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The Canadian Agriculture Weather Prognosticator

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WORLD WEATHER ISSUES

- France remains much drier than usual and neighboring areas of the U.K., Germany and Belgium are also trending too dry
- Southeastern Europe has dryness issues once again with the lower Danube River Basin suffering most
- Eastern Ukraine into Kazakhstan has slipped into another dry summer not too much different from that of eastern Saskatchewan
- Russia's New Lands where spring wheat and sunseed are produced in abundance have recently begun to dry out and crop stress has begun. Some rain will evolve briefly this week
- India's monsoon is still performing quite favorably and little change is likely
- Australia's winter crops are establishing well, but more rain is still desired
- Western Argentina wheat production has been cut nearly 15% because of poor planting conditions.
- China continues to flood

Early July Rain Expands Wet Bias In West

Rain in the first half of July expanded the region of excess moisture from western and northern Alberta to a much larger part of that province as well as northwestern Saskatchewan. The wet and cool bias that has dominated the first half of summer has been 100% correct relative to Environment Canada's Outlook for the western Prairies.

Drought that continues to hang on in the eastern Prairies was eased by rain in the first half of July, but despite the relief, long term soil moisture is still lacking and the late July and August weather will do nothing to help the situation.

The outlook for the second half of summer will perpetuate the first half of summer's weather at least through mid-August and the earliest that a change can take place will be the second half of August and after four years of poor harvest conditions in Alberta there will be considerable praying going on. Alberta and both west-central and northwestern Saskatchewan have already been too wet during much of this month and for parts of Alberta it is a problem that has prevailed all season long.

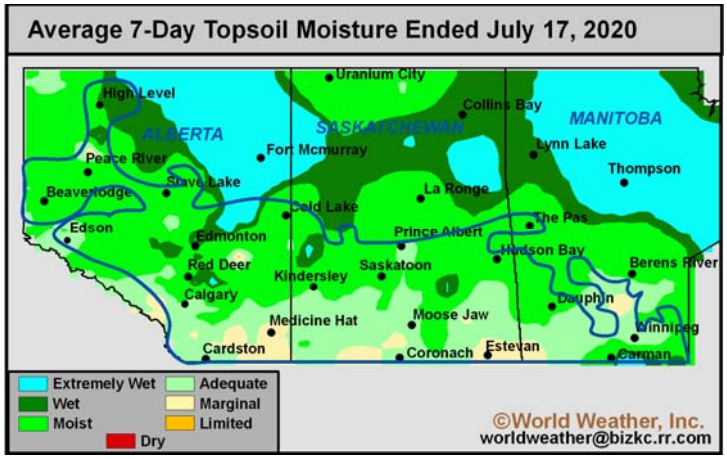
The first half of July either saturated the ground or maintained saturated soil conditions. The environment was certainly not supportive of much fieldwork and crop development rates were slow.

Frequent cloud cover and near daily rainfall kept temperatures from warming and that kept evaporation rates low. The number of sunny and warm days was very low.

The wet bias in Alberta contrasted by the continuation of drought in parts of eastern Saskatchewan. The dry conditions led to bolting canola and premature heading and flowering of some spring cereals in the driest areas resulting in lower production.

The orientation of the wet weather pattern shown in the topsoil moisture assessment, seen here, looks like our original summer outlook except 200-300 kilometers too far to the north. Why? We can make many excuses, but the only one you will believe is poor forecasting skills and you are probably right, but given the same circumstances all over again we would most likely have made the same error.

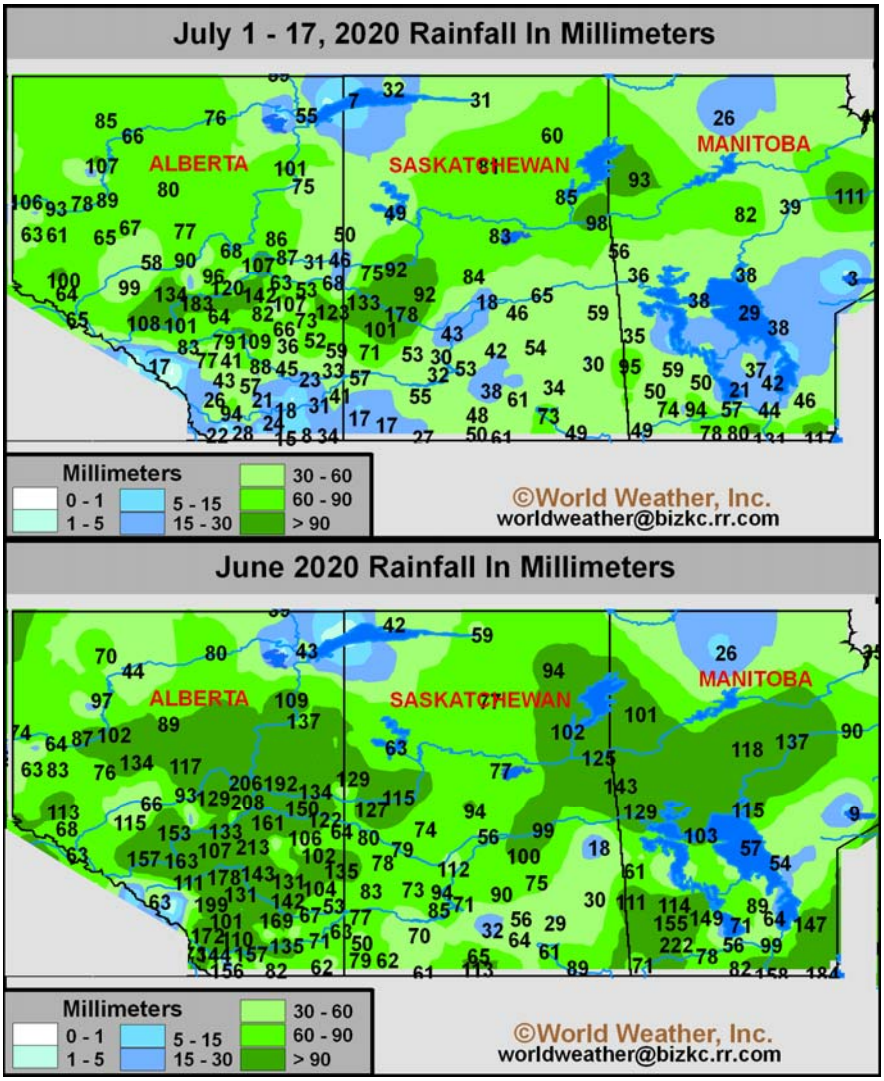
The northward shift in the jet stream occurred too quickly to support our expectations for the summer and we underestimated the amount of cold weather that would be present. Having the jet stream far-



Early July Rain Expands Wet Bias In West (continued from page 1)

ther north sooner than expected and more cool air to the north and warm air to the south resulted in the wetter bias. Kudos go to Environment Canada for getting this pattern right. So now what happens?

The summer weather pattern originally predicted was an active one with frequent bouts of rain and that has verified, so far, but farther to the north. There is very little reason to expect big changes in late July and August. The biggest change expected is the presence of a stronger ridge of high pressure in the central United States that will poke its top into the southern Prairies bringing back the dry and warm bias that the southeastern and south-central parts of the region dealt with early in the growing season.



In the meantime, take a look at the rain maps displayed here. The amount of rain that has fallen so far this season is phenomenally great. Some of us can remember the "good old days" when excessive rain was 2.00 inches. Who would have thought that two months in a row would generate 4.00 to 7.00 inches of rain with local totals in June reaching over 8.00 inches over Alberta and northwestern into west-central Saskatchewan? The atmosphere is certainly different than that of 20-30 years ago.

The saddest part of this new weather world that we live in is that even though the rainfall has increased our evaporation rates have not been as high as needed this year to get rid of the moisture. Temperatures were just not warm enough at the right time to bail us out of the moisture surpluses.

Now that is the scenario for Alberta and northwest into west-central Saskatchewan. What about those drier areas in Saskatchewan? Time after time storms systems would move into Saskatchewan and either dissipate or split and move around the south-central through east-central parts of the province. A wall of dry air stayed nearly stationary over the region from the start of the growing season. This is a classic result of significant drought. The dry air over parts of Saskatchewan was a mere tongue of dryness that extended north of the U.S. border just far enough to aggravate many producers from south-central through east-central parts of the province. The drought impacting Saskatchewan is part of a drought that extends far to the south through the U.S. High Plains region, Rocky Mountains and far western States. The drought does not stop in the U.S. It continues south into northeastern Mexico.

Now that it is mid-summer the odds are greatly against this drought breaking down and a ridge of high pressure developing over the U.S. Plains will now help to reinforce the pattern until autumn cooling begins. The early July rain that fell in the driest areas of Saskatchewan and Manitoba was a Godsend, but it also came a little too late to save some of the most seriously stressed crops. Some producers will also tell you the rain was too little too late as well and it represents only a temporary reprieve from dryness that is bound to return with a vengeance over the next few weeks further stressing some of the crops that experienced a short term improvement because of rain in early July. In the meantime, Manitoba's driest areas have shifted to the central part of the province.

More Frequent Changing Weather Rest Of Summer

Weather patterns will change a little more often in late July and August than they did in the first half of summer, but for some of the wetter areas in Alberta relief from the wet bias is going to have to wait until late August. As for the drier areas of Saskatchewan a change back to drying will occur into the end of this month, but August weather will bring a little relief like that of earlier this month.

For the balance of July, the upper air wind flow pattern will be in flux and because of that there will not be much active weather, but at least one more bout of rain will fall in parts of central and southwestern Alberta and there will be a few strong thunderstorms possible in southern Manitoba that might leave some moisture surpluses around.

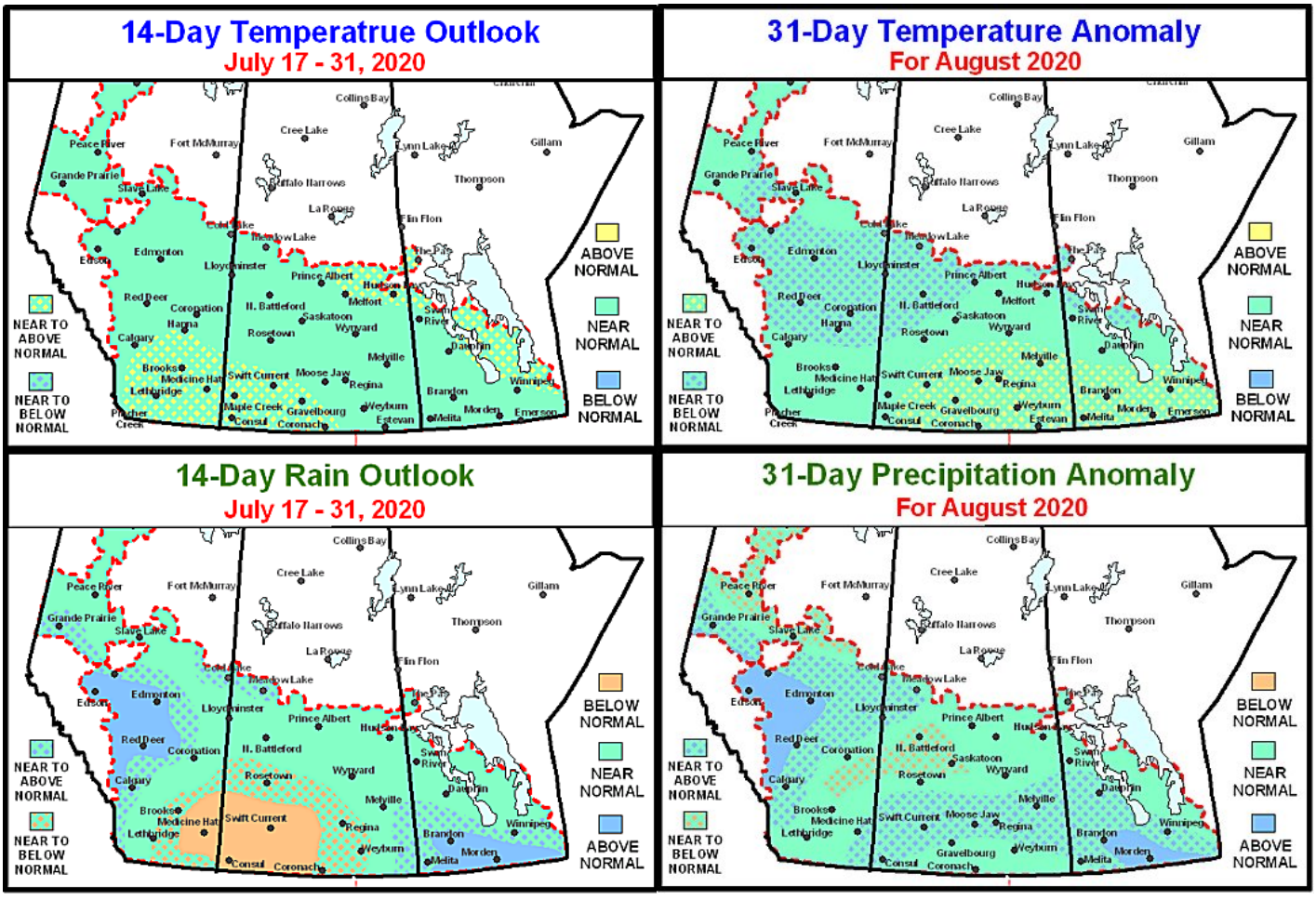
Ridge development in the U.S. western Plains during the balance of this month should reduce some of the rainfall potential in the southwestern and south-central parts of the Prairies into the end of this month. The drier biased period will raise worry that drought will be worsened, but a mixed weather pattern in August will start out perpetuating the drier bias until mid– to late-month when a couple of weather systems will produce some needed rain in the region.

Southern Manitoba should see additional rain often enough in the balance of July and in August to leave a wetter bias in place across a part of that region, but excessively wet conditions are not likely except briefly during the stronger thunderstorms that produce locally heavy rainfall.

Some of the water-logged areas in northwestern Saskatchewan will have a chance to dry down a little in August, but absolute dryness is not very likely and the moisture abundance will remain in the soil which will be great in preparation for next year.

Temperatures in August will be cooler than usual in central and northwestern Alberta and parts of northern Saskatchewan. For a little while in the middle part of August, the cool conditions will dominate much of the Prairies. However, warm weather for a brief period ahead of the cool off and warm weather again at the end of August should leave southern Saskatchewan and parts of Manitoba with a slight warmer bias but no persistent hot weather is expected anywhere in the Prairies.

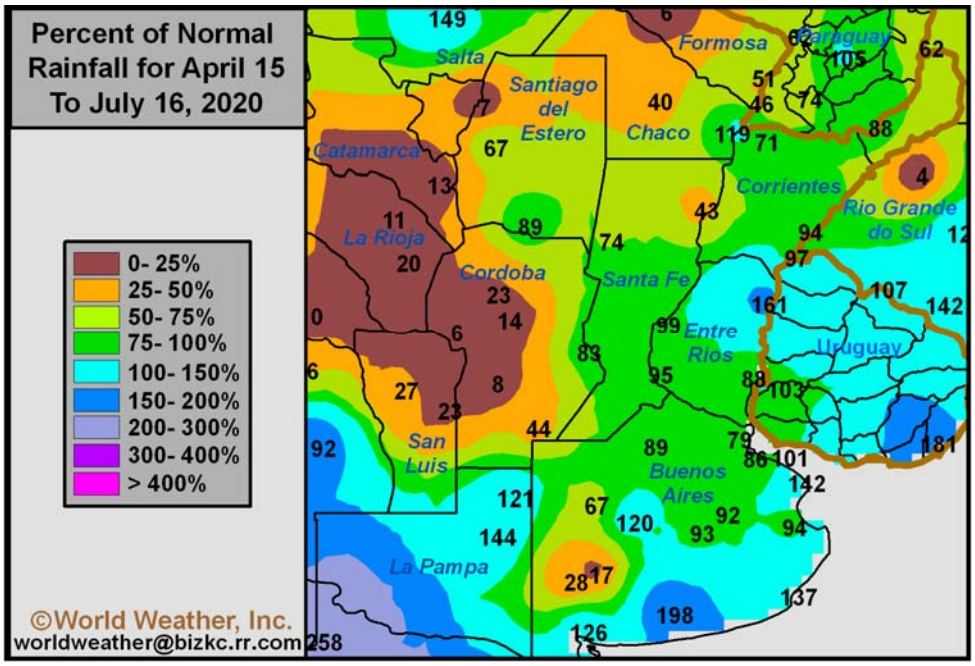
Degree day accumulations may be a little low as we finish the summer in western areas which will further delay the start of this year's harvest.



Argentina Wheat To Get Temporary Relief

Cordoba and neighboring areas in Argentina have been drier biased for several months. The lack of rain helped to promote a very successful harvest season of summer grain, oilseed and cotton crops, but winter wheat and barley have not established well in western parts of the nation.

Portions of Buenos Aires and Entre Rios have seen periods of rain in recent weeks that helped support more favorable winter crop establishment and production potentials are good in those areas. There will be an opportunity for some rain early in this coming week, but it is looking doubtful that Cordoba or Santa Fe will receive much "significant" rain leaving those areas with a poor stand of wheat and barley.



Cordoba and much of Santiago del Estero into Chaco and Formosa have been drier or much drier than normal during the past three months. Rainfall since April 15 has been less than half of normal in most of Cordoba, northern Santiago del Estero and from Chaco into northern Formosa. A large part of Cordoba reported less than 25% of normal rainfall and Cordoba produced 23% of the wheat crop on average from 2014-2017. In 2015-16 Cordoba produced 20% of the nation's total wheat which might be one of the reasons the Rosario Grains Exchange recently reduced production potential for the 2020-2021 crop to 18-19 million tonnes down from a previous outlook of 21-22 million tonnes previously.

As of July 16, cotton harvesting was 99% complete in Argentina. The corn harvest was 92% complete, up from 76% this time last year. Peanut harvesting is complete while 84% of the crop was out of the ground this time last year. Soybean harvesting is also complete while the sorghum harvest is nearly complete. Yields were generally favorable, though dryness toward the end of the growing season slightly reduced production potentials for some of the oilseed areas.

Winter wheat planting was 91% complete as of July 16 compared to 89% this time last year. Barley planting was 82% complete while 84% of the crop was in the ground this time last year. Although the lack of rain in recent weeks supported aggressive planting and fieldwork, there is a pressing need for rain in Cordoba and neighboring areas. Wheat and barley have established unevenly or poorly for the driest fields. Additional production cuts are possible if rainfall continues poorly into the spring.

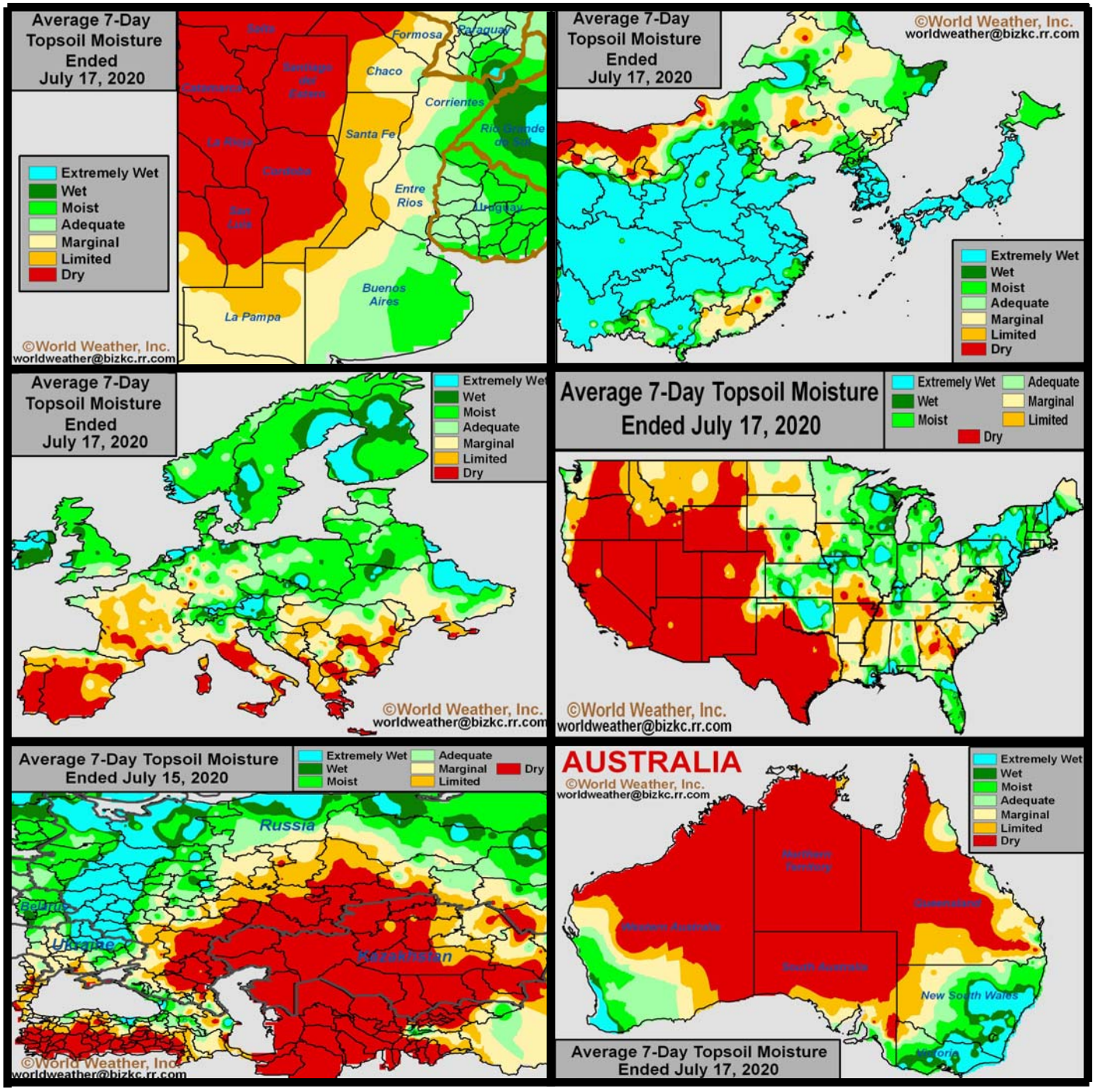
A few light showers will evolve in Buenos Aires and southern Entre Rios today (July 18) before a frontal boundary brings more rain to southern and central Argentina later this weekend into early Wednesday. The rain will then shift into northeastern Argentina later in the day Wednesday. Buenos Aires and parts of eastern La Pampa will receive 0.40-1.50" of rain with locally amounts to more than 2.00 inches in southern Buenos Aires. Rainfall in Cordoba, Santa Fe and Entre Rios will vary from 0.10 to 0.75 inch which is unlikely to be enough to fix long term soil moisture or induce much improvement in emergence and establishment in the driest areas. Most of the rainfall will be less than 0.50 inch.

Rainfall for Cordoba and northern Santa Fe will be too light to significantly improve the moisture profile by the end of next week. Southern Argentina will see soil moisture remain near current levels by the end of next week while net drying is slated for much of northern Argentina. Late season harvesting will likely advance swiftly around the periods of rain.

World Weather, Inc. is looking for some improved rainfall frequency and intensity during August, but only for a short period of time. Eastern parts of the nation are expected to experience the drier bias in September and October which may further threaten some of the nation's production potential.

In the meantime, parts of far southern Brazil have been rather wet at times this winter resulting in some flooding for Rio Grande do Sul, but most of Brazil's wheat is rated favorably.

Selected Weather Images From Around The World



Argentina is still waiting on significant rain to support its winter wheat and barley crop, but dryness has lasted long enough to reduce expectations for this coming year by nearly 15%. Northern China grain and oilseed crops are performing relatively well, but serious flooding has occurred periodically since March threatening its rice and hurting rapeseed production at least to some degree of significance. Dryness in France and much of southeastern Europe is becoming more serious and the earliest that relief is possible will be late this month. U.S. crop conditions have been mostly good so far this year. Dryness pockets are prevailing, but so far very little production cut has occurred except in the southwestern Plains where small grain production is down. Dryness in parts of eastern Ukraine was recently eased, but Russia's Southern Region is still too dry and some sunseed and spring wheat areas in the eastern New Lands are becoming too dry. Australia's winter crops are poised for much improved production compared to last year.

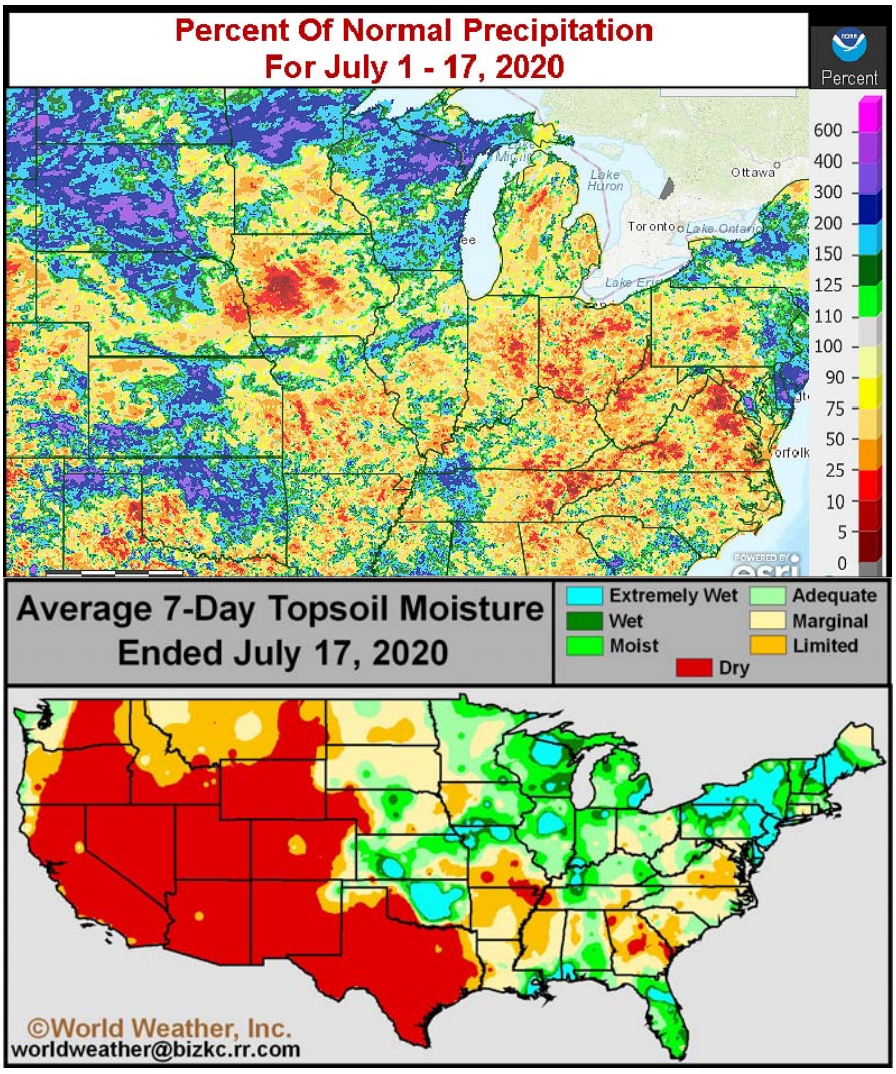
U.S. Summer Heat To Challenge Rainfall Pattern

Missed rainfall in the first two weeks of July in eastern and south-central Minnesota and the middle two-thirds of Iowa along with some areas in Missouri, central and south-eastern Illinois and many other areas in the eastern Midwest will be closely monitored over the next week to ten days for significant relief. Crops are already feeling some stress and how well rain is distributed in the next couple of weeks will have much to say about 2020 production.

Recent rain that fell this past week brought significant relief to dryness in southern Iowa and northern Missouri. Some areas across Kansas and far southeastern Nebraska also benefited from rain. But the drier areas in northern and central Iowa and Minnesota were missed by this event.

Some of the same rain event noted above also brought needed rain to central and northern Illinois and in a few interior southern Illinois locations easing long term dryness, but more rain was needed throughout the Midwest and in particular the eastern parts of the region.

Most of the recent computer forecast model runs have been suggesting rain will eventually scatter across the eastern Midwest drier areas, but it may come erratically this weekend and into next week. Some of the rain amounts will be a little light and that may restrict the amount of stress relief that occurs in the driest areas. In the meantime, a temporary ridge of high pressure will bring on the first round of hot weather into the western Corn Belt and northern Plains through Monday.



A few showers will occur this weekend in the western Corn Belt, but afternoon temperatures will rise strongly into the 90s Fahrenheit (32-37C) across much of the region and a few extremes near 100 (38C) will occur in the far southwestern parts of the region. Hotter conditions will occur in the central and southern Plains. A few extremes in the upper 90s will be possible Saturday as far north as the drier areas of Minnesota and Iowa while extremes of 100 to 110 (38-43C) occur in the central and southwestern Plains. Highs in the lower to middle 90s (32-36C) will also occur in the heart of the Midwest briefly today and Sunday with a couple of upper 90s (36-38)C possible in the drier biased areas of Illinois and eastern Missouri.

The heat coming to the Midwest this weekend will pull large amounts of moisture out of the soil and into the air. Relative humidity is going to be oppressively high stressing livestock and humans for at least a couple of days and probably for as long as four days in some areas. There will be potential for some heat-related illnesses and possible death and energy demand for home and business cooling purposes will surge higher.

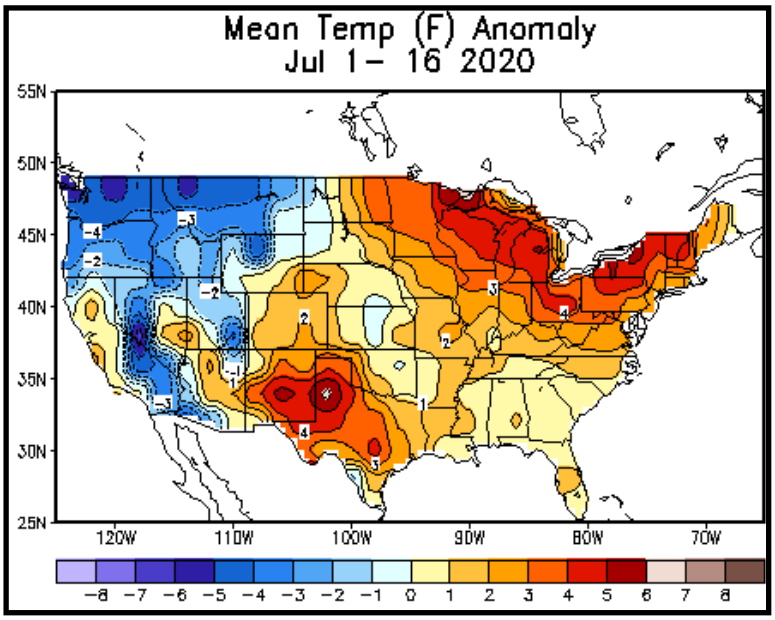
The drier biased areas in the Midwest that do not get good rainfall soon will start to experience enough stress to threaten production potentials, although at least some timely rain is expected to slow that process. Temperatures in the 90s (32-37C) can remove more than 0.50 inch of moisture a day from the soil and those areas that do not have much moisture or are experiencing marginal crop stress because of recent missed rain could be put into a more significant state of duress raising the need for immediate relief.

A new wave of cooler air is ex-

U.S. Summer Heat To Challenge Rainfall (continued from page 6)

pected to push into the Midwest from northwest to southeast next week and that will help to set off a new wave of thunderstorm activity. Low level moisture in the atmosphere will be abundant after the significant heatwave pulls moisture out of the soil. That will give the atmosphere fuel to support thunderstorms as the next wave of cooling moves through the Midwest. That event will be closely monitored in the remaining drier areas because immediately following that rain event will be a new wave of ridge building in the Plains.

The new ridge of high pressure expected in the Plains will be strong enough to include parts of the western Corn Belt and that means temperatures will surge higher once again and rainfall may end up being greater farther to the east. The new wave of heat is expected to be over the central and northern Plains and western Corn Belt during the middle to latter part of next week. Once again, if the rainfall during the early part of next week fails to be significant in some areas it will not take long for the ground to dry out and crop moisture stress to increase once again.



THE BOTTOM LINE

Despite the favorable rainfall outlook, there will be some areas in the Midwest that will be drier than other areas over the next two weeks. The waves of heat that will be occurring in the Plains and parts of the western Corn Belt will eventually diminish soil moisture and dryness will become more of an issue.

World Weather, Inc. still believes corn pollination will be successful and there may be some moisture stress for a part of the Midwest, but most crops will come through the production year with good yields. Late developing crops will possibly lose a little yield in the filling and maturing stage as greater dryness evolves in a part of the southwestern Corn Belt and Delta. We remain more concerned over late season summer crop development like soybeans and sorghum than we are about corn.

The ridge of high pressure is not expected to move over the heart of the Midwest for any prolonged period of time, although it could drift over the region briefly in August and September in response to a number of atmospheric changes – including the potential for tropical cyclones threatening the United states. Tropical waves are expected periodically this late summer moving from east to west through the Gulf of Mexico and those systems are expected to limit the northward movement of moisture into the Midwest, northern Delta and parts of the Tennessee River Basin. Restricting that moisture feed will reduce rainfall for parts of the lower Midwest and especially the southwestern Corn Belt and northern parts of the Tennessee River Basin.

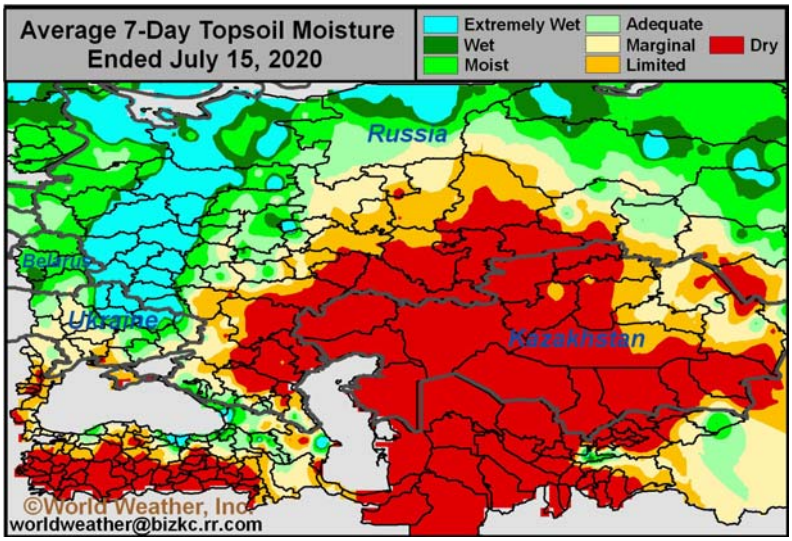
Monsoonal moisture feeding into the Rocky Mountains is expected to be more consistent from late July into August, but the strong high pressure ridge aloft in the Great Plains may limit the moisture from getting into the Midwest as well as it might in other years. The result of more limited monsoon moisture and limited Gulf of Mexico moisture flowing into the Midwest will cut into August and early September rainfall. That will lead to additional net drying especially during the times of notably warmer temperatures which raises the potential for crop moisture stress over a long enough period of time to threaten some late season crop yields. This is why World Weather, Inc. continues to have soybeans in Kansas, Missouri, southern Iowa, southeastern Nebraska, southwestern Illinois the northern Delta and parts of the Tennessee River Basin on a watch list for possible production issues late this summer.

All of this discussion is based on no tropical cyclones reaching into the Midwest during these next couple of months. A tropical cyclone can single-handedly change the moisture situation in the Midwest and Delta in a quick day or two.

The northern and eastern Midwest will continue to experience periodic rainfall during late July, August and early September and crops in those areas should perform relatively well, although with restricted moisture flowing into the Midwest from the Gulf of Mexico and southwest monsoon some of the precipitation amounts will be light which may lead to net drying. The timeliness of rain no matter how light relative to normal will determine production potentials in these areas of the Midwest.

Russia's Spring Wheat, Summer Crops Drying Out

Russia's New Lands region have dried down this month while the USDA defined 'Southern Region' remained much too dry. Both of these regions are experiencing some crop moisture stress and some of the driest areas are vulnerable to production cuts. Scattered showers will bring some temporary relief to dryness in this coming week, but very little of the rainfall will be great enough to soak the soil so that worry over spring wheat, sunseed, corn and soybeans is minimized. Moisture shortages are also a concern in eastern and southern Ukraine where some welcome rain fell for a brief period this past week.



The 'Southern Region' and neighboring areas in eastern Ukraine through the main production areas near and east of the Ural Mountains into the eastern New Lands have all dried down during the past week. Soil moisture is short to very short with the driest conditions noted in Southern Russia and other areas near the Kazakhstan border. Other production areas in western Russia have mostly adequate to excessive soil moisture.

Development of summer grain and oilseeds has slowly deteriorated in the 'Southern Region' and neighboring areas in the lower Volga River Basin, eastern Ukraine and western Kazakhstan this month. There is not enough moisture to support aggressive growth and concern over production potentials is rising. Abundant rain is needed to fix the moisture deficits, which may be difficult to come by during the next several weeks. Some rain was noted in eastern Ukraine earlier this week that brought on a short term bout of relief, but more rain is needed and some may occur later next week. In the meantime, dryness has been support a good harvest environment for winter crops.

Portions of southern Russia will see a mix of rain and sunshine during the coming week. Areas closest to the Black Sea will receive 0.50-2.00" of rain and locally greater amounts by next Wednesday morning. Most other locations in the 'Southern Region' will only receive 0.10-0.75" of rain during this time. Western Kazakhstan and the lower Volga River Basin into eastern Ukraine will otherwise trend drier than normal. Any rain that does occur will generally be too light to counter evaporation.

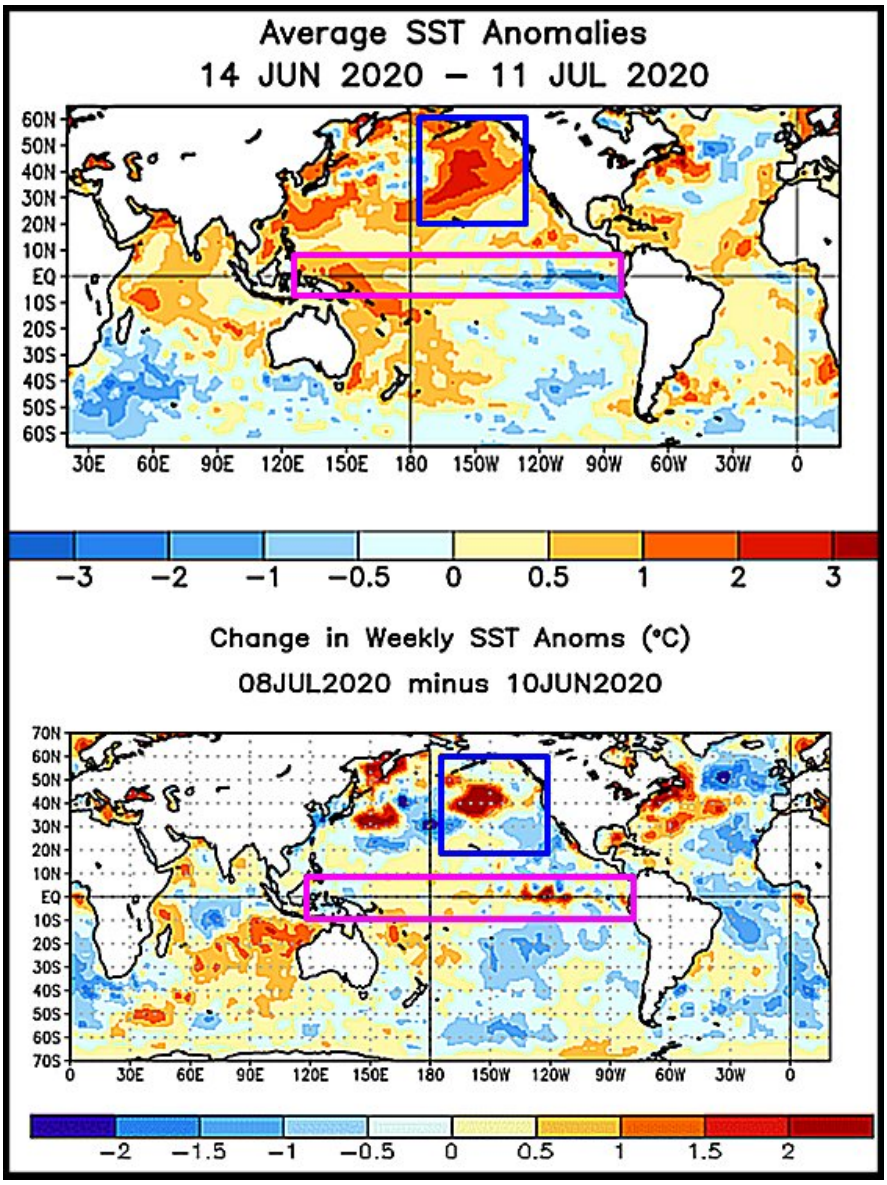
Although marginal improvements to topsoil moisture are expected for areas closest to the Black Sea in southern Russia, the moisture profile will remain short to very short for the 'Southern Region', lower Volga River Basin, western Kazakhstan, and eastern Ukraine by the middle of next week. Significant production cuts will be possible if dryness persists into the first part of August.

Production has not yet been significantly impacted by the drying trend for the Ural Mountains region and eastern New Lands. There is still adequate moisture in the subsoil for most locations outside the fields closest to Kazakhstan to maintain aggressive growth. Development for the shorter-rooted crops may have otherwise slowed as the ground firmed. A good soaking of rain is needed in the near future to reverse the drying trend and promote a good environment for the spring grains and oilseeds.

Alternating periods of spotty rainfall and sunshine are slated for the eastern New Lands through the middle of next week. Most of the rain will occur through Monday with only a few isolated showers expected through the middle of next week. Rain totals by next Wednesday morning will range from 0.25-1.50" most often with some locally greater amounts in northern fringes of crop country. Areas closer to the Kazakhstan border will also be mostly dry. Development will likely remain sluggish for the fields closest to Kazakhstan as the ground remains dry. Many areas may become quite dry by the middle of next week and concern over production potentials may rise especially if the drier biased environment continues through early August. Areas farther north will, otherwise, have enough moisture to maintain aggressive growth.

La Nina Evolution Still A Few Weeks Away

Eastern Equatorial Pacific Ocean surface temperatures remain a little cooler than usual, but not cold enough to qualify for La Nina and subsurface ocean temperatures have recently warmed leaving a low probability for La Nina evolution for a few weeks. A new wave of subsurface ocean cooling is probably a few weeks away, but it is expected and when it occurs there will be more chatter about drying and warming in both the U.S. Midwest and Russia as well as chatter about increasing rainfall in the tropics. Until then, none of the anomalous weather around the world can be attributed to developing La Nina because there is no such phenomenon right now.



By definition, the average temperature anomaly within 10 degrees of latitude in the equatorial Pacific Ocean must be at least 0.5 degrees Celsius below normal for five months to qualify as a La Nina event. However, world weather patterns usually begin to change as the ocean surface temperatures become progressively colder over a large part of the defined region. Recent cooler biased temperatures are not significantly cold enough to alter world weather patterns, despite some forecasters who have suggested that the cooling ocean water was contributing to drying in the Midwest. World Weather, Inc. believes the mere fact that recent forecast model runs have trended wetter for the next couple of weeks further attests to the lack of La Nina presence and the same can be said for high pressure aloft over parts of Russia recently.

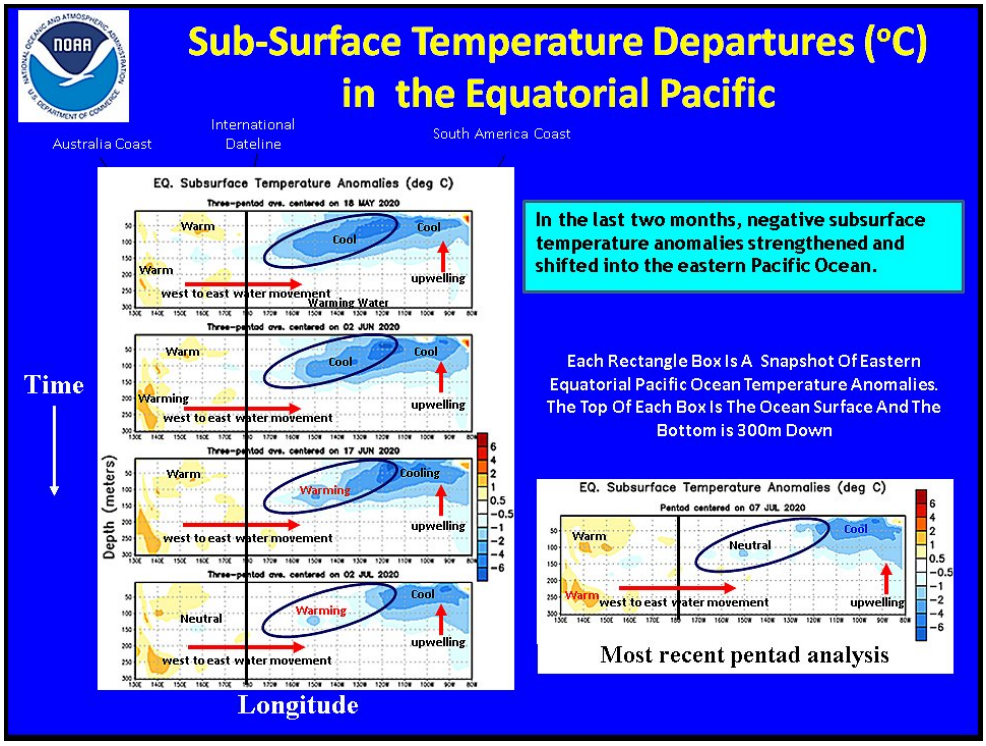
The tropics have also been void of significant convection which is often associated with the developmental stages of La Nina. Recent rainfall in most of Southeast Asia has been erratic and often lighter than usual and the same can be said of Central America and Mexico in recent weeks. Once La Nina starts to evolve in a more significant manner rainfall in the tropics should increase in Africa, southern Asia and northeastern Australia.

Notice that in the eastern equatorial Pacific Ocean the most recent few weeks of temperature change has been toward warming not cooling. If La Nina were evolving these cool ocean temperature anomalies would be increasing significantly instead of decreasing as they are. That is one of the reasons why La Nina is not developing right now. The final proof is found beneath the surface of the ocean where temperatures have also been warming.

Subsurface ocean temperature anomalies were colder than usual in

La Nina Evolution Still A Few Weeks Away (continued from page 9)

mid-May and with upwelling in the eastern Pacific Ocean the colder than usual water was being lifted to the surface which is why surface ocean temperatures off the coast of South America trended cooler in May and June. However, notice in the time sequence of maps shown on this page that the subsurface ocean water temperature anomalies were diminishing through June and into early July. This warming trend is exactly opposite of what should be occurring beneath the ocean surface if La Nina was evolving.



Each of the boxes shown in the image to the right are cross-sectional images of the tropical Pacific Ocean with the top of each box representing the surface temperatures of the ocean and the bottom of each box representing temperature anomalies at 300 meters below the surface. The top box on the left side of the graphic is dated May 18 and each of the following three boxes represent ocean temperature anomalies for June 2, June 17 and July 2 while the box on the lower right-hand side of the graphic is from July 7. The blue shading is colder than usual water and the yellow and orange colors represent warmer than usual ocean water. It should be obvious that over the past two months the cold subsurface ocean temperature anomalies have diminished.

Conditions are not favorable for cooling in the ocean today, but in a few weeks they will become better for water temperature anomalies to start trending cooler once again. Once that pattern begins to evolve it will be just a few weeks later that the ocean surface temperatures will begin cooling as well. By that time, it ought to be mid-August and it is at that time that there may be little more support for La Nina development, but the cooling ocean temperature trend must continue for many weeks to help ensure that La Nina is actually developing.

By the time La Nina conditions begin to evolve most of the Northern Hemisphere summer season will be over. However, it is possible that developing La Nina could contribute to a drier autumn season in the central United States this year as well as in central Russia. There is also potential that if La Nina prevails during the fourth quarter that winter temperatures in central North America and parts of Russia may be notably colder than usual.

Outside of the colder winter bias there should also be some tendencies for greater rain in southern Asia, central Africa and Central America. South America weather may be impacted with Brazil rainfall in September and October being slow to evolve, but once the heart of the summer arrives rainfall could become quite heavy and that might interfere with early soybean harvesting and Safrinha corn planting. There is also a tendency for far southern Brazil to experience a wet start to spring and then a drier than usual summer.

Typically, La Nin events that evolve after the solar minimum tend to be stronger and longer lasting than La Nina events that occur at other times in the solar cycle. The longer La Nina prevails the higher potentials become for drought in North America and central Asia. Flooding could evolve in northeastern Australia and in many of the tropical and subtropical regions of the world.