Rio Grande|Bravo

CLIMATE IMPACTS & OUTLOOK May 2017

SUMMARY

Forecasts favor above-average temperatures in all of the Rio Grande/Bravo Basin, and above-average precipitation in the southern portion of the Basin, through August.

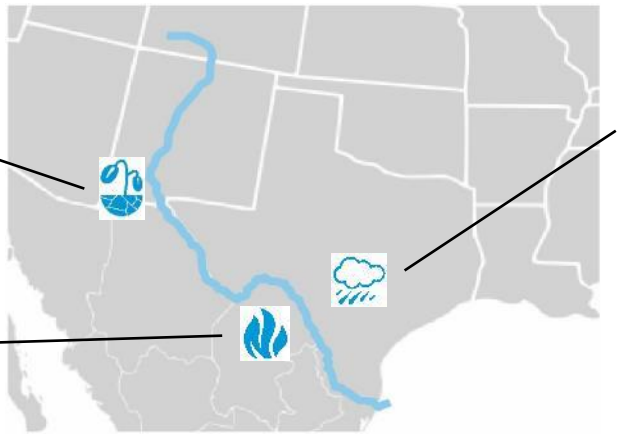
AT A GLANCE

Southwest New Mexico

Moderate drought conditions developed in early May, but are predicted to improve by August.

Sierra Madre Oriental

Above-average fire potential is forecasted through July.



Northeast New Mexico, Central and South Texas, Northern Mexico

Slight chances for above-average precipitation is forecasted through August.

REGIONAL CLIMATE OVERVIEW — FEBRUARY | MARCH | APRIL

Over the last three months (February – April) precipitation was 25–70% below average in southern New Mexico and West Texas, and 150–300% above average in northeast New Mexico, and North and South Texas (Figure 1; left). Temperatures were 4–6 °F (2.2–3.3 °C) above average for most of Texas and eastern New Mexico, 2–4 °F (1.1–2.2 °C) above average for western New Mexico, and 6–8 °F (3.3–4.4 °C) above average in pockets across Texas (Figure 1; right). The first four months of the year (January – April) have been the warmest on record for both New Mexico and Texas (NOAA).

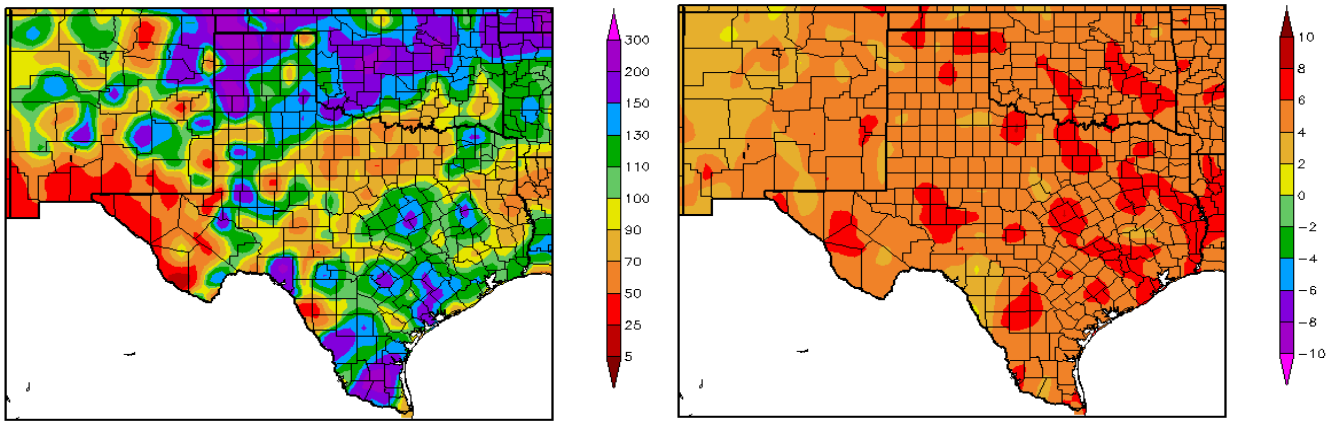


Figure 1 (above): Percent of average precipitation (left) and departure from average temperature in degrees F (right), compared to the 1981–2010 climate average, for 2/1/2017–4/30/2017. Maps from HPRCC.

Temperatures during the first half of May (5/1/2017–5/16/2017) were 0–3 °F (0–1.7 °C) above average for most of New Mexico, and 0–3 °F (0–1.7 °C) below average for most of Texas, except for West Texas which experienced temperatures slightly above average (figure not shown). Precipitation over the same time period was 0–50% of average for almost all of Texas and southern New Mexico.

Above normal temperatures were observed in northern Mexico for February–April, with the exception of southern Sinaloa that was close to normal. Greatest anomalies were more than 9 °F (5 °C) above average in parts of Chihuahua, Durango and Coahuila (Figure 2, left). Most of the regions above 40 °C for more than 30 days were in the Sonora-Chihuahua-Sinaloa border, as well as southern Durango (Figure 2, right).

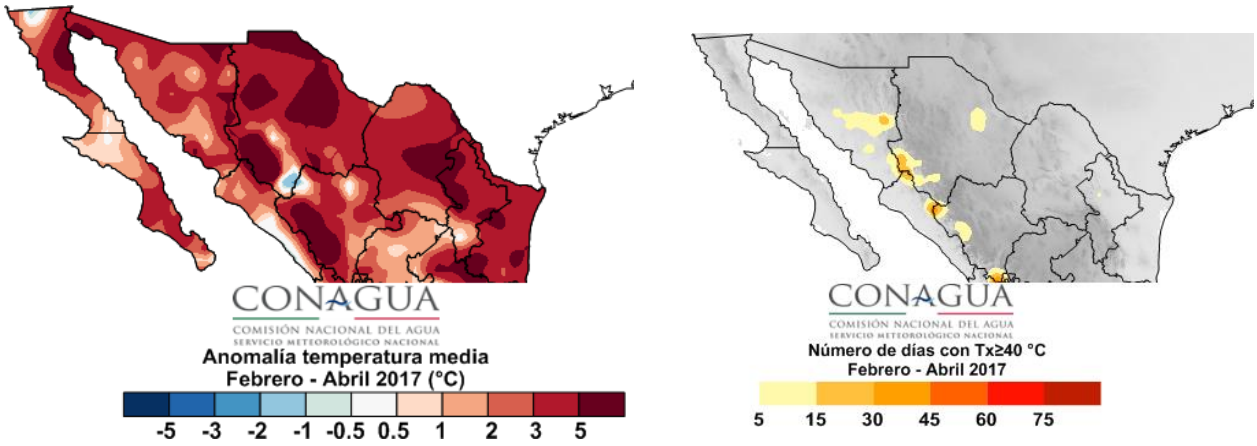


Figure 2: Temperature anomalies in °C (left) and number of days with maximum temperatures at or above 40 °C (104 °F) (right) for February–April. Maps from SMN.

DROUGHT

According to the North American Drought Monitor (NADM), by the end of April, all of the Rio Grande/Bravo region was drought-free (Figure 3). Southwest New Mexico, and small areas in northern Coahuila, Nuevo León, and Tamaulipas, were experiencing abnormally dry conditions. As of May 9, according to the U.S. Drought Monitor, moderate drought conditions had developed in the Southwest corner of New Mexico. These conditions are predicted to improve by the end of August, according to the U.S. Seasonal Drought Outlook (figure not shown).

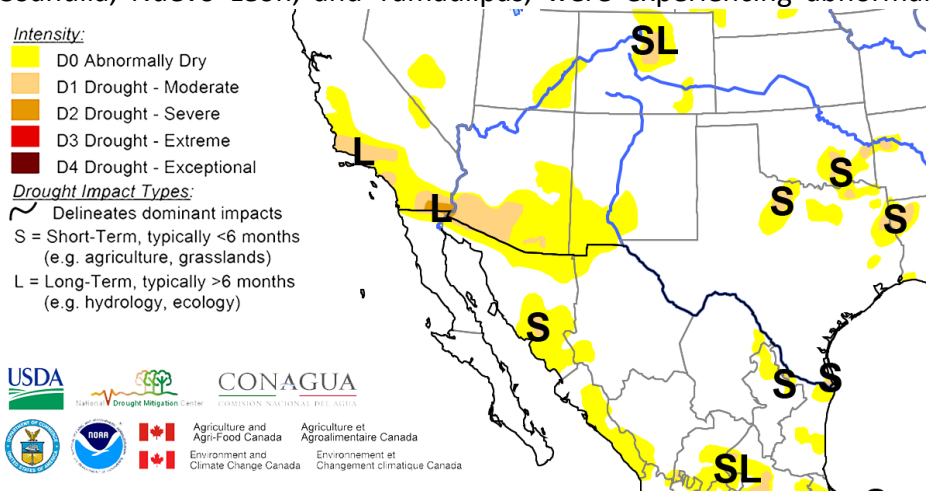


Figure 3 (above): North American Drought Monitor, released May 12, 2017.

TEMPERATURE

The one-month (June; figure not shown) NOAA temperature outlook favors increased chances for above-average temperatures in most of New Mexico and Texas. Chances for above-average temperatures increase as the summer progresses, according to the NOAA three-month temperature outlook (June–August; Figure 4). Forecasts from CONAGUA's Servicio Meteorológico Nacional (SMN) indicate above-average temperatures in the states of Chihuahua, Coahuila and northern Nuevo León through June. In July, SMN expects above-average conditions in the northern part of Chihuahua, western Coahuila and the state of Nuevo León (Figure 5).

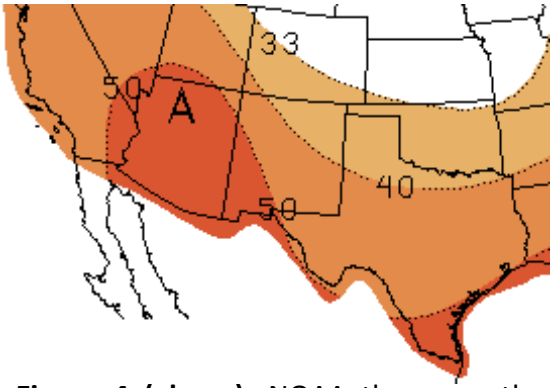


Figure 4 (above): NOAA three-month temperature outlook (June–August). Forecast made on May 18, 2017 by CPC.

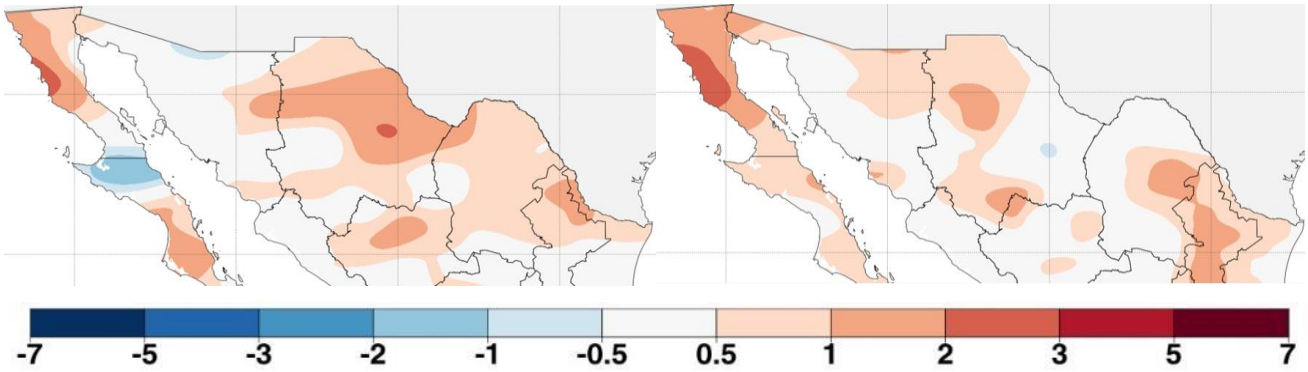


Figure 5 (above): Predicted maximum temperature anomalies for northern Mexico (in °C); June (left) and July (right). Forecast made on May 1, 2017 by SMN.

PRECIPITATION

In the next month, the NOAA precipitation outlook (June; figure not shown) predicts equal chances of below-, average, or above-average precipitation for most of New Mexico and Texas, and above-average chances in the northeast corner of New Mexico and far North Texas. Chances for above-average precipitation increase as the summer progresses; the three-month NOAA forecast (June–August; Figure 6) predicts increased chances for above-average precipitation in Northeast New Mexico and most of Texas.

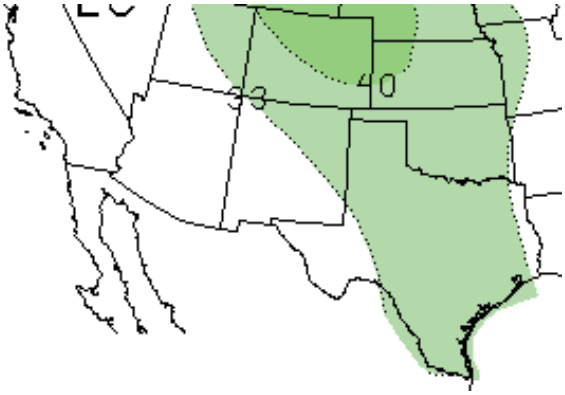


Figure 6 (above) : NOAA three-month precipitation outlook (June–August). Forecast made on May 18, 2017 by CPC.

For Mexico in June, SMN forecasts below-average precipitation in the state of Sonora and northern Nuevo León, and above-average in regions of Chihuahua and in the south of Coahuila. In July, SMN predicts conditions above to near average conditions in most of the Basin (Figure 7).

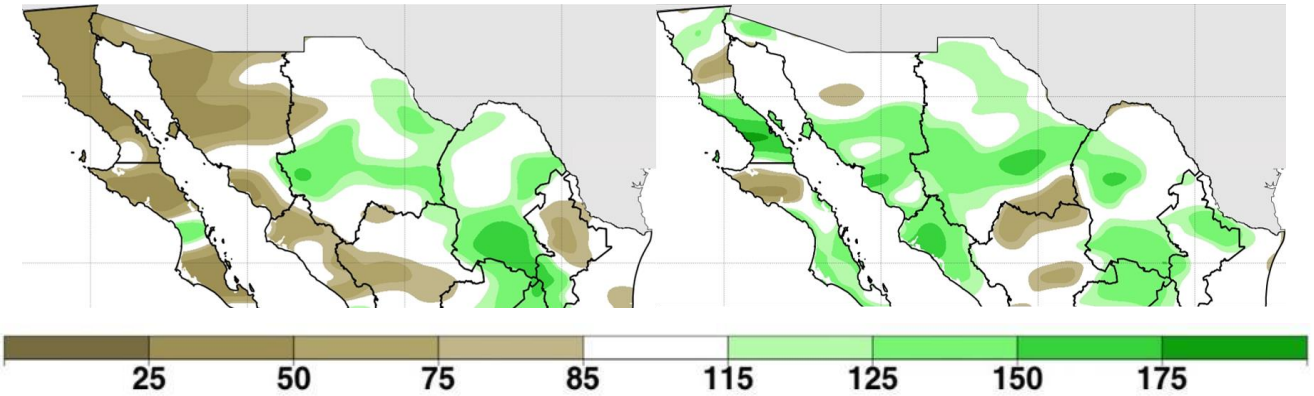


Figure 7 (above): Percent of average precipitation for northern Mexico; June (left) and July (right). Forecast made on May 1, 2017 by SMN.

FIRE

The National Interagency Fire Center (NIFC) and SMN forecasts, made on May 10th, favor above-normal fire potential for the northern mountain ranges of Mexico in June, decreasing from the South by July, attributable to below-average precipitation in recent months (Figure 8). In July, above-normal fire potential is also forecasted for Southwest New Mexico, due to developing drought conditions.

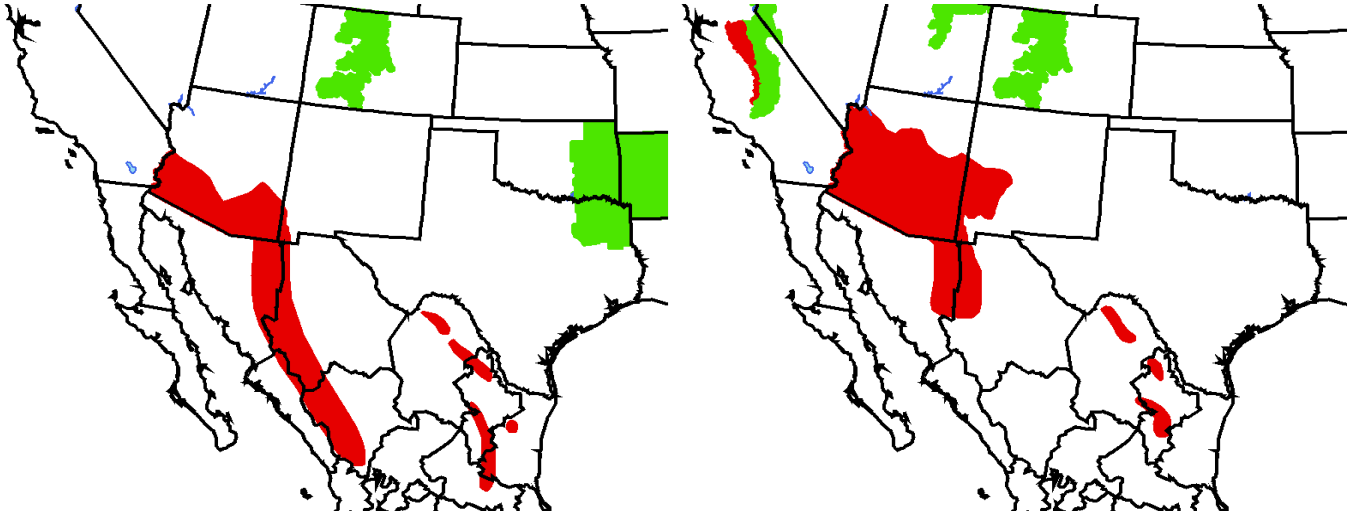


Figure 8 (above): Fire outlook for June (left) and July (right). Red shading indicates conditions that favor increased fire activity. Green shading indicates conditions that favor decreased fire activity. Forecast made on May 10, 2017 from NIFC and SMN.

EL NIÑO-SOUTHERN OSCILLATION (ENSO)

Sea surface temperatures (SSTs) and atmospheric conditions in the tropical Pacific Ocean continue to indicate ENSO-neutral conditions (IRI; NOAA). The official ENSO forecast reflects lower chances of El Niño development than was predicted in previous months, due to a lack of consensus in the models and no clear shift toward El Niño development in the observations. Predictions now equally favor both ENSO-neutral and El Niño through the summer and fall of 2017 (Figure 9; NOAA).

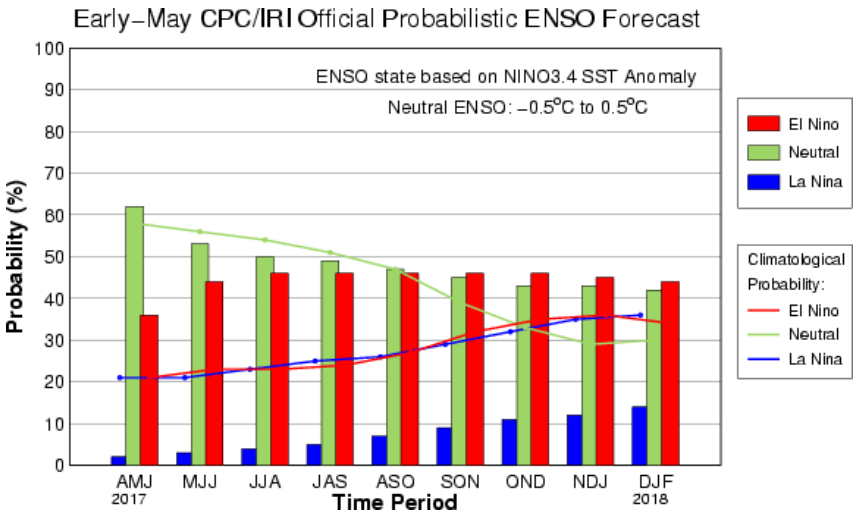


Figure 9 (above): ENSO probabilistic forecast from IRI.

For more ENSO information:
English: http://iri.columbia.edu/our-expertise/climate/enso/enso-essentials/ and http://www.ncdc.noaa.gov/teleconnections/enso/.

Spanish: http://www.smn.gov.ar/?mod=biblioteca&id=67 and http://www.smn.gov.ar/?mod=biblioteca&id=68

RECENT RESEARCH/TOOLS

RECENT DECLINES IN UPPER RIO GRANDE RUNOFF LIKELY DUE TO WARMER TEMPERATURES

The recent decline in Upper Rio Grande runoff from the 1980s to present is unprecedented in the past 445 years, according to a recent study published in Geophysical Research Letters. Using new and existing records of precipitation and streamflow, the authors reconstructed runoff ratio—"the portion of precipitation that ends up in the river each year, rather than evaporating." They show that the runoff ratio is dominantly influenced by precipitation, with years of high runoff corresponding to years with high precipitation, and years of low runoff with low precipitation. However, temperature also plays a large role in dry years, making low runoff about 3 times as likely if temperatures are above normal. Warm temperatures in recent decades "have been an important factor in very low runoff ratio years," and if the warming trend continues, further declines in Upper Rio Grande runoff ratios may occur, presenting water management challenges in the region. https://www2.ucar.edu/atmosnews/news/126957/warmer-temperatures-cause-decline-in-key-runoff-measure

SOUTHWEST U.S. BECOMING DUSTIER, WITH POSSIBLE LINK TO VALLEY FEVER

Dust storms in western states, including New Mexico and Texas, have increased in frequency by 240% from 1990–2010, according to authors of a recent study published in Geophysical Research Letters. The authors further determined that the largest increase in dust storms was observed during spring—the season characterized by windy conditions primarily due to the passage of Pacific cold fronts. It's not surprising then that the authors found that the climate indicator most responsible for the increase in dust storms to be the Pacific Decadal Oscillation—ocean-atmosphere variability in the North Pacific Ocean. As global temperatures warm, rendering a drier subtropic, dust storm activity may become stronger in the future. The authors further investigate the relationship between dust storms and incidences of Valley fever, which have increased 800% from 2000 to 2011. Focusing on endemic centers in Arizona, they find a positive correlation between dust storms and Valley fever incidences that is stronger than correlation with other factors that could explain the increase in Valley fever incidences. https://weather.com/news/climate/news/southwest-dust-storms-growing-ocean-temperatures

AFTER FIRE: TOOLKIT FOR THE SOUTHWEST

A new toolkit (https://postfiresw.info/) provides information and resources for managers, landowners, and communities on the impacts of post-fire flooding, providing guidance for assessing and preventing potential damage. The site contains publications, funding opportunities, and information on the research, methods, and tools available for measuring and reducing risks associated with post-fire flooding, debris flows and sedimentation.

UPCOMING FORUMS

5TH GLOBAL PLATFORM FOR DISASTER RISK REDUCTION

Mexico will host the 5th Global Platform for Disaster Risk Reduction in Cancún, Mexico on May 22–26, 2017. The global conference is the most important multilateral forum of its kind, aiming to "reduce loss of life and economic losses from disaster caused by man-made and natural hazards."

23RD CONFERENCE ON APPLIED CLIMATOLOGY

Sponsored by the American Meteorological Society, the 23rd Conference on Applied Climatology will be held in Asheville, North Carolina on June 26-28, 2017. Registration beings in late March.

98TH ANNUAL MEETING OF THE AMERICAN METEOROLOGICAL SOCIETY

The next meeting of the American Meteorological Society (AMS) is scheduled for January 7–11, 2018 in Austin, Texas. The meeting is "the world's largest yearly gathering for the weather, water, and climate community."

NEWS HEADLINES

Rio Grande still running high, officials keep an eye on levees May 15, 2017: http://nmpoliticalreport.com/319325/where-the-rio-grande-meets-its-levees-en/

Climate change is shrinking the West's water supply May 15, 2017: http://www.hcn.org/articles/climate-change-is-shrinking-the-wests-water-supply

Breaking New Ground in Weather Forecasting May 11, 2017: https://www.insidescience.org/news/breaking-new-ground-weather-forecasting

Water efficiency in rural areas is getting worse, even as it improves in urban centers May 18, 2017: https://phys.org/news/2017-05-efficiency-rural-areas-worse-urban.html

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United States

Victor Murphy
Climate Focal Point
NOAA-National Weather Service
Southern Region

Gregg Garfin
Climatologist
Climate Assessment for the Southwest
(CLIMAS)

Sarah LeRoy
Research Assistant
Climate Assessment for the Southwest
(CLIMAS)

Mark Shafer
Director of Climate Services
Southern Climate Impacts Planning Program

Meredith Muth
International Program Manager
Climate Program Office
(NOAA)

Mexico

Martín Ibarra | Óscar García
Seasonal Forecasts
Mexico National Meteorological Services
(SMN)

Reynaldo Pascual | Adelina Albanil
Drought
Mexico National Meteorological Services
(SMN)

Julio Martínez
Diagnostic Observations
Mexico National Meteorological Services
(SMN)

Darío Rodríguez Rangel
Mexico National Meteorological Services
(SMN)

Juan Saldaña Colín
Climate Services
Mexico National Meteorological Services
(SMN)