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The Canadian Agriculture Weather Prognosticator

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World Weather At A Glance

- Drought remains in Argentina and poses a significant risk to summer crop production
- Brazil summer crops are developing well except in Rio Grande do Sul where moisture stress is evolving
- Turkey weather is drying out after abundant precipitation earlier in the autumn
- North Africa durum wheat areas are still drier than usual and need significant moisture
- Southeast Asia oil palm production is still getting frequent rain of significance
- La Nina is weakening and the trend will be accelerated this month
- India winter crops looking for moisture ahead of reproduction
- U.S. Central Plains drought remains and limited relief likely
- CIS winterkill potential remains low

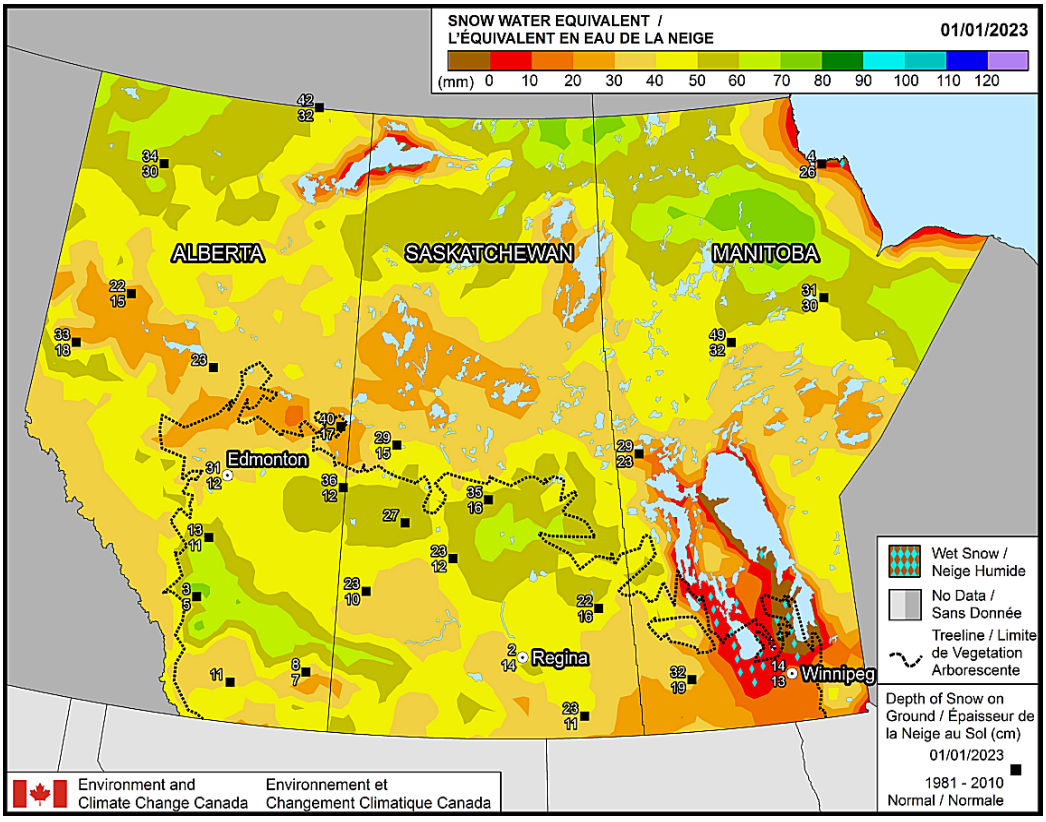
Late Winter Snowfall Should Increase

Snow is on the ground in many areas across the Prairies. The southwestern Prairies are once again the exception with many areas either snow free or reporting very light snow accumulations. Another area of limited snow cover is in southern portions of the Interlake region in Manitoba. Both of these areas will need greater snow depths later this winter, although Manitoba still has plenty of soil moisture following last year's unusually wet weather.

The southwestern Prairies have reported significant snow on the ground a number of times in the past few weeks and months. Warm temperatures keep occurring to melt the snow periodically and another period of such conditions is under way now.

Most of the Prairies will be warmer than usual in this first half of January. Actually, the number of cool days relative to normal should be kept low until sometime around the 20th of January and/or later at which time cold weather will be resuming.

Some net loss in snow cover is expected until the third week of this month in the warmer areas near the U.S. border especially in the southwestern corner of the Prairies where drought remains a concern. In the meantime, as of January 1, 2023 most areas reporting snow on



Late Winter Snowfall Should Increase (continued from page 1)

the ground are reporting a little more than the norm for this time of year. Snow water equivalents in most of the snow covered areas varies from 30-50 millimeters which is good and will be of some use for those fields that were covered in snow early enough in the cold season to limit frost in the ground. Those areas with limited frost will experience the greatest increase in soil moisture when the snow melts in the springs. In contrast, areas with significant frost in the ground will not likely benefit as much from the snow melt when it finally occurs.

A more limited amount of snow water equivalents are present in the southwestern and southeastern corners of the Prairies where the snow cover is more limited. Southern Alberta, interior southwestern Saskatchewan and a few south-central Saskatchewan locations have the lightest snow depths. The Canadian Cryosphere Information Center suggested areas in the southern Interlake region of Manitoba may be very low on snow depths, but areas in the Red River Valley in southern Manitoba are significantly buried in snow as are most northern areas in the Prairies.

Weather conditions in the first half of January will include warmer than usual temperatures and below normal precipitation. Snow depths are unlikely to change much, although conditions will not be as dry as they are advertised to be through January 10 during the middle 10 days of this month.

The Northern Hemisphere jet stream is well to the south of Canada right now and that is not unusual for the middle of winter. Typically, weather in January is rather quiet in the Prairies with only light amounts of snowfall expected periodically. That makes the next 10-20 days of weather look relatively normal, but for those snow free areas the need for greater snowfall will stay high for a while.

Drought stricken areas in the southwestern Prairies will not have much opportunity to see soil moisture improved over the next few weeks unless an unusually warm and wet period of weather evolves. Temperatures will be warmer than usually, but not warm enough to remove frost from the soil.

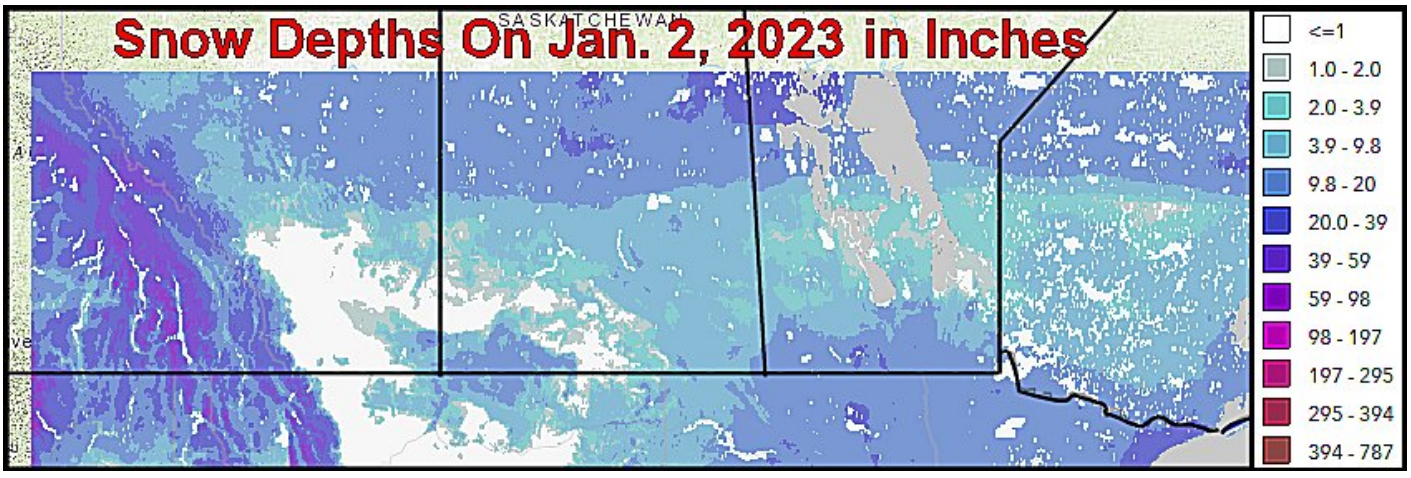
Weather in the spring will be very important for some parts of the Prairies this year because of low soil moisture prior to the arrival of winter weather conditions. Some areas in southern Alberta and southwestern into central Saskatchewan are still carrying some significant moisture deficits and that has many producers concerned about the fate of 2023 spring planting conditions.

The more active late winter weather should help ease some of the concern over low soil moisture, but until the frost comes out of the ground precipitation that falls may be mostly runoff leaving low soil moisture a running theme into the first days of the spring planting season this year.

The longer range outlook for the heart of spring still has some hint of lighter than usual precipitation for a while during the planting season. That could be a blessing if there is an abundance of snow on the ground when spring warning finally arrives. A drier bias at that time would help melt snow, induce runoff and begin firming the soil relatively quickly. The faster the spring snow melt is completed and soil temperatures rise the quicker crops can get planted.

Soil moisture early in the planting season should be plentiful, but there will be need for moisture after crops get planted to ensure good germination emergence and establishment. For the drought stricken areas, crops will need timely rainfall through the spring and summer to prevent another year of drought from impacting production.

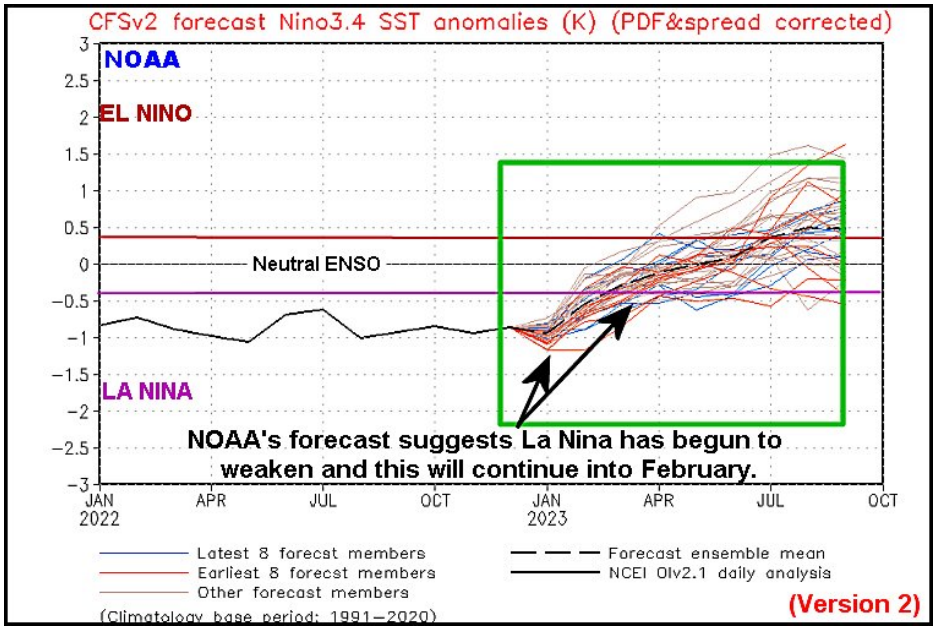
Early spring and mid– to late-summer weather still looks wettest and crops will likely perform favorably, but there will likely be a few periods of concern, one of which will include the potential for a high pressure ridge to develop in the central part of North America and that could have a negative impact on crop moisture and temperatures during the height of summer.



Long Term Trends For Canadian Weather Considerations

La Nina has begun to weaken and is expected to experience an acceleration in that trend this month. Most of the trend changes so far have been in subsurface ocean temperature anomalies leaving the surface of the eastern equatorial region of the Pacific Ocean cooler than usual. That lingering cool bias is still controlling world weather; including that of western Canada, but especially in South America and the central United States.

La Nina has been dominating world weather for three years and its demise in the first quarter of 2023 will offer some changes and new challenges for forecasters. The weakening trend in La Nina will immediately impact the potential for precipitation in the southern and central U.S. Plains and Argentina. For western Canada, the trend change will be less persistent cold and possibly a change in precipitation patterns—the latter of which would be welcome by most Prairie producers.



Once La Nina backs off of its world dominance other weather patterns that have been playing out in the background will have opportunity for greater influence on North America weather. For Canada those patterns of interest will be the 18-year cycle, ocean temperature anomalies off the west coast of North America and the negative phase of Pacific Decadal Oscillation (PDO).

Thankfully, spring is far enough away from this month that the atmosphere will have time to respond to diminishing La Nina; however, breaking down a persistent pattern of size, like this 3-year La Nina, will take a few months to remove all of the biases that have been prevailing. Some immediate changes are expected, but sustainable changes in weather are not likely to seriously kick in until March or April even though some changes will already be noted late this month and in February.

Despite some wishful thinking the breakdown of La Nina does not suddenly bring higher odds of breaking drought in Canada's southwestern Prairies. The odds are much higher that relief will occur, but concern over ocean temperatures off the west coast of North America, the dominating negative PDO and 18-year cycle all have some degrees of similarity that could easily limit the amount of relief that occurs to dryness in the central parts of North America and raise the potential for mid– to late-summer dryness, mostly in the U.S. and possibly in a part of the eastern Prairies.

The prevailing negative PDO and cool ocean water off the west coast of North America still supports the potential for a southwesterly flow pattern aloft this summer bringing waves of rain into the multi-year drought-stricken Palliser's Triangle.

World Weather, Inc. has been closely monitoring the weather in California and the U.S. Pacific Northwest. The frequent succession of storm systems coming into northern California recently is very encouraging for a possible change in the drought stricken areas of Canada this summer. The current succession of storms has occurred three times so far since October. The first occurred in the week ending November 9, the second occurred during the 2-week period ending Dec. 14 and the third is under way now and should last into next week.

The reason for encouragement is hidden in the cause of the greater storminess in western parts of the United States. In order for storm systems to reach the California and Oregon Coast the jet stream needs to be farther to the south than what is traditionally associated with La Nina. The fact that this pattern has appeared three times since October suggests that it is not a fluke and that the cool ocean water off the west coast of North America may be supporting a more active jet stream.

The negative phase of PDO can induce a deep trough of low pressure in the western United States while inducing a ridge of high pressure over the central United States. This pattern is being hinted at today, although the jet stream is too strong and too far to the south to bring the classic pattern to North America that would bring a frequent succession of storms to Canada's Prairies during the summer while drying out the central United States and possibly a part

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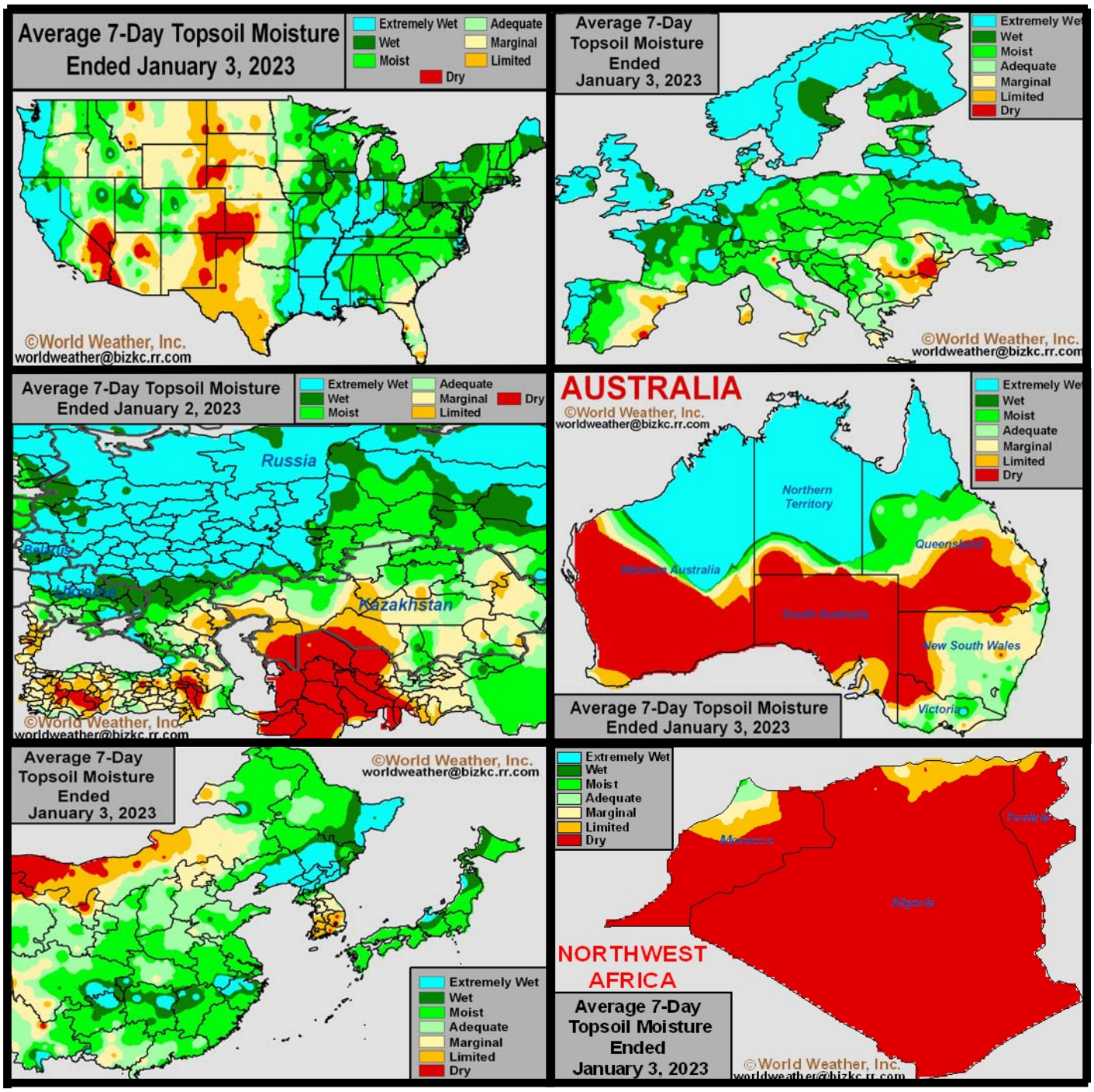
Selected Weather Images From Around The World



Drought relief has begun in central and northern California, though the region will need much more rain and snow in future weeks. The region will receive copious amounts of moisture in the coming ten days inducing some flooding. Western portions of Russia continue to experience frequent precipitation leaving topsoil conditions wetter than usual with significant snow on the ground and a saturated soil beneath it. Flooding could be an issue for western Russia in the spring. Australia's late season winter crop harvest weather was very good in December, but there is need for rain in east-central parts of the nation now to support unirrigated cotton and sorghum. North Africa will one of the largest areas durum wheat production areas hurting for moisture. Some dryness is also continuing in eastern Spain and in the lower Danube River Basin of Europe. The U.S. southwestern Plains is still dry and India is in need of moisture prior to reproduction in February. China weather has been and will continue to be fine.

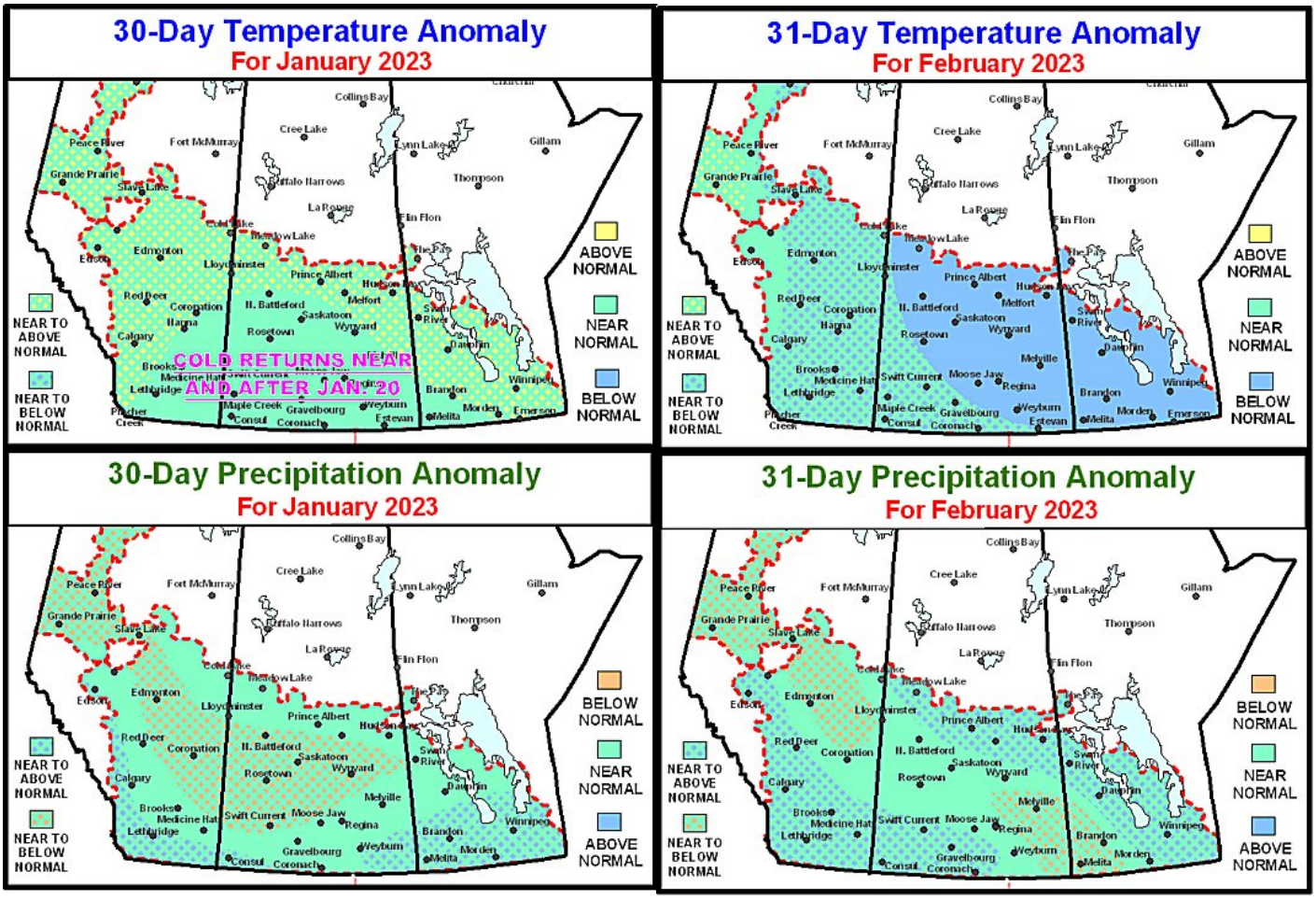
Returning Cold Expected in Late January, Early February

January is starting out plenty warm and it will likely continue that way for another ten days easily. There is potential for a cyclical return of bitter cold air in the second half of January. The most favored period for the cold to return in will be the last week to ten days of the month and it should prevail into February. World Weather, Inc. believes the cold will begin showing up on the forecast model runs around January 20. Until then, above normal warmth should dominate, although a couple of short term bouts of near normal temperatures are expected.

The return of cold air will induce some waves of snowfall as well. Early indications suggest snow will impact all of the Prairies when the cold is first debuting. Be aware that this warmer than usual bout of weather will enable the atmosphere to moisten up so that when the cold air comes into the Prairies it will do so with the potential for some significant snowfall. For now, the areas most favored for the greatest snow will in the southwestern Prairies and in southern and central Manitoba and southeastern Saskatchewan. The precipitation intensity and distribution will be largely determined by the intensity of the cold coming and by how quickly it moves through the Prairies. Most likely the cold will come into the region in steps with some precipitation expected in the middle part of this month that may impact most of the Prairies. Another shot of cooling later in the month will be more significant and the greatest precipitation may end up occurring in the southeastern parts of the Prairies rather than in all areas. That is the reason for lighter than usual precipitation in January in central parts of the Prairies.

February may be dominated by the colder weather. However, the biggest unknown is how extensive the cold will be and how persistent it will be. The odds are high for the cold to be less potent than that of December and it will probably be less oppressive . All of the Prairies will be impacted, but the coldest conditions may favor eastern parts of the region more than the west.

Precipitation in February will become limited for a while when the coldest air is in place, but as soon as it begins to warm more snow is likely to evolve. Southwestern and northeastern parts of the Prairies may be wettest with the middle one-third of the region getting snow, but it may be a little lighter than that in other areas. February's forecast is of lower confidence than that of January because of the unknown intensity of cold that is expected.



Long Term Trends In Canada Weather (continued from Page 3)

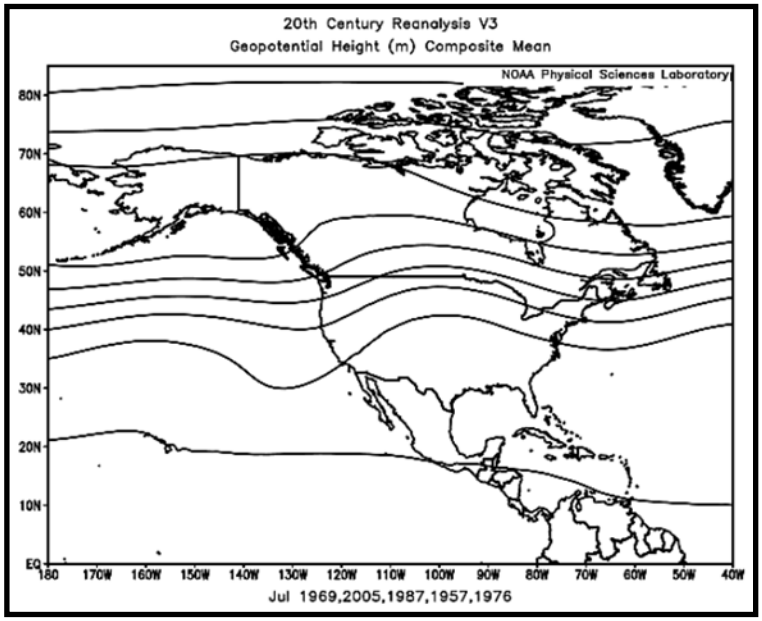
of the southeastern Prairies. Those are features that could evolve later this year.

For now and for the next few months, the pattern for frequent bouts of rain and mountain snow may continue in the western United States offering future relief to drought in California and neighboring areas. If the same pattern is prevailing during the warm season the wetter bias will shift farther to the north as the jet stream shifts to the north. A ridge of high pressure will evolve in the U.S. Plains and storms coming into the U.S. Pacific Northwest during the summer would be forced through the Prairies by a blocking ridge in the Plains.

That all sounds quite promising, but the assumptions have to be made about other weather patterns and the stability in the pattern prevailing today. Those assumptions cannot be made with confidence this far in advance, but the changes hinted at are encouraging for Palliser's Triangle.

The 18-year cycle data suggests a favorably well mixed weather pattern will occur in the Prairies during late winter and early spring followed by a lighter precipitation bias in portions of the southwest and briefly in the southeastern Prairies during late spring. This pattern is of great interest because it suggests another period of limited precipitation may evolve for a little while in April and May. Two out of three 18-year cycle years studied also carried some of that dryness into June. This is of some concern because the late winter and early spring well-mixed weather would occur while the soil is frost bound limiting the potential for moisture to reach very deeply into the soil. Once warming occurs in the spring and frost is removed a drier bias would be in place and some producers who have had the greatest frost in the ground may not get much solid precipitation until later in the summer.

The negative phase of PDO will attempt to correct this drier bias that is being carried in the 18-year cycle, but herein is where the conflict and challenge to forecasters is centered upon. The negative PDO can override some of the 18-year cycle data, but it must be a strong pattern through spring and confidence in that is not huge. PDO has been strongly negative for nearly 18-



months which is a record since the early 1900s. That is a long time and leaves the door wide open for some weakening in the pattern—at least for a while. Weakening in the negative PDO would allow more of our weather to come frim the 18-year cycle and that could be more frustrating for the drought stricken areas of the nation.

More time is needed for these patterns to evolve. La Nina must go away, PDO needs to remain strong and an active jet stream must continue over the next few months to bring the best potential for relief to the drought stricken areas.

In the meantime, a well balanced environment is predicted for most of the Prairies during the balance of winter with precipitation expected in most areas. Another bout of bitter cold is expected later this month and in early February followed by warmer conditions once again. Precipitation over the next few months should be sufficiently mixed that most areas will get snow and there will be a few bouts of rain late this winter that should maintain some level of hope for improved weather in Palliser's Triangle and favorable mix of weather elsewhere.

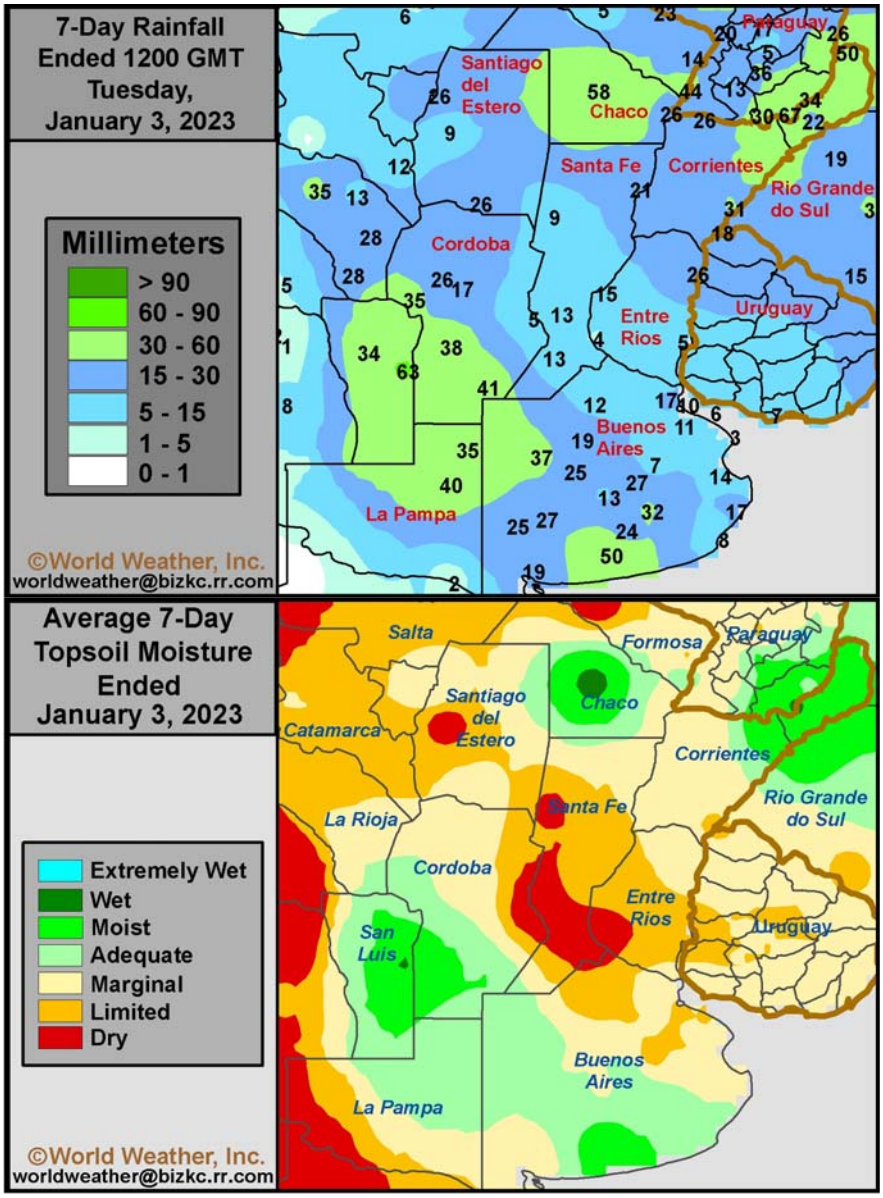
There will be some potential for drying in the far northwestern parts of the Prairies (i.e. northwestern Alberta) and in the southeastern Prairies (i.e. southeastern Manitoba and a part of far southeastern Saskatchewan later this summer depending on the strength of the central U.S. high pressure ridge.

None of this discussion is set in stone, but there is reason to be have hope for changes in 2023 that would bring relief to the drought stricken areas and less rain to the water-logged areas of Manitoba. Drying in northwestern Alberta during the summer, though may occur in any of these scenarios.

One last feature to note is that there seems to be some persistent cool weather aloft during the summer this year and if that happens it may help to keep the central U.S. ridge of high pressure with a low amplitude. A low amplitude ridge would help the wetter July and August pattern come to fruition across the Prairies. World Weather, Inc. will not more in coming weeks. Stay tuned….

Argentina Received Rain; Dry Weather Returns

Argentina received much-needed rain during the long New Year Holiday weekend with some of the most significant precipitation in the western Pampas agricultural region. The rain will support better short-term establishment and growth in areas that received the greatest rain; however, most of the rain was too light to end drought that has plagued parts of Argentina for months. The eastern Pampas region failed to get nearly as much moisture and is still rated critically dry. Another full week to ten days of restricted rainfall is predicted for Argentina's key agricultural areas and that will lead to deteriorating crop conditions within a few days as the ground quickly dries out once again. The nation's total production for summer crops is still at risk of tumbling lower because of poor follow up rain events and frequent moisture stress.



Much of Argentina's main production area received at least a light amount of rain during the past week. La Pampa, San Luis, the southwest half of Cordoba, central Chaco, and much of western and southern Buenos Aires received 0.51 to 1.61 inches of moisture with local amounts up to 2.48 inches in San Luis, Chaco, and southern Buenos Aires for the seven-day period ending this morning. The remainder of Argentina received 0.16 to 0.68 inch with a few totals reaching up to 1.02 inches.

Recent rainfall helped bolster topsoil moisture to adequate or marginally adequate levels in much of western and southern Buenos Aires, northeastern La Pampa, Chaco, San Luis, and the southwestern half of Cordoba. Most other areas in the nation had short to very short soil moisture with some areas in Santa Fe, east-central Cordoba, Entre Rios north-central Buenos Aires and Santiago del Estero critically dry. As of December 29,

Cotton planting was 74% complete compared to 90% done last year at this time. Corn planting was 77% done compared to 79% a year ago and soybeans were 82% planted down from 86% in 2021. Sorghum planting was ahead of last year with 68% of the crop in the ground up from 63% done in 2021. Most peanut planting was complete and the same was true for rice and sunseed which were done being planted earlier in December. Wheat harvesting was 94% done as of late last week and barley harvesting was 93% dome.

Crop emergence and establishment may be a more anomalous feature than the planting pace since producers may be planting their crops regardless of soil moisture just in case it rains soon enough to bring the crop up and support better estab-

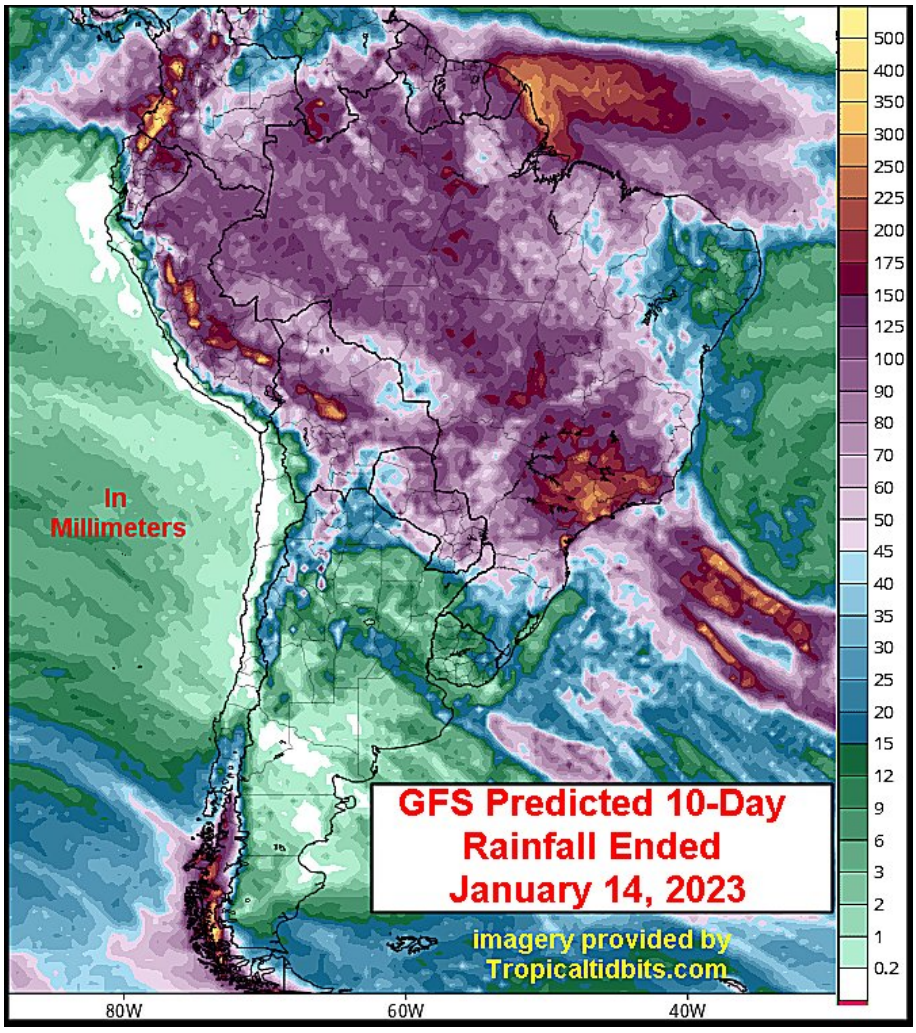
Argentina Received Rain; Dryness Returns (continued from page 7)

lishment and early growth. Previously planted and emerged crops (including early season sunseed and corn) vary in condition greatly from one location to another because of the distribution of rain in recent weeks. Some areas have had sufficiently well-timed rainfall to support good crop development while many other areas have been struggling with serious dryness over an extended period of time.

Despite the recent rainfall, long-term crop prospects remain less than favorable for much of Argentina this season. Drought is ongoing across the region and the recent rain was too light to support favorable long-term development conditions. La Nina will remain the main driver for weather in Argentina into mid-month and the threat for drier and warmer than normal weather will persist. There is potential for more neutral ENSO conditions late in the growing season, which could lead to increased rain potentials. However, the rain may occur too late in the growing season to significantly improve overall production potentials for the country. Vegetative health is rated poorly and abundant rainfall will be needed to improve crop conditions.

WEATHER OUTLOOK

Drier- and warmer-than-normal weather is slated for Argentina during the coming week to ten days as a weak high-pressure ridge extends over the country. Periodic rainfall will occur at times in western and southern Argentina, though resulting rainfall will generally be lost to evaporation. Daytime highs will initially be in the upper 80s and 90s today and Wednesday before increasing to a range of 90 to 110 degrees for the remainder of the coming week.



Nighttime lows will be in the 60s and 70s with pockets in central and southern Argentina cooling to the 50s. The ridge may briefly weaken January 11 – 17, which may lead to some rain in portions of crop country. However, the main grain and oilseed areas may miss out on the most significant rainfall.

Aggressive drying is slated for much of Argentina during the coming week due to the warm and mostly dry weather. Topsoil moisture will gradually trend or remain short to very short in much of crop country with some areas staying critically dry. Crop conditions will deteriorate as the ground firms especially in the driest areas.

Late-season planting and general fieldwork should advance with few weather related disruptions during the next ten days. Winter wheat and barley harvesting should also come to an end.

Overall production potentials remain less than favorable to poor in Argentina. Development conditions will remain far from ideal and the lack of rain heading into mid-January will promote more drying in the main agricultural areas.

Wheat Production Areas Need More Moisture

Most wheat conditions in the world have not changed greatly in recent weeks. Most Northern Hemisphere crops are dormant or semi-dormant and have little need for near term moisture. However, drying has been noted recently in North Africa and continues in eastern Spain, the lower Danube River Basin of Europe, and across the central and southwestern U.S. Plains. India's winter crops will be approaching reproduction late this month and into February requiring a boost in rainfall that is not presently expected.

In most cases, the drier biases noted above are not of critical importance right now, but a few weeks from now when seasonal warming is getting under way the precipitation anomalies will become much more important. Out of all areas noted above North Africa has the most immediate need for rain since moisture during planting was restricted.

North Africa precipitation is unlikely to be very great in this next ten days period. This is a time of year when crops are semi-dormant and their need for moisture is not usually very great. However, crops in a part of the region from Morocco to northern Tunisia were not as well established this autumn as they normally are which raises the importance of timely February and March precipitation. The first half of January is expected to be drier than usual and the second half of the month may trend a little wetter, but confidence is low.

India's winter crops performed mostly in a favorable manner over the past couple of years due to La Nina. With that said, last year's crop did not yield as well as the previous year. La Nina is expected to abate during late January and February and the return of more "normal" atmospheric patterns raises the potential for lighter and more sporadic rainfall this winter. Reproduction normally begins in the final days of January and prevails during February and significant moisture is needed to induce the best yield potentials.

Rainfall during the planting season in India was restricted at times, although winter crops likely emerged and established relatively well. The need for follow up rain later this month and in February is high for India to induce the best yielding crops. The jet stream is farther to the south than usual which may bring some rain to some of the northern crop areas in a few weeks, but until that happens there will be some potential for a more lackluster production year.

U.S. hard red winter wheat has been beat up by drought and bitter cold weather in recent weeks. The lack of precipitation in the next two weeks will leave the crop dormant, but not well established. There have been a few bouts of precipitation recently in far northern and easternmost portions of the production region, but most of the rain and snow was too light for a notable change in production potential.

However, with La Nina expected to weaken and eventually dissipate over the next several weeks, the odds will improve for a few storm systems to move into the region and offer some short term moisture relief from dryness. A cool and wet spring is needed to induce the best environment for new tillering and repaired root systems after multiple of months of harsh weather. World Weather, Inc. believes the needed weather change will occur for many areas across the central and southwestern Plains, but no changes are likely in the next two weeks and it is questionable how much relief will occur in the southwestern parts of the production region.

Dryness in eastern Spain and the lower Danube River Basin is not quite as serious as it may sound, but there is need for a weather change soon to support better spring crop establishment and development potentials. Without the improved moisture profile, wheat, barley and rye in these areas may suffer from enough moisture stress to reduce yield potentials.

China's wheat is still well established and dormant or semi-dormant. The crop is suspected of being in favorable condition with better root and tiller systems than those of last year when flooding delayed autumn planting and cut into some of the region's production potential.

Turkey's wheat production potential as well as other areas in the Middle East are fair to good. Turkey received significant rain during the planting and establishment season, but has been dealing with limited precipitation more recently. Other areas in the Middle East experienced the opposite conditions with poor rainfall during the planting season and some improvement recently. Crop development should be restricted for a while leaving time for better rain to evolve.

Russia and Ukraine winter wheat, rye and barley are suspected of being in relatively good shape. There will be some concern over flooding in southwestern Russia this spring because of heavy snow accumulations over saturated soil and the prospects for abundant precipitation during the spring.