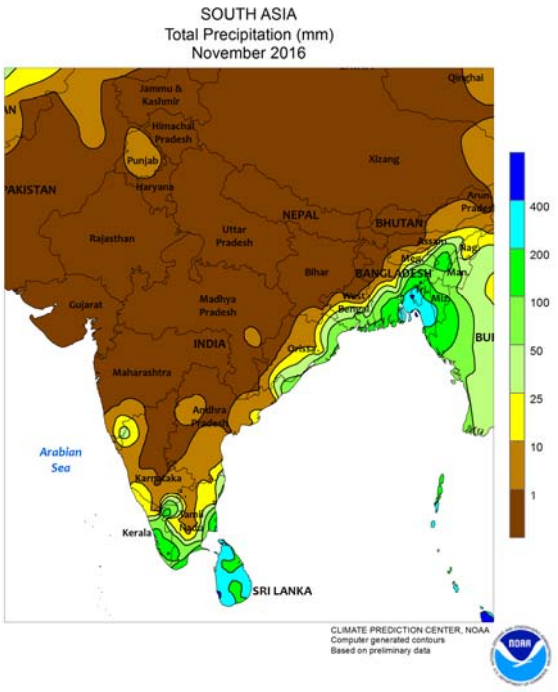


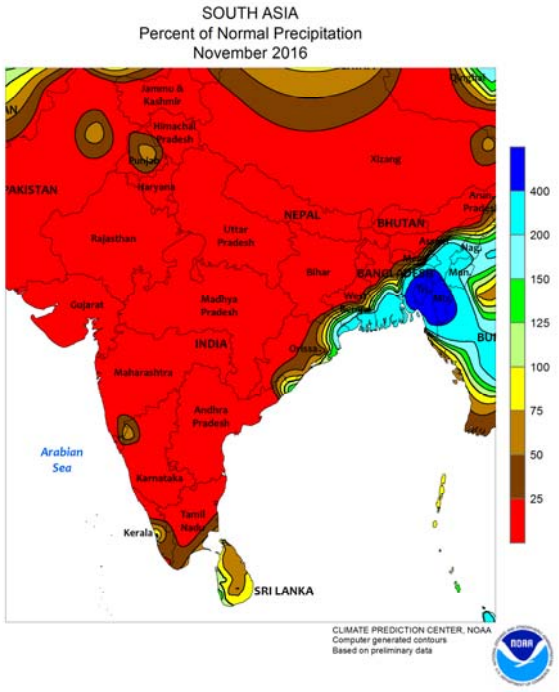


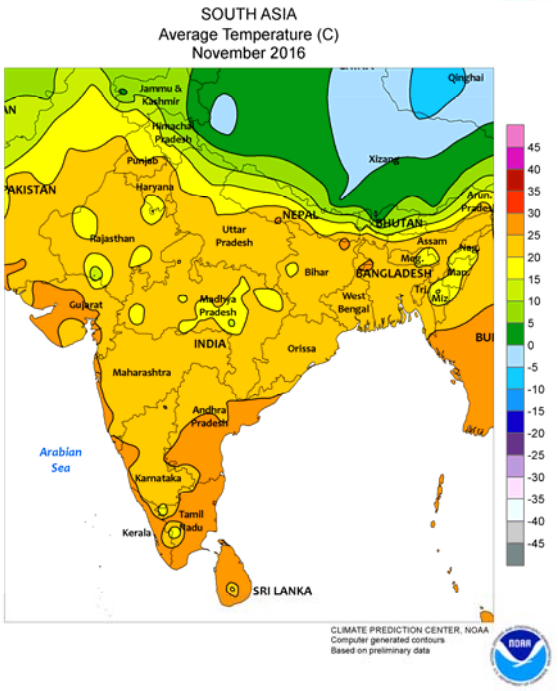


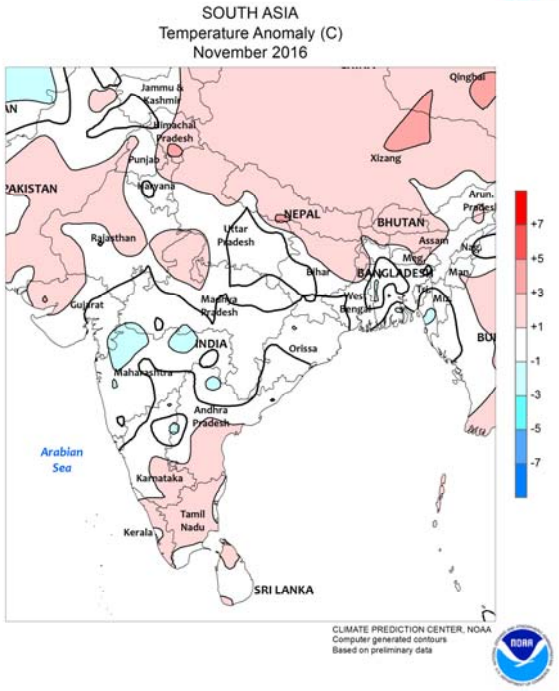
NORTHWESTERN AFRICA

During November, moderate to heavy rainfall during the latter half of the month alleviated drought in Morocco and Algeria. In Morocco, the 50 to 200 mm of rain (locally more in far northern Morocco) ended drought concerns and vastly improved conditions for winter grain planting and establishment. Likewise, 35 to 190 mm of rainfall in Algeria eased or ended autumn drought and improved winter grain prospects. Moderate to heavy showers continued in Tunisia, where autumn drought has not been a concern.



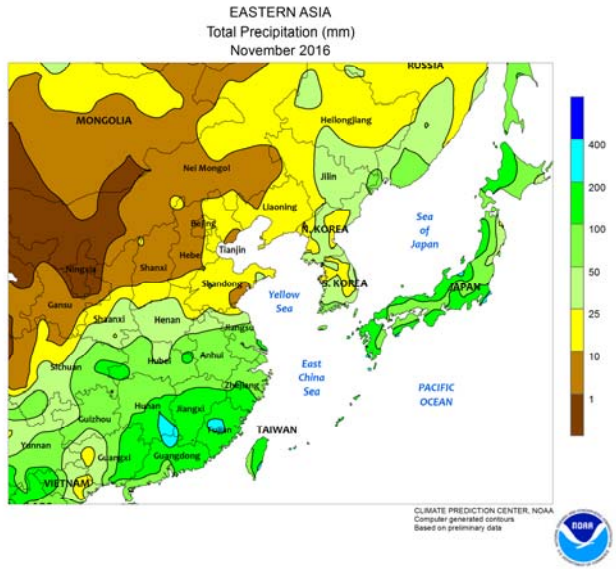


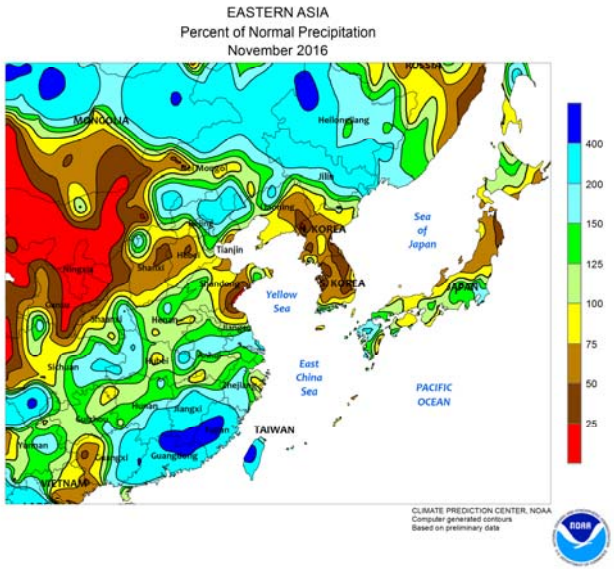


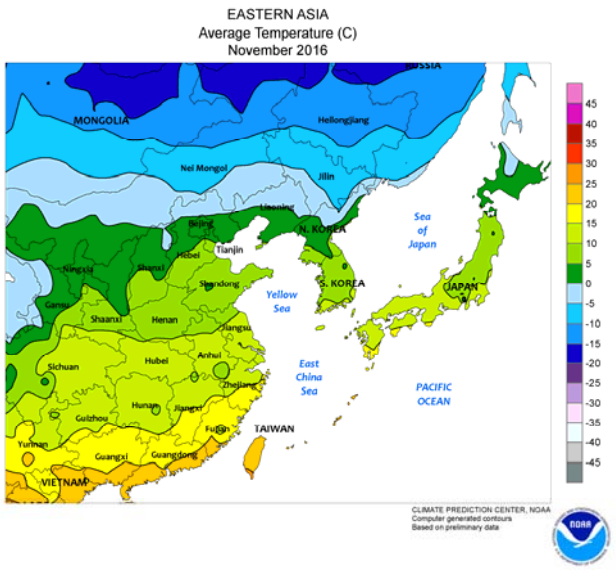


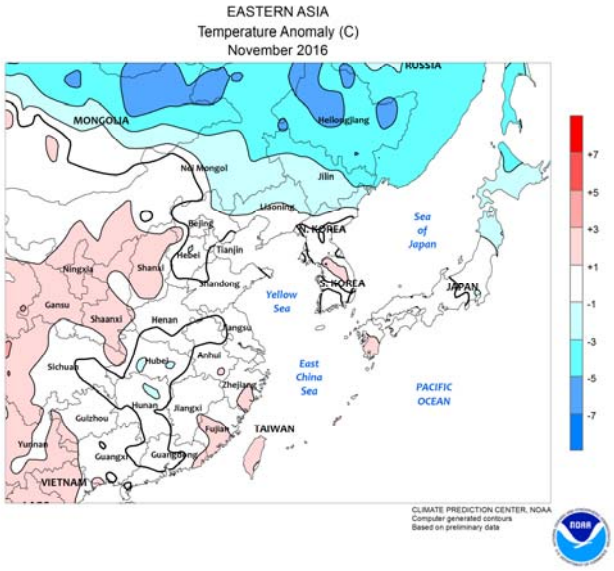
SOUTH ASIA

Seasonably dry weather prevailed across much of India during November, although most of the south was unusually dry. Southern states typically receive over 300 mm of rain in November and managed little more than 25 mm for the month. While the dry conditions elsewhere benefited rapid winter (rabi) crop planting, the southern dryness limited soil moisture and irrigation supplies for rice and other seasonal crops. In other parts of the region, dry weather in Pakistan aided wheat planting, while seasonal showers in Bangladesh and Sri Lanka benefited rice.



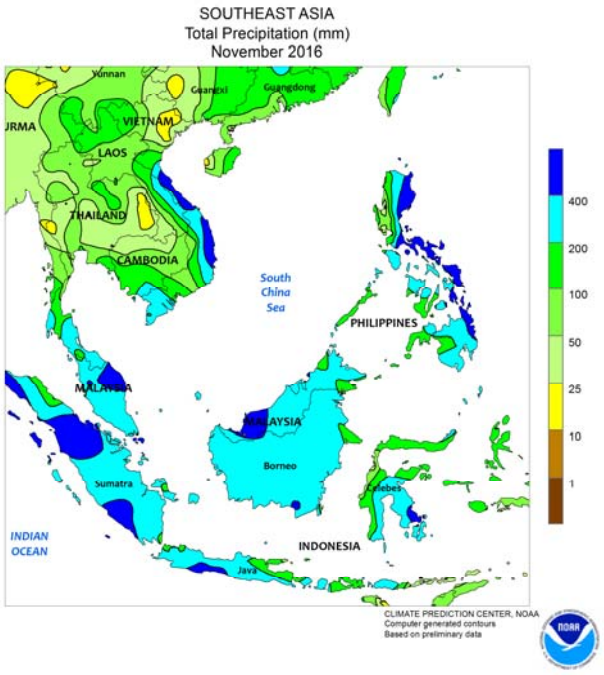


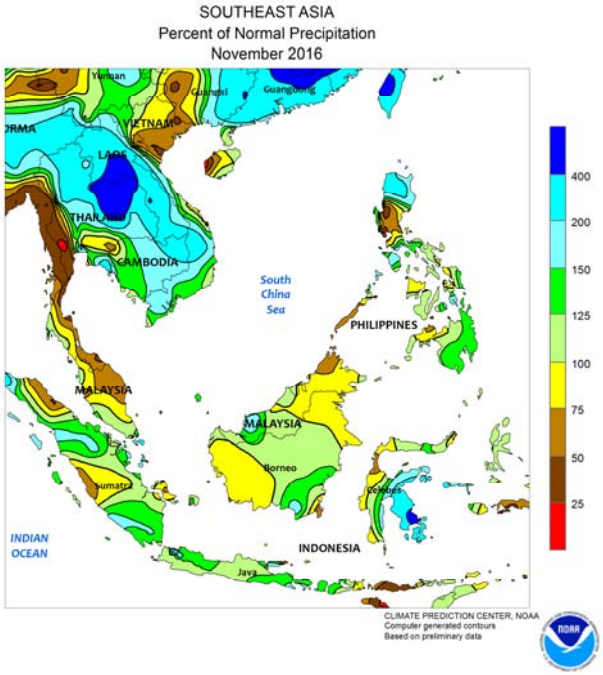


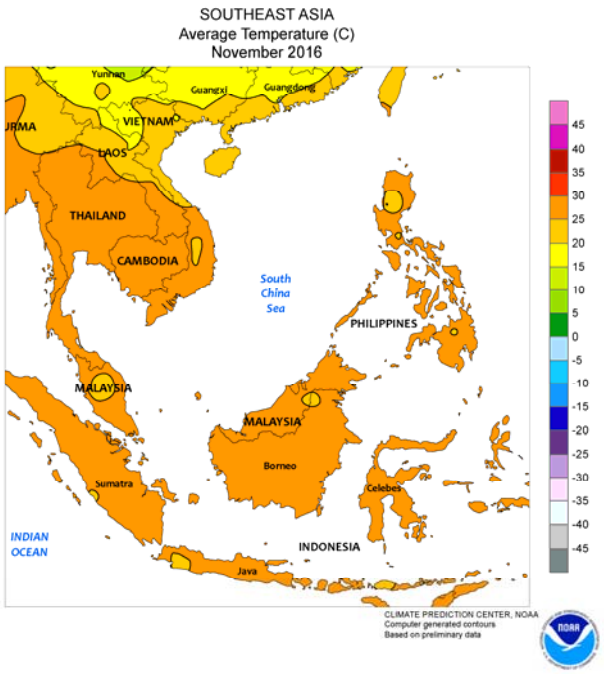


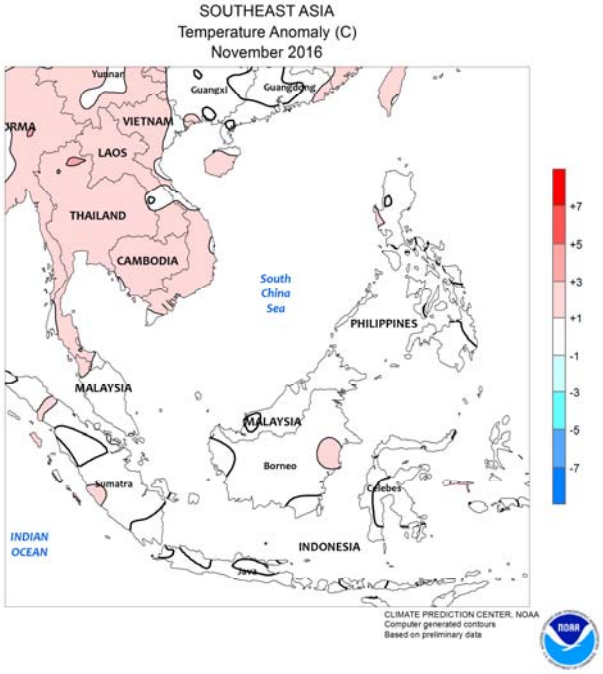
EASTERN ASIA

Rainfall was near to above normal across much of eastern China in November and much above normal in the southeast. Rainfall totals ranged from 25 mm on the North China Plain to over 200 mm south of the Yangtze River. The moisture, along with seasonable temperatures, benefited establishment of wheat and rapeseed in northern sections as well as promoting development of sugarcane and seasonal vegetables in southern provinces. However, by month's end an arctic air mass descended onto winter crop areas, forcing much of the wheat on the North China Plain into early dormancy and stymying development of rapeseed in the Yangtze Valley. Temperatures rebounded quickly, though, to more seasonable values aiding crops that remained vegetative.



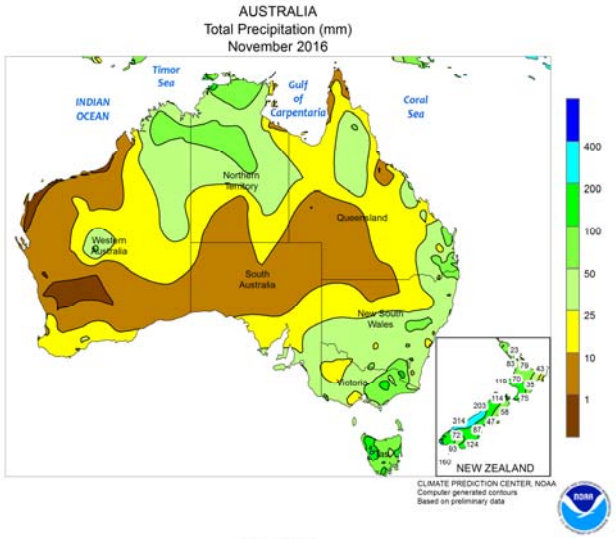


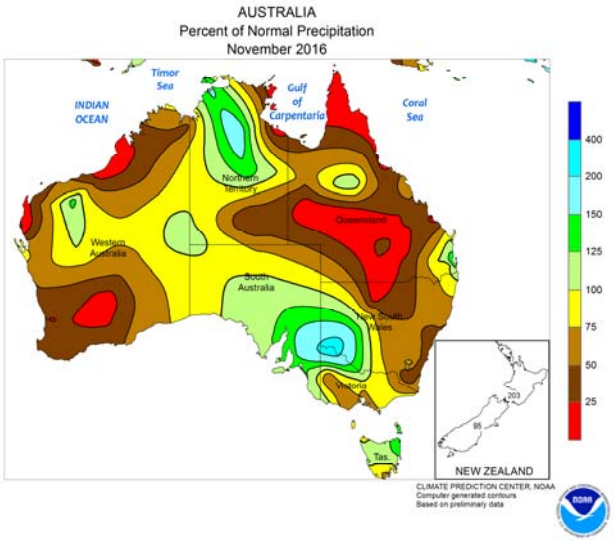


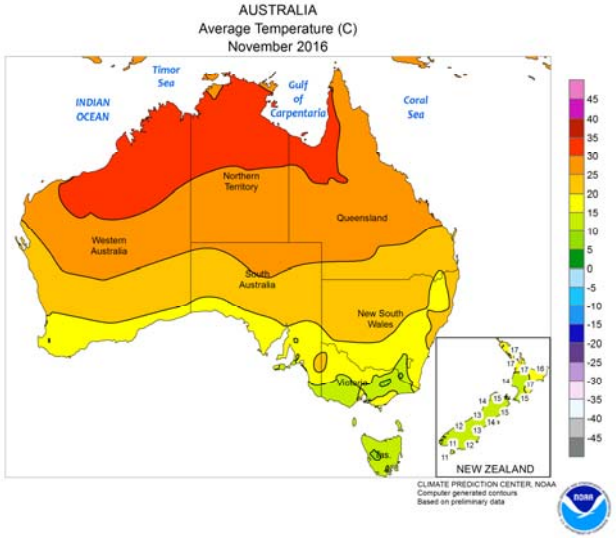


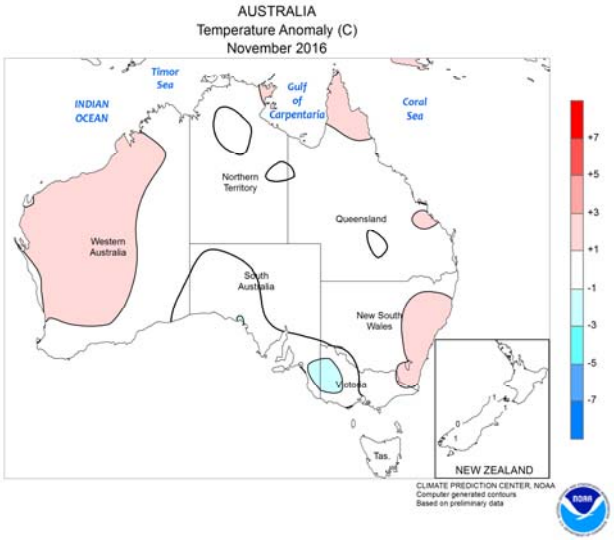
SOUTHEAST ASIA

Unusually wet weather occurred in northern portions of the region during November, reflecting the current La Niña conditions. Unseasonable showers early in the month across Thailand slowed both summer rice harvesting and winter rice sowing but further improved irrigation supplies. In Vietnam, monthly totals over 1,000 mm in some central locales caused massive delays in coffee harvesting and transport, while more seasonable amounts (less than 100 mm) were reported in northern and southern rice areas. To the east, near- to above-normal rainfall in the Philippines maintained favorable moisture conditions for rice and corn. Much of the rainfall came as a result of Tropical Storm Tokage which moved across the central islands at the end of the month. In southern sections of the region, near- to above-normal rainfall improved oil palm prospects in Indonesia while keeping rice well watered. In contrast, unseasonably light showers in Malaysia created short-term moisture deficits for oil palm. Longer-term (6 months) moisture conditions have been more favorable and prospects remained improved over last year's drought-affected crop.



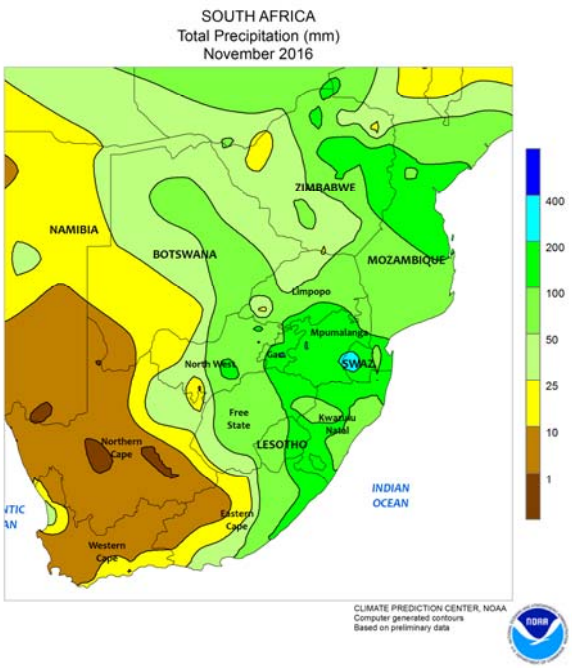


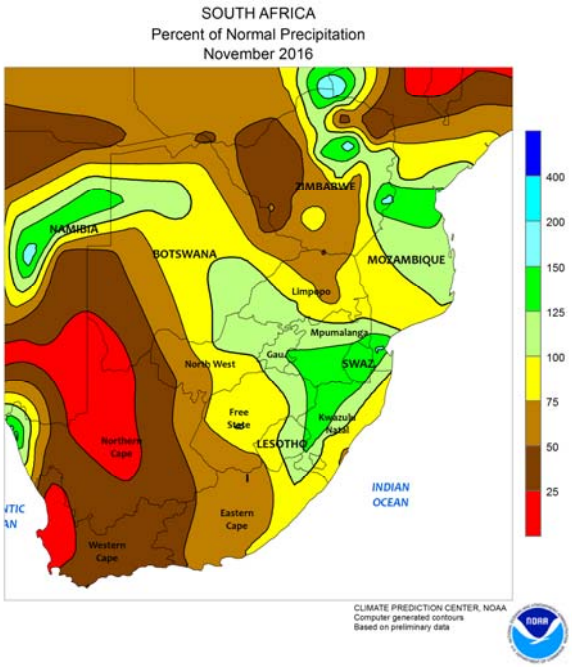


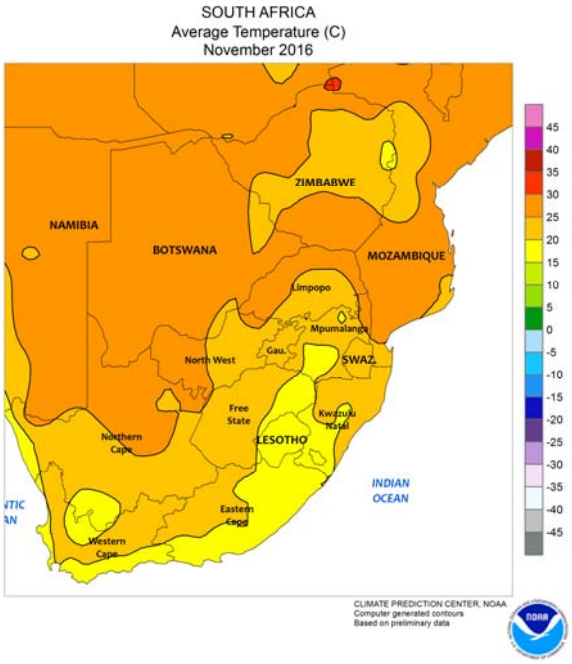


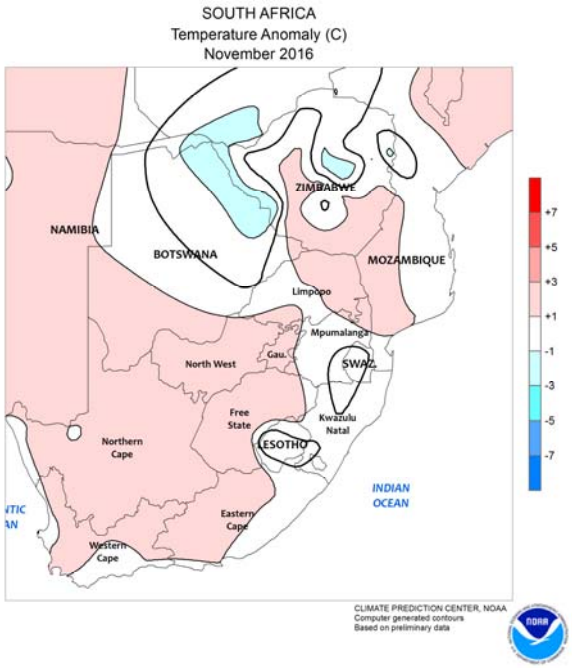
AUSTRALIA

In November, near-normal rainfall in eastern Victoria and southern New South Wales benefited immature winter grains and oilseeds. Throughout the remainder of the wheat belt, mostly dry weather prevailed, favoring winter crop maturation and harvesting while sustaining good to excellent yield and quality prospects. Although the dry weather aided fieldwork in southern Queensland and northern New South Wales, the dryness slowly but steadily reduced topsoil moisture for recently sown summer crops.





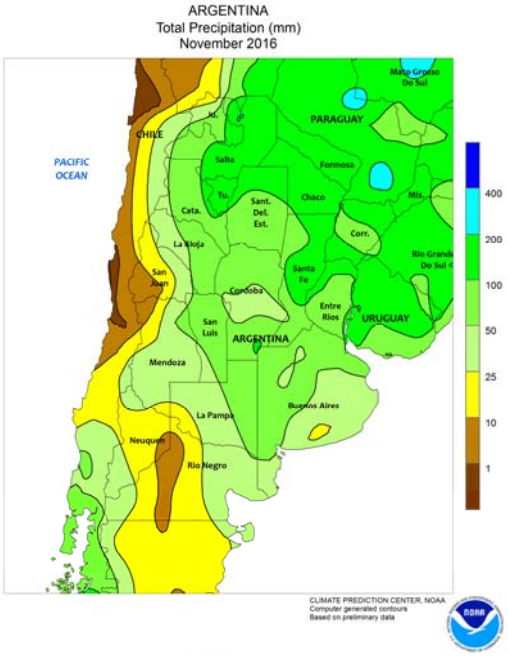


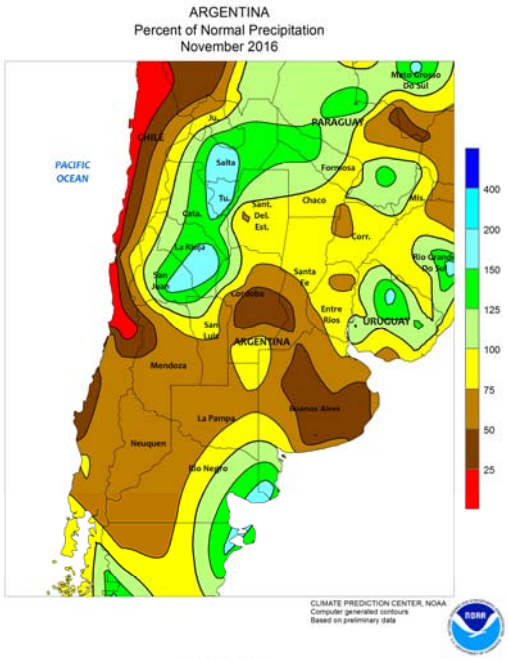


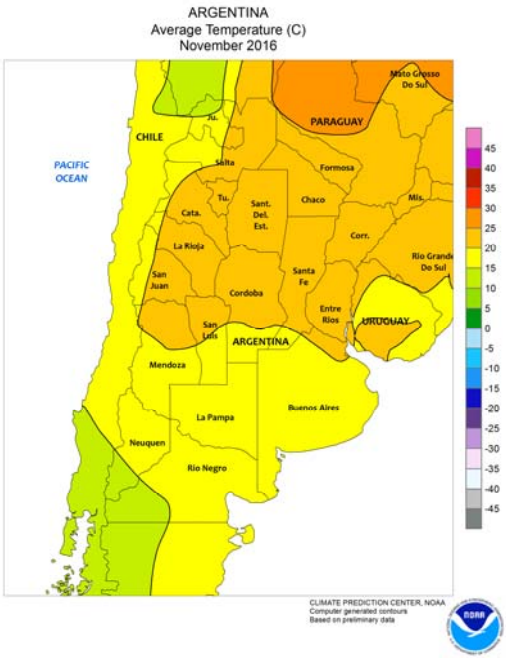
SOUTH AFRICA

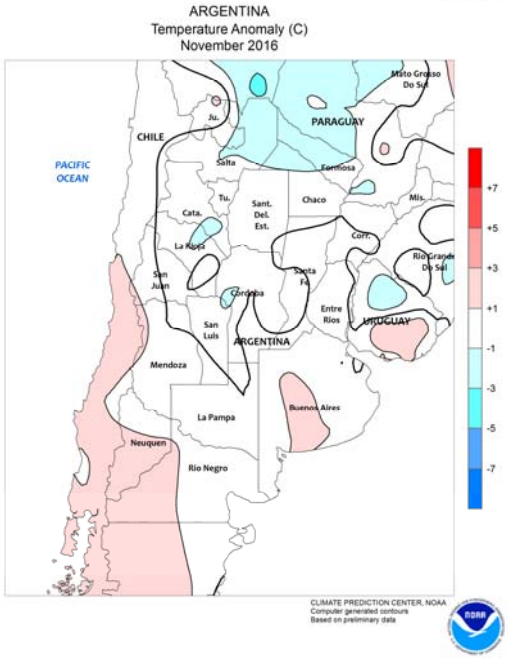
In marked contrast to last season, widespread, occasionally heavy November showers maintained overall favorable prospects for corn and other rain-fed summer crops. Monthly rainfall accumulations of more than 100 mm were recorded in Mpumalanga and nearby locations in Gauteng, Free State, and KwaZulu-Natal, areas where planting had either already occurred or was likely imminent. Near- to above-normal rainfall was also recorded in western sections of the corn belt (North West and the remainder of Free State), helping to condition fields in preparation for December-planted summer crops. Summer warmth (daytime highs in the middle 30s degrees C) maintained high evaporative losses in the outlying northern and western farming areas but temperatures were closer to normal (highs more commonly in the upper 20s and lower 30s) in eastern production areas, advancing corn development in the absence of stressful heat. Elsewhere, early-month rain benefited sugarcane and other rain-fed summer crops in and around southern KwaZulu-Natal, though a drying trend developed during the latter part of November. Unseasonable warmth and dryness dominated irrigated farmlands of the Cape Provinces for much of the month, spurring rapid early development of summer row crops — including corn and cotton — as well as tree and vine crops in key production areas of Western Cape.

For additional information contact: mbrusberg@oce.usda.gov



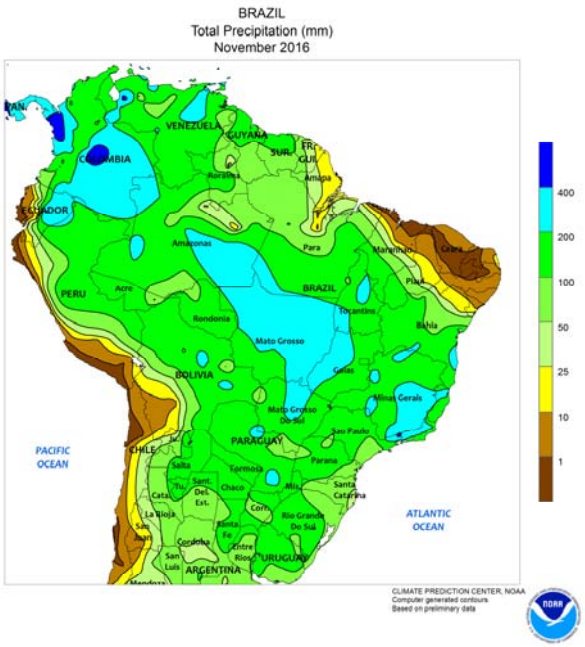


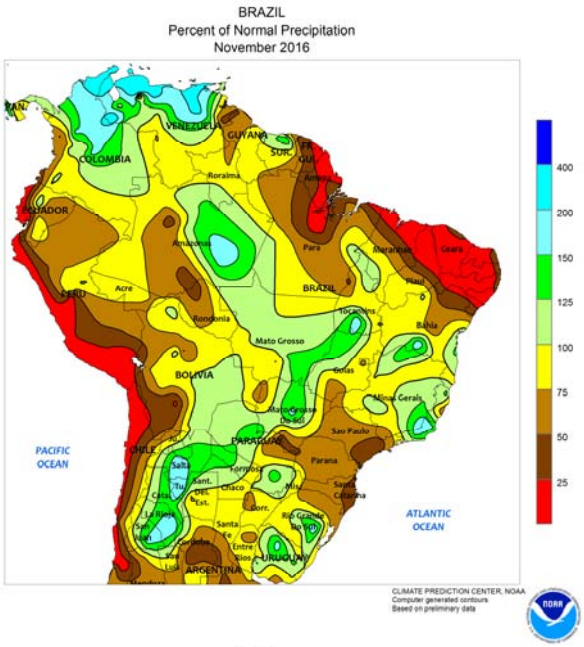


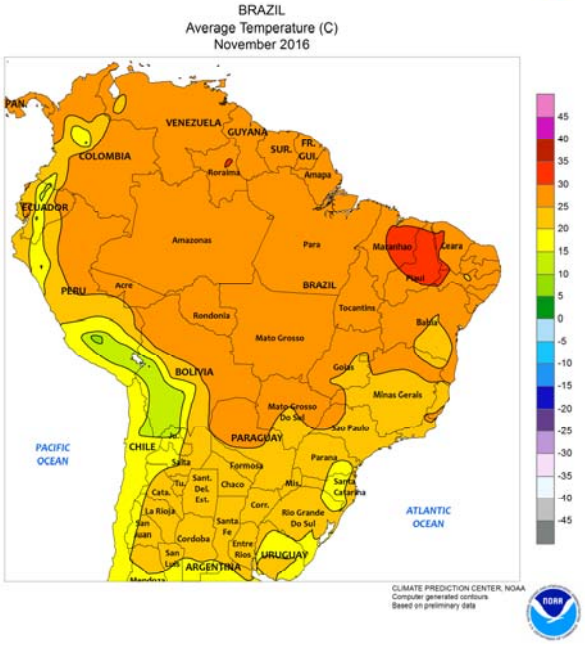


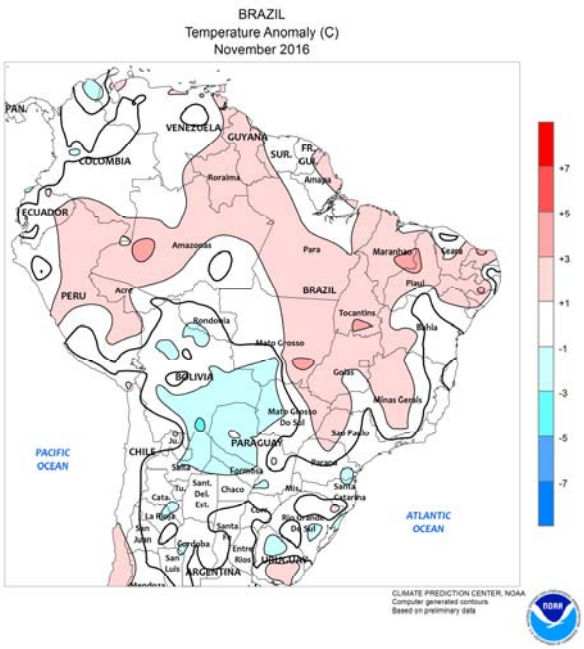
ARGENTINA

A November drying trend improved conditions for spring fieldwork in high-yielding summer crop areas of central Argentina that had been plagued by earlier periods of wetness. Monthly accumulations of rainfall ranged from 25 mm in southern Buenos Aires to 100 mm (locally higher) in the traditionally wetter southern Parana River Valley (southern sections of Santa Fe and Entre Rios). While favoring drydown and harvesting of winter grains, sections of southeastern Buenos Aires had become too dry for uniform germination of soybeans and other summer crops that typically follow wheat and barley, and more rain was needed. In contrast, unfavorable wetness returned to the vicinity of northern La Pampa as rainfall returned toward the end of November after a brief period of dryness. Monthly average temperatures were near to slightly above normal in Argentina's more southerly farming areas, despite a late spring freeze that reportedly damaged immature winter grains in southern Buenos Aires during the second half of November. Farther north, wetter-than-normal conditions prevailed for much of the month in western agricultural areas (Tucuman and Salta) but a drying trend — similar to that recorded in central Argentina — developed over the northeastern cotton belt (northern Santa Fe to eastern Formosa), aiding fieldwork.





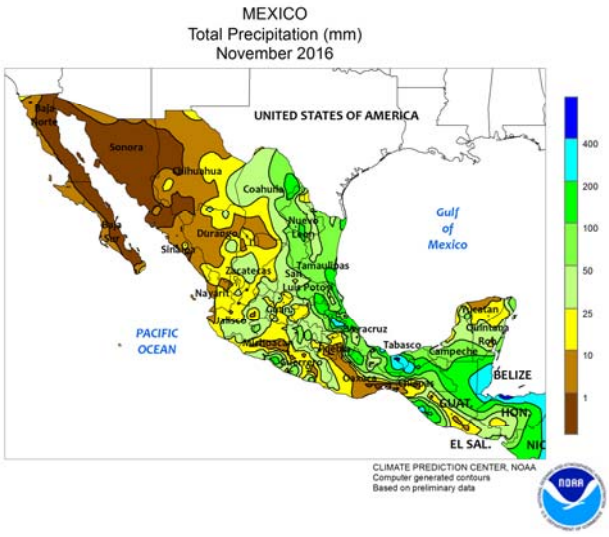


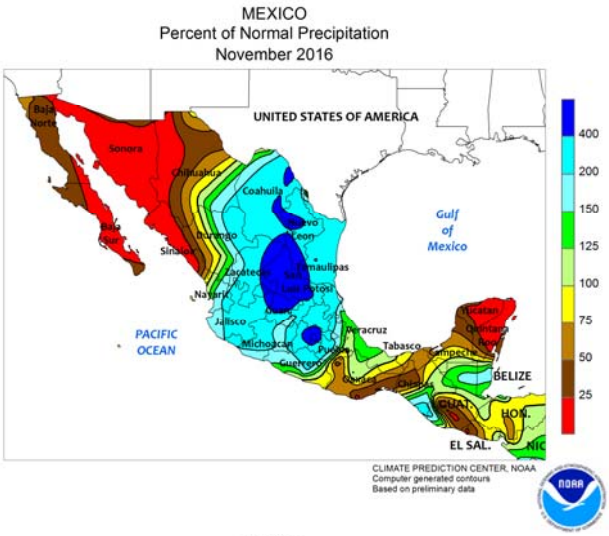


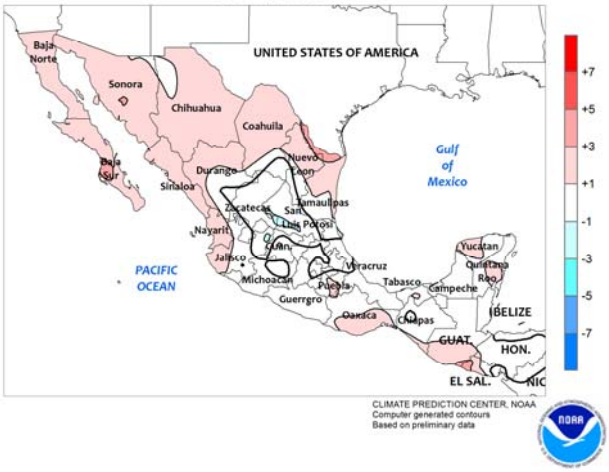
BRAZIL

During November, the combination of occasional showers and extended periods of dry, sunny weather maintained overall favorable conditions for summer crops in southern Brazil. Monthly rainfall averaged between 100 and 125 mm from Sao Paulo southward through Rio Grande do Sul; while this represented near-to below-normal accumulations for most the region, moisture conditions were still overall favorable as a result of periodic wetness in October. According to reports emanating from the governments of Rio Grande do Sul and Parana, early-planted crops advanced toward — and into — reproduction during November, making the return of the rainfall at month's end timely. In Sao Paulo and southern Minas Gerais, heavy rain in early November contrasted with drier, warmer conditions during the latter half of the month. Heavier rain (amounts totaling more than 200 mm) fell in the Center-West Region (Mato Grosso, Goias, and northern Mato Grosso do Sul) throughout the month while in the northeastern interior (Tocantins and environs), showers developed a bit later and ended after just a few weeks. The northeastern rainfall, though below normal in many locations, marked the onset of the summer rainy season and encouraged planting of soybeans, cotton, and other crops. Summer warmth (daytime highs reaching the middle and upper 30s degrees C) maintained high evapotranspiration rates in the more northerly farming areas.

For additional information contact: mbrusberg@oce.usda.gov

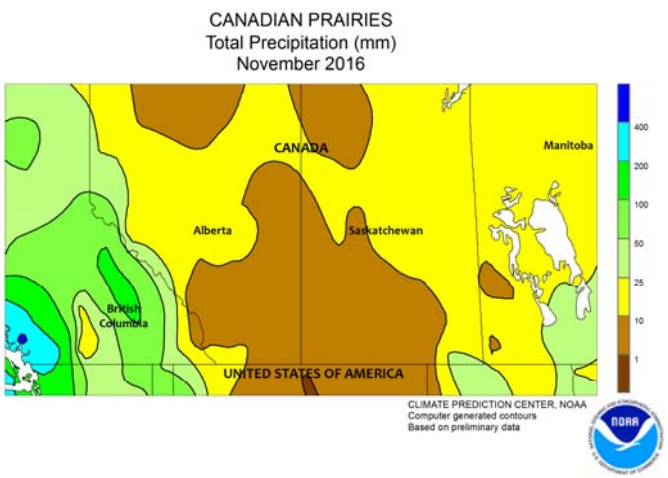


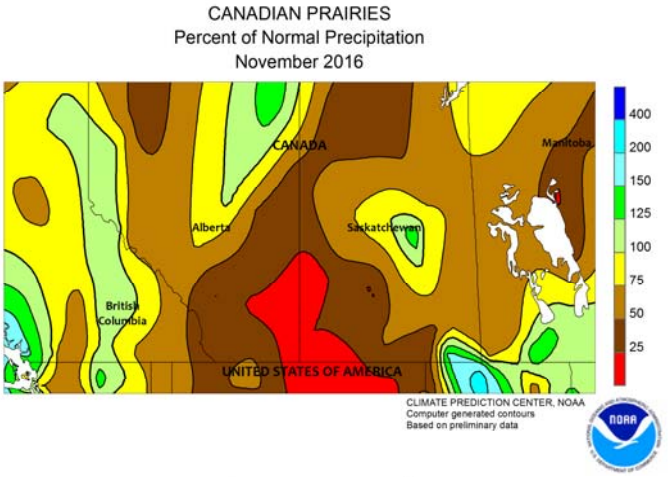


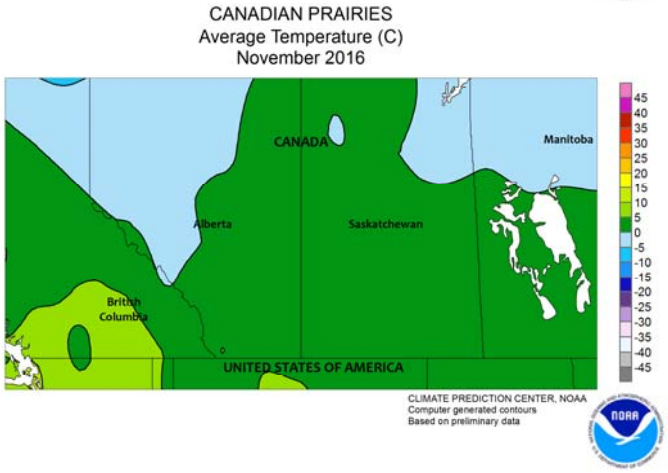


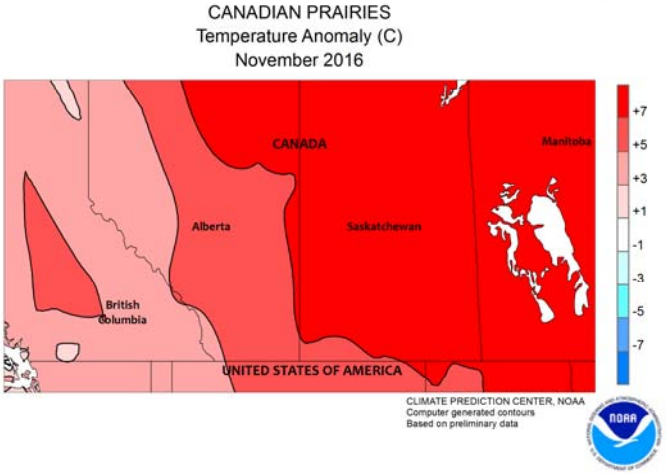
MEXICO

In November, unseasonable rainfall gave a late-season boost in moisture to immature summer crops in southern and eastern parts of the country. The moisture also increased irrigation reserves for the upcoming winter cropping season. Areas recording above-normal rainfall included the southern plateau (Jalisco to Puebla), where rain totaling 10 to 50 mm fell over a period of several weeks during the middle part of the month. Heavier rain (monthly accumulations from 50 to locally more than 200 mm) fell from the northeast (Coahuila, Nueva Leon, and Tamaulipas) southward along the Gulf Coast to Tabasco and Campeche, increasing irrigation reserves for winter crop production. According to the government of Mexico, national reservoir levels were at 76.6 percent of capacity as of November 30, compared with 78.2 percent at this time last year and 67.0 percent in 2014. Northwestern reservoirs (including those in Sinaloa and Sonora) were at 85.0 percent versus 84.4 percent last year and 72.6 percent in 2014.









CANADIAN PRAIRIES

Unseasonable warmth dominated the Prairies for much of the month of November, keeping large sections of the Prairies snow-free for late fieldwork. Monthly average temperatures were 3 to 5°C or more above normal in Alberta and more than 7°C above normal throughout most of Saskatchewan and Manitoba. Below-normal precipitation (5-25 mm, liquid equivalent, in most areas) accompanied the warmer-than-normal conditions. However, snow returned to Alberta's northern growing areas during the middle part of the month, renewing harvest delays; according to the government of Alberta, harvesting of all crops had only reached 90 percent complete as of November 29, with remaining crops likely to be left in the fields until spring. Fieldwork was virtually complete in Saskatchewan and Manitoba by month's end.

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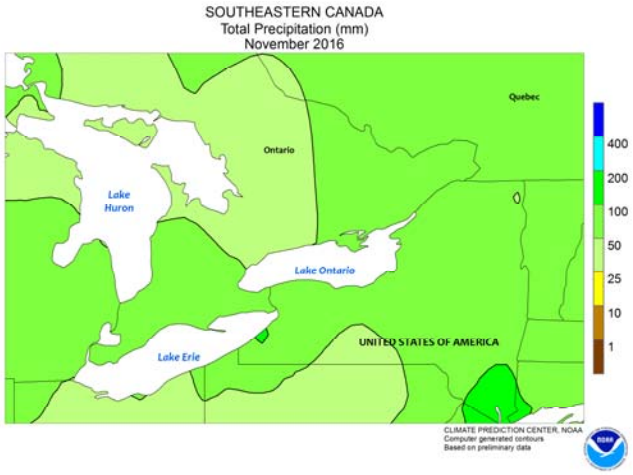
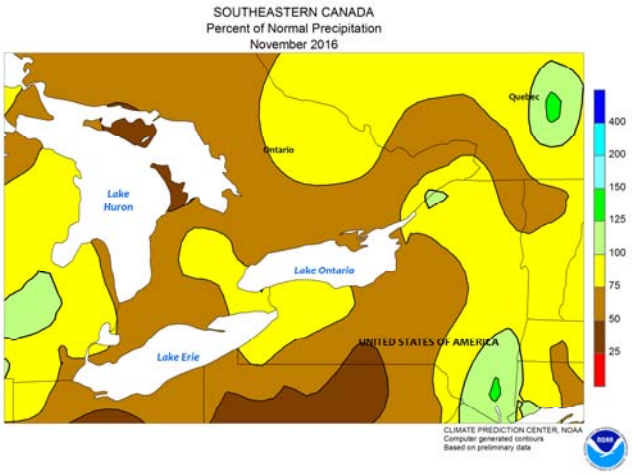
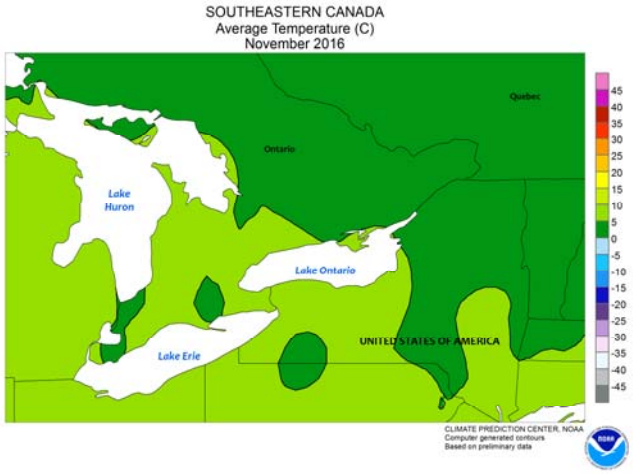
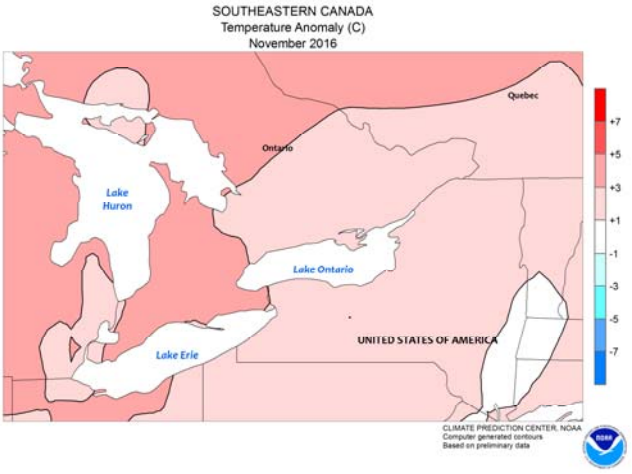






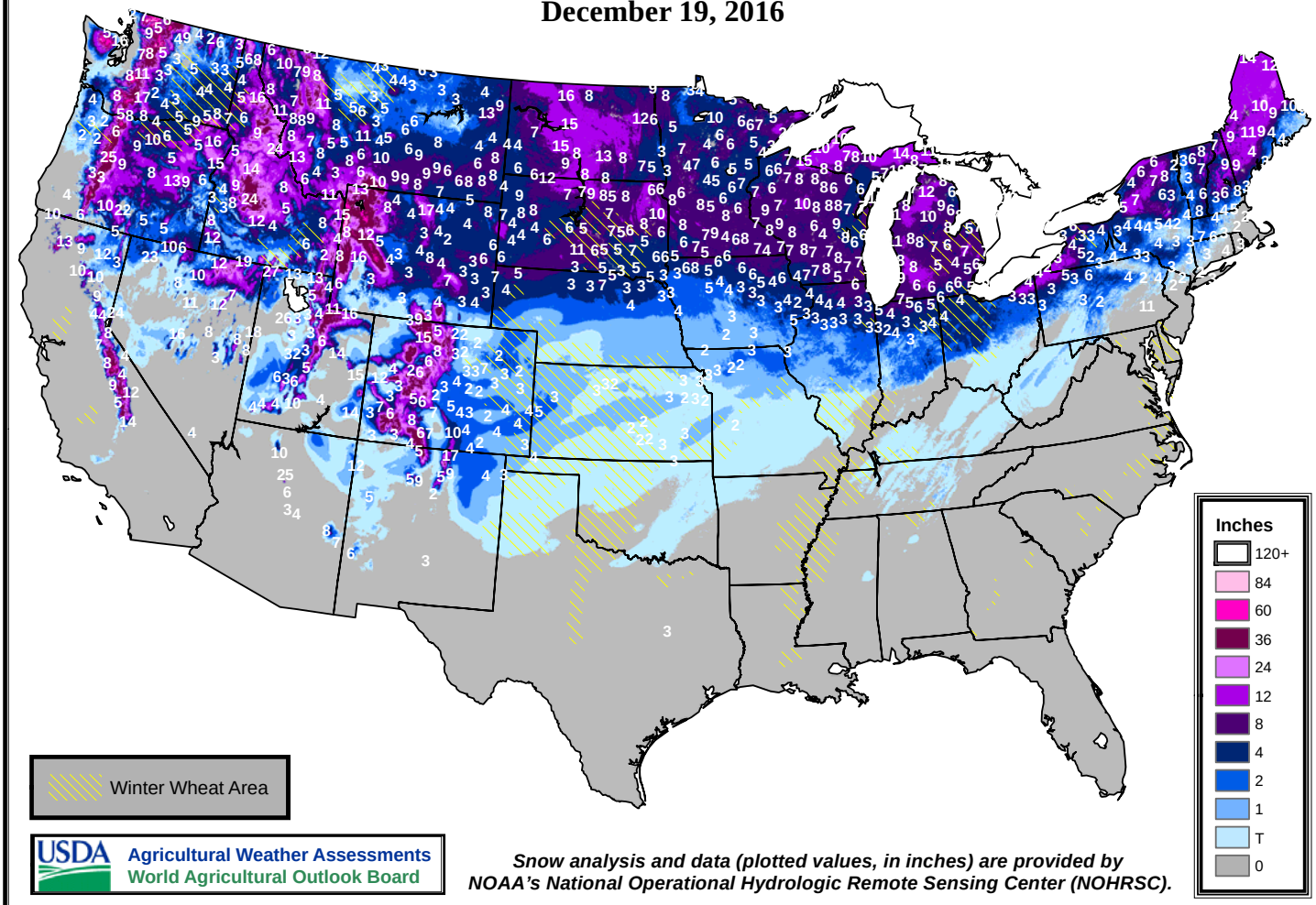


SOUTHEASTERN CANADA

Seasonal cooling occurred across the region during November, although temperatures were above normal on most days. Despite the unseasonable warmth, daily average temperatures had fallen below the threshold for dormancy (averaging 5°C or lower for at least 2 weeks) in most areas by month's end, first in Quebec before gradually moving southward through Ontario. Nighttime lows briefly approached -10°C in a few outlying production areas but the cold was generally not low enough to affect dormant wheat. Although monthly precipitation was near to below normal, most of Quebec and Ontario had accrued a protective layer of snow cover ahead of the aforementioned cold outbreak. Much of this snow had melted off by month's end, upon the advent of warmer weather (daytime highs approaching 15°C in some of the warmer parts of Ontario).

Snow Depth

December 19, 2016



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