

Global Water Monitor & Forecast Watch List

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Introduction

The ISciences Water Security Indicator Model (WSIM) monitors and forecasts water anomalies on a global basis. Each month we produce data and a report that document current conditions and provide forecasts with lead times from 1 to 9 months. WSIM has been run continuously since April 2011 and has been validated against subsequently observed data. ISciences also provides assessments of the impacts of water anomalies on people, agriculture, and electricity generation. Detailed data and reports are available for purchase. Additional information and pricing are available upon request.

We have recently completed the latest Water Security Indicator Model (WSIM) analysis of global water anomalies using observed temperature and precipitation through July 2023 and an ensemble of forecasts issued the last week of July 2023. This edition of Global Water Monitor & Forecast Watch List presents a selection of regions likely to encounter significant water anomalies in the next few months.

This edition is the first to use results from a new version of WSIM that uses temperature and precipitation data from the ECMWF Reanalysis v5 ([ERA5](#)) instead of gridded station data published by NOAA's Climate Prediction Center. Spatial resolution of the maps has sharpened from half-degree to quarter-degree and we expect higher fidelity in sparsely instrumented regions of the world. We have also changed the baseline period for computing statistical distributions from 1950-2009 (60 years) to 1981-2020 (40 years) to rely more exclusively on data from the satellite era. We will be publishing more details and some side-by-side comparisons of the two versions of WSIM in the coming days. Visit <https://wsim.isciences.com> for details.

All maps have quarter-degree resolution and depict our composite water anomaly index, which is based on WSIM estimates of soil moisture, evapotranspiration [deficit](#), runoff, and total blue water anomalies. Shades of red indicate deficits and shades of blue indicate surpluses. Since different variables are used to estimate deficits and surpluses, it is possible for a single half-degree cell to register both a [deficit](#) and a surplus. These cases are depicted on the maps in shades of purple, with the more extreme value (deficit or [surplus](#)) used to determine the shade.

Deficits and surpluses are stated in terms of return period – a measure that characterizes the rarity of an event. For example, a return period of 10 years indicates an event that would occur, on average, once every ten years. Higher return periods indicate more extreme and, therefore, more disruptive anomalies. Return period is computed by comparison to cell-specific distributions of data from 1950 through 2009. Anomaly levels correspond to return periods: abnormal=3-5 years, [moderate](#)=5-10 years, severe=10-20 years, extreme=20-40 years, and exceptional=greater than 40 years.

Please note that the WSIM model makes use of seasonal temperature and precipitation forecasts produced by the U.S. National Oceanic and Atmospheric Administration (NOAA) Climate Forecast System Version 2 (CFSv2). These forecasts predict broad temperature and precipitation patterns, but do not effectively predict singular events such as tropical storms. Detailed outlooks and analyses of tropical storms are available from the [NOAA National Hurricane Center](#).

There are numerous regions around the world where country borders are contested. ISciences depicts country boundaries on these maps solely to provide some geographic context. The boundaries are nominal, not legal, descriptions of each entity. The use of these boundaries does not imply any judgment on the legal status of any territory, or any endorsement or acceptance of disputed boundaries on the part of ISciences or our data providers.

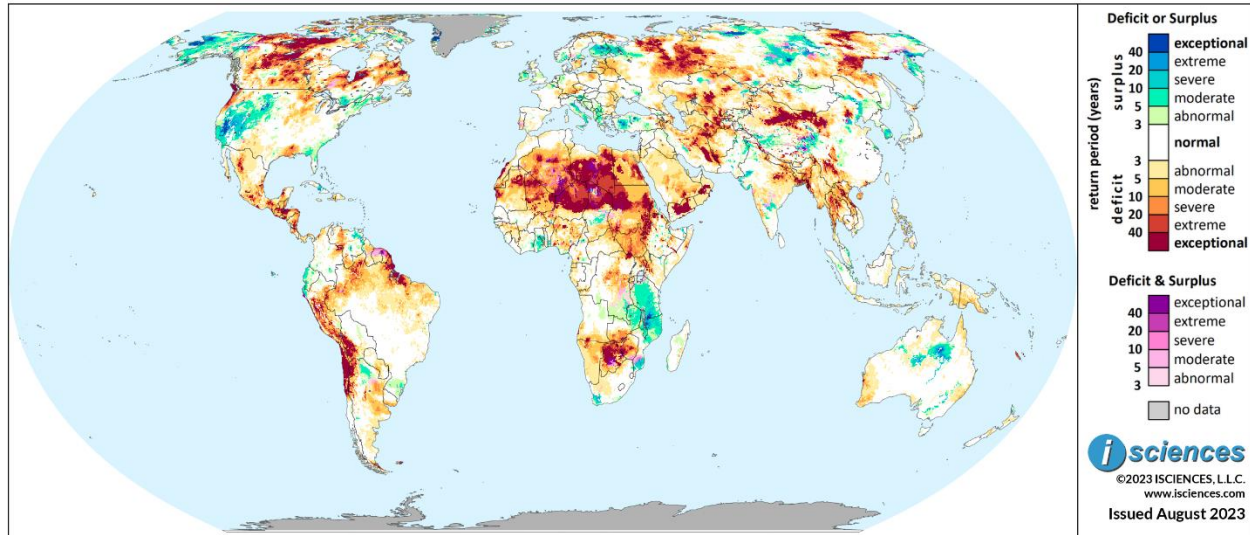
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Worldwide Water Watch List

This map presents a selection of regions likely to encounter significant water anomalies during the one-year period beginning in May 2023 and running through April 2024 using 3 months of observed temperature and precipitation data and 9 months of forecast data.

ISciences Water Anomalies Forecast: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

Watch List: Regional Synopsis

This synopsis provides highlights of regional water forecasts. More detailed analysis is available in “Watch List: Regional Details” immediately following the synopsis.

United States: Intense surplus is expected to continue in western states throughout January 2024 or longer.

Canada: Deficits of varying intensity are expected to linger throughout most provinces until October 2023 or longer.

Mexico, Central America, and the Caribbean: The forecast ending in April 2024 indicates that intense deficits will arise throughout Mexico and Central America.

South America: Exceptional deficits are expected to arise in northern and western areas of South America, but will decrease in magnitude throughout October 2023 or longer.

Europe: Intense surpluses are expected to persist in southern Continental Europe until October 2023 or longer.

Africa: Intense deficits are expected to arise in northern regions of Africa, as are intense surpluses in southeastern countries, but will dissipate to near normal conditions around January 2024.

Middle East: Exceptional deficits are anticipated to emerge in Saudi Arabia, but dissipate after October 2023.

Central Asia and Russia: Extreme to exceptional deficits are anticipated in European and eastern Russia throughout October 2023 or longer.

South Asia: Exceptional deficits are expected to emerge in western regions of the region until January 2024 or longer.

Southeast Asia and the Pacific: Extreme deficits are expected to linger in Mainland Southeast Asia until October 2023 or longer.

East Asia: Small, isolated pockets of exceptional deficits are expected to emerge in January 2024 or longer.

Australia & New Zealand: Extreme to exceptional surplus is expected in north-central Australia throughout October 2023 or longer.

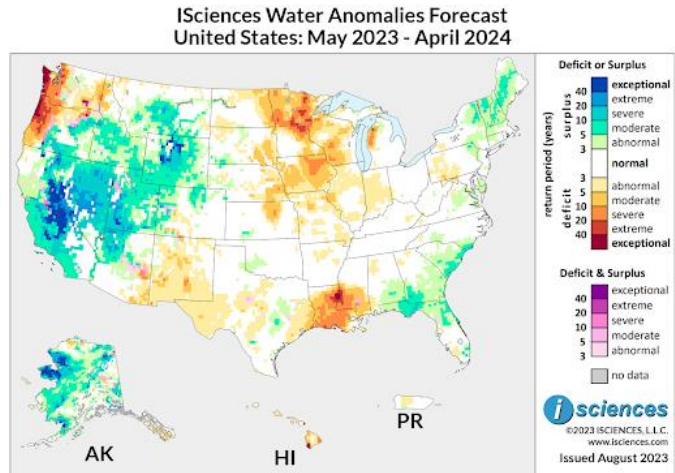
Watch List: Regional Details

United States

The 12-month forecast ending in April 2024 indicates that western states will continue to experience widespread surpluses, with some intense deficit anomalies appearing in the Pacific Northwest, northern states of the Midwest, and isolated regions in the South.

Extreme to exceptional surplus is expected in the following states:

- **Wyoming**, in west-central regions of the state along the Wind River. These anomalies continue north into southern and central **Montana**, along the Bighorn River and in areas south of the Missouri River.
- **Utah**, in southwestern regions west of the Colorado River.
- **Nevada**, in most central and western areas of the state, with anomalies crossing its western border into the Sierra Nevada region of eastern **California**. These anomalies also continue south into northwestern **Arizona**, in western regions of Kane County.
- **Oregon**, appearing in southern regions west of the Sprague River and south of the John Day River. Similar surplus anomalies continue east into central **Idaho**, near the **Salmon Mountains**.



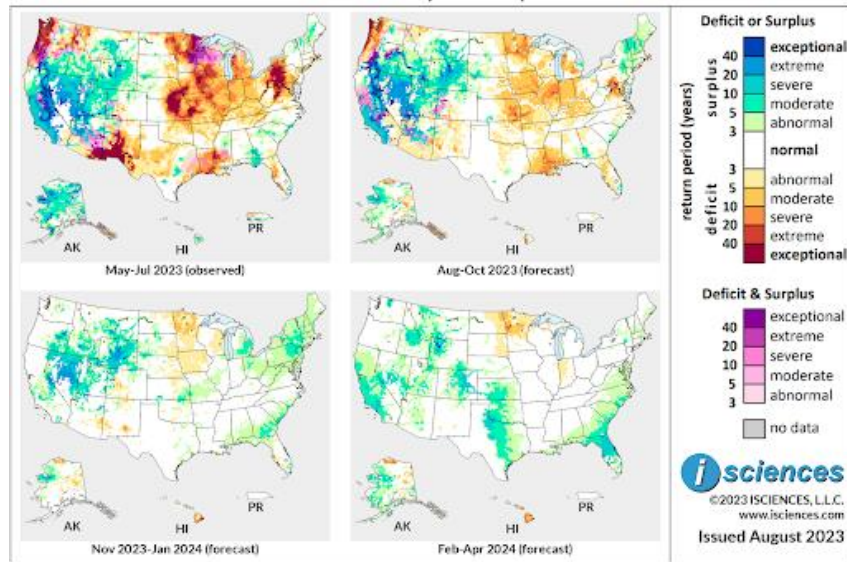
Based on observed data through July 2023 and forecasts through April 2024

These areas should expect severe to exceptional deficits:

- Northeastern **Louisiana**, near Davis Island, with some anomalies continuing east into southwestern **Mississippi**.
- Western coastal regions of the Pacific Northwest, particularly in western **Oregon** and **Washington**.
- Eastern **Minnesota**, in areas along the Mississippi and Namekagon rivers.
- Western **Michigan**, north of the Grand River.
- Northeastern **Iowa**, in regions along northern portions of the Cedar River.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
United States: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 indicates that deficits in the Midwest will persist, but decrease in intensity, particularly in Louisiana, Mississippi, Illinois, eastern Nebraska, Iowa, and northern Wisconsin. Northern Virginia and south-central Pennsylvania should anticipate similarly intense deficits, along with western coastal regions of the Pacific Northwest. In western states, widespread surplus is expected to persist and expand, covering more regions throughout Nevada, central Wyoming, southwestern Utah, Washington, Arizona, and California. Transitional conditions are also expected in west-central California, western Colorado, and scattered throughout Washington.

Outside of the Continental U.S., western regions of the island of Hawai'i should anticipate intense deficits, as well as northern and southeastern Alaska. Northwestern Alaska can anticipate severe to exceptional surplus, specifically in the Seward Peninsula.

From November 2023 through January 2024, most notable deficits are expected to disappear in the Continental U.S., with intense surpluses continuing in Nevada, Wyoming, Utah, Oregon, and Idaho. Surpluses are expected to substantially decrease in size and severity in California, with some surplus anomalies lingering along California's eastern border and Nevada's western border. Intense deficits are expected to arise in Hawaii. Mild to moderate surplus will persist and expand throughout the northeastern states, as well as southern South Carolina and Georgia.

The forecast for the final months – February 2024 through April 2024 – intense surpluses are expected to emerge in Florida, Georgia, coastal Carolinas, and central Texas, continuing north in the latter into Oklahoma, Nebraska, and into Colorado. Widespread surpluses in western and southwestern states are expected to somewhat lessen in magnitude but continue in California, Nevada, Colorado, Wyoming, Idaho, and Montana. Deficits in Hawaii and surpluses in Alaska are both expected to spread throughout both regions.

Please note that WSIM forecast skill declines with longer lead times.

Canada

The 12-month forecast ending in April 2024 anticipates widespread exceptional deficits throughout most provinces. Small areas of the Yukon should anticipate intense surplus, as well as some transitional conditions.

The following provinces should expect extreme to exceptional deficits:

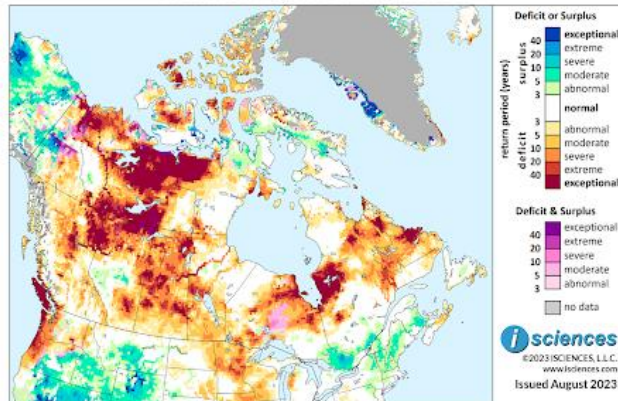
- Northeastern **British Columbia**, in areas east of Snake River, continuing east into Mackenzie County in northwestern **Alberta**.
- Central and northeastern **Saskatchewan**, in areas east and south of Meadow Lake Provincial Park.
- Northeastern **Yukon**, in areas north of the Lapierre House territory. Exceptional deficits continue throughout most of the **Northwest Territories**, with the most intense anomalies appearing south of both Great Bear Lake and Great Slave Lake.
- **Nunavut**, throughout the Kitikmeot Region and into the Queen Elizabeth Islands.
- In coastal regions of **Ontario** and **Quebec** along the Hudson Bay and surrounding the La Grande Riviere Reservoir. These deficits continue east into northeastern coastal regions of **Newfoundland**.

Moderate to severe surplus is anticipated in:

- Western **Yukon**, in regions northeast of Tombstone Territorial Park.
- **Nunavut**, in coastal regions of Cambridge Bay Inuit Owned Land.

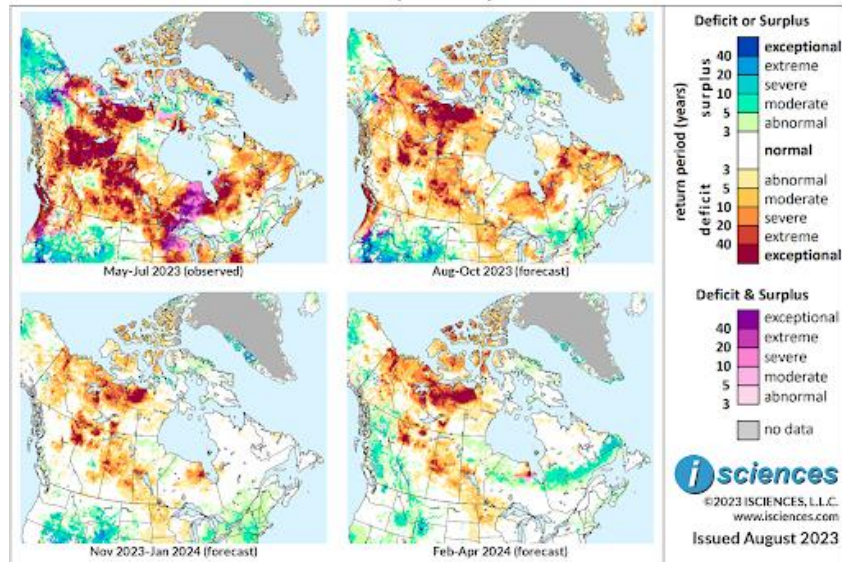
The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Canada: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

Isciences Water Anomalies Forecast
Canada: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 expects widespread deficits to continue in Nunavut, Northwest Territories, and the Queen Elizabeth Islands. Northeastern British Columbia and northwestern Alberta should anticipate deficits to also continue. Saskatchewan will experience widespread deficits of varying intensity, with the most intense deficits occurring in the province’s central regions. In Manitoba, territories northwest of Lake Winnipeg will also continue. Coastal regions along the Hudson Bay in both Ontario and Quebec are expected to endure continued deficits, which continue east into northern Quebec and northern Newfoundland.

From November 2023 through January 2024, deficits in Nunavut, northern Alberta, Northwestern Territories, and Saskatchewan are expected to lessen in magnitude and intensity, with many areas expected to experience near normal conditions, though exceptional deficits are still expected in areas south of Great Bear Lake and east of Umingmaktok. Deficits will also continue but shrink in central Saskatchewan, as well as in Manitoba, west of Lake Winnipeg. Regions in Quebec along the coast of the Hudson Bay, but persist in northeastern Ontario.

The forecast for the final months – February 2024 through April 2024 – expects deficits to continue in northern Nunavut and the Northwest Territories, as well as northern coastal regions of Yukon. Small areas within northeastern British Columbia and northwestern Alberta can expect similar deficits. West-central regions of Saskatchewan, west of Dore Lake, may experience severe to extreme deficits. Further south, much of British Columbia, central Quebec, and eastern Newfoundland can anticipate moderate surplus.

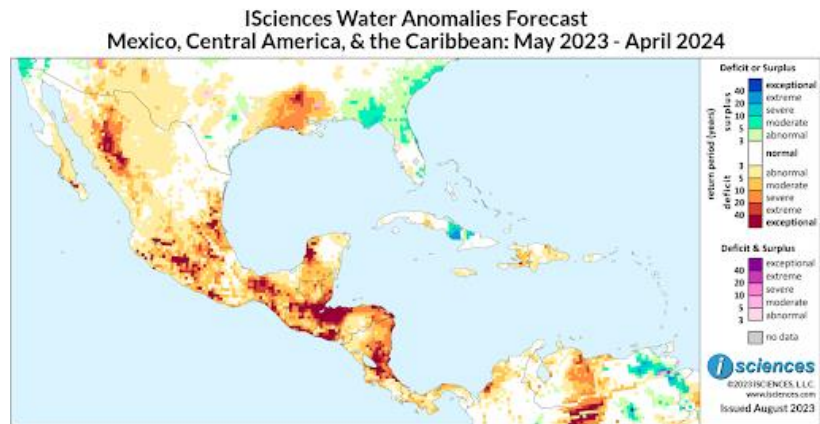
Please note that WSIM forecast skill declines with longer lead times.

Mexico, Central America, and the Caribbean

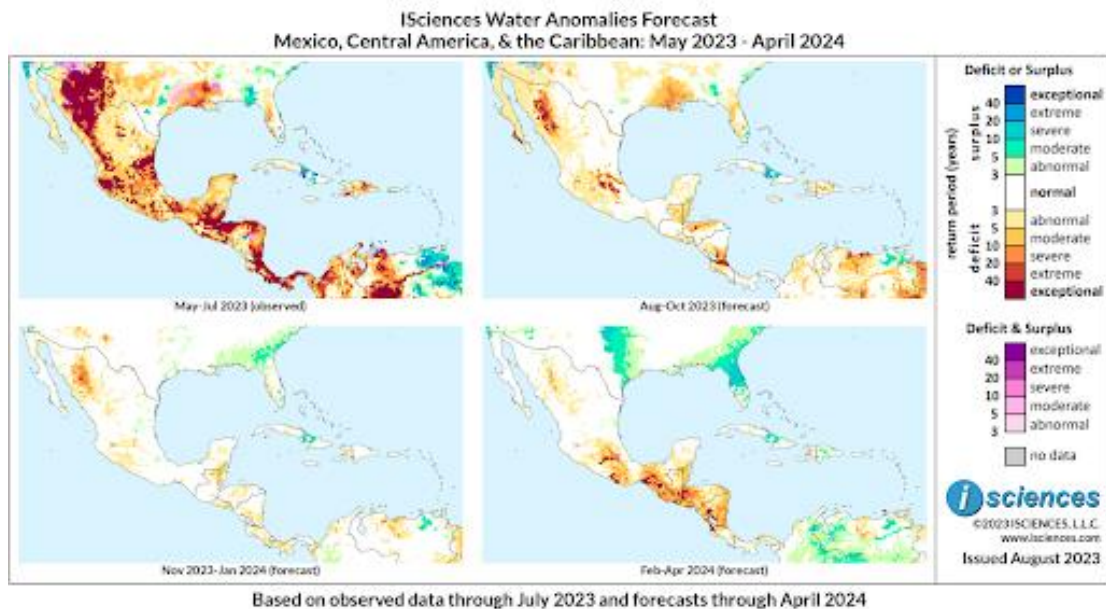
The 12-month forecast ending in April 2024 anticipates deficits of varying intensity to be widespread throughout most of Mexico and Central America.

The following countries should expect extreme to exceptional deficits:

- **Mexico**, in southern regions of the state of Chihuahua, as well as northern regions of the state of Durango.
- Central **Guatemala**, in areas surrounding Izabal Lake, spreading into southern **Belize**.
- Western **Honduras**, widespread throughout areas west of Lake Yojoa.
- **Costa Rica**, in the Chontales and Rio San Juan departments.



The 3-month maps (below) show the evolving conditions in more detail.



The forecast through October 2023 anticipates deficits in southern regions of Chihuahua to persist, as well as in regions near Mexico City. Similar deficits are forecast in southern coastal regions of Baja California Sur, near the town of Todos Santos. Areas of west-central Honduras, near San Pedro Sula, can anticipate severe to extreme deficits. In Central America,

From November 2023 through January 2024, exceptional deficits are expected to continue in southern regions of Chihuahua, but dissipate into mostly normal conditions throughout the rest of Mexico. Much of Central America will also experience a mixture of normal conditions and mild deficit anomalies.

The forecast for the final months – February 2024 through April 2024 – anticipates extreme to exceptional deficits to reemerge in southern Mexico, near coastal regions of the state of Oaxaca, as well as throughout Guatemala, western Honduras, and regions of Costa Rica, north of Lake Cocibolca.

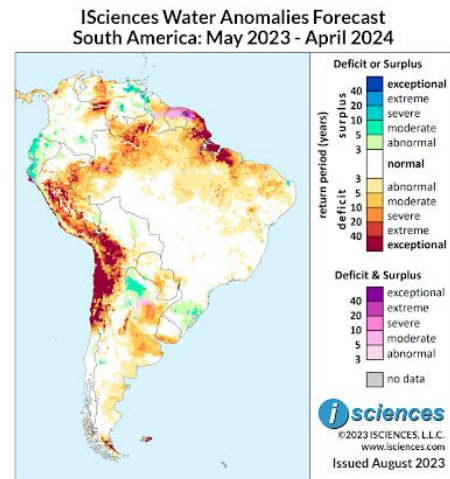
Please note that WSIM forecast skill declines with longer lead times.

South America

The 12-month forecast ending in April 2024 anticipates intense deficits to occur throughout several western countries, as well as northern regions of Brazil. Transitional conditions are expected in northern regions of the Guianas.

The following regions are expected to experience exceptional deficits:

- Northeastern **Colombia**, in areas near the Vichada National Park.
- Pockets of northern **Brazil**, in northern portions of Barcelos municipality, as well as in coastal regions of the states of Amapa and Para.
- Southwestern **Bolivia**, throughout the country's southern highlands region.
- Northern **Chile**, throughout the regions of Tarapaca and the Antofagasta province.



Based on observed data through July 2023 and forecasts through April 2024

Severe to extreme deficits are predicted to appear in the following countries:

- Northwestern **Venezuela**, in the states of Apure and Portuguesa.
- **Uruguay**, near coastal regions of the Maldonado Department.
- **Argentina**, with the most concentrated anomalies appearing in the Entre Rios and Corrientes provinces.
- **Peru**, appearing in pockets throughout central regions of the country.

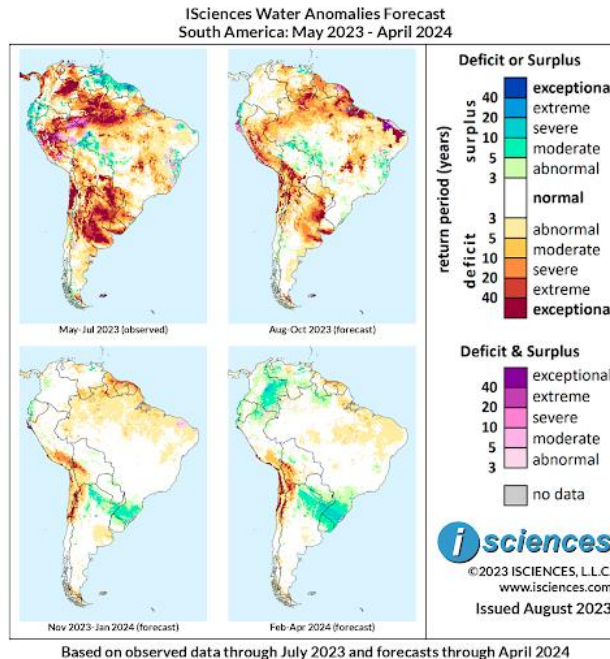
Moderate to severe surplus is anticipated in:

- Western coastal regions of **Ecuador** and **Peru**.

Transitional conditions are expected to emerge in:

- The **Guianas**, in northeastern **Guyana** and northwestern **Suriname**.

The 3-month maps (below) show the evolving conditions in more detail.



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 anticipates severe deficits to arise in several areas of South America, especially in northern Brazil and the Guianas. Widespread deficits in Peru are expected to continue through the southern Bolivarian Nations, continuing further south into eastern Argentina and southern Uruguay. Western coastal regions of Ecuador are expected to endure continued moderate to severe surplus.

From November 2023 through January 2024, most intense anomalies are expected to disappear, with the exception of southern Peru, western Bolivia, and northern Chile. Similarly intense deficits are anticipated in northern coastal regions of the Guianas. In northern Argentina and southern Brazil, moderate to severe surpluses are expected.

The forecast for the final months – February 2024 through April 2024 – anticipates deficits to persist and slightly expand in magnitude in northern Chile, as well as in northern coastal regions of the Guianas. Moderate to severe surplus is expected to occur in northern Argentina, Uruguay, and southernmost regions of Brazil.

Please note that WSIM forecast skill declines with longer lead times.

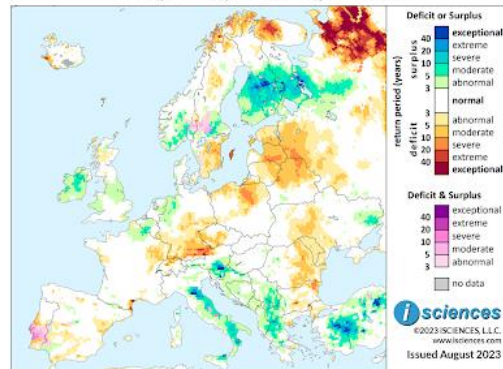
Europe

The 12-month forecast ending in April 2024 indicates that while the majority of Continental Europe should anticipate mostly normal conditions and mild anomalies, intense surplus will persist in southern Europe and Finland, with deficits appearing in western European countries and the Baltics.

Extreme to exceptional surplus is anticipated in the following countries:

- **Italy**, along much of the country's eastern and southern coasts, with the most intense anomalies appearing in the region of Emilia-Romagna.
- Northeastern **Slovenia**, throughout regions along the country's northern border shared with southern **Austria**.
- **Finland**, widespread throughout its Western, Southern, and Eastern provinces.

ISciences Water Anomalies Forecast
Europe: May 2023 - April 2024

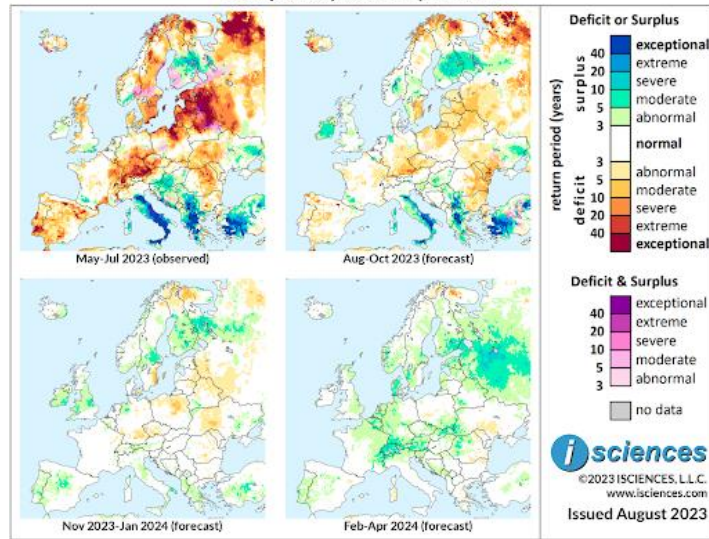


The following countries should expect severe to extreme deficits:

- Southern **Germany**, in southern regions of the state of Bavaria.
- Southern **Latvia**, throughout the Semigallia region.
- Northern **Norway**, in the county of Troms og Finnmark, which continues east into western regions of Murmansk Oblast, **Russia**.
- Northeastern **Poland**, near the city of Olsztyn.
- Throughout the **Swedish** island of Gotland.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Europe: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 expects exceptional surpluses in southern Europe to resume in southern and eastern coastal regions of Europe but decrease in magnitude, as well as small areas of the Balkans. Moderate to severe deficits are expected to continue in southeastern Germany, and emerge in eastern Romania and Moldova. In northern Norway, intense deficits will persist in the county of Troms og Finnmark, as will severe to extreme surpluses across southern Finland.

From November 2023 through January 2024, intense deficits are expected to dissipate throughout Continental Europe, with moderate surpluses continuing in Finland and east-central Norway. Most of Continental Europe can anticipate mostly normal conditions.

The forecast for the final months – February 2024 through April 2024 – expects continued normal conditions and mild anomalies, with moderate surpluses emerging in Switzerland, Austria, and southwestern Germany.

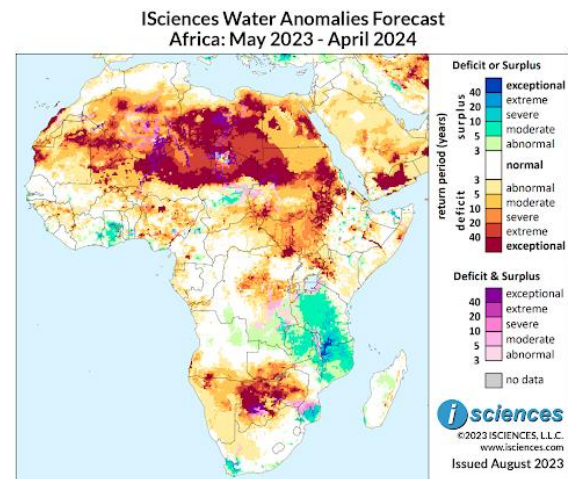
Please note that WSIM forecast skill declines with longer lead times.

Africa

The 12-month forecast ending in April 2024 indicates that exceptional deficits will persist throughout much of northern and south-central Africa, with surpluses in the continent's southeastern countries.

The following countries can expect extreme to exceptional deficits:

- **Libya**, throughout most regions of the country, except in northwestern regions near the city of Tripoli, which will observe primarily normal conditions. These anomalies continue west into southwestern and central **Algeria**.
- The majority of central to northern **Niger**, as well as northern **Chad**, throughout its Tibesti, Fada, and Am-Djarass region. Similar anomalies appear in western and eastern **Sudan** near the Al Malha region, and into areas along the western border of **Ethiopia**.
- North-central and western **Mauritania**, in the Zouerat and Dakhlet Nouadhibou regions, which continue into the Salam region of northern **Mali**. Further west, similar deficits are expected in western coastal regions of **Morocco** and **West Sahara**.
- Eastern **Egypt**, in the Red Sea Governorate.
- **Botswana**, throughout most central and northern regions, with anomalies moving further east into western to central **Zimbabwe**.



Based on observed data through July 2023 and forecasts through April 2024

Severe deficits are expected in several countries, including:

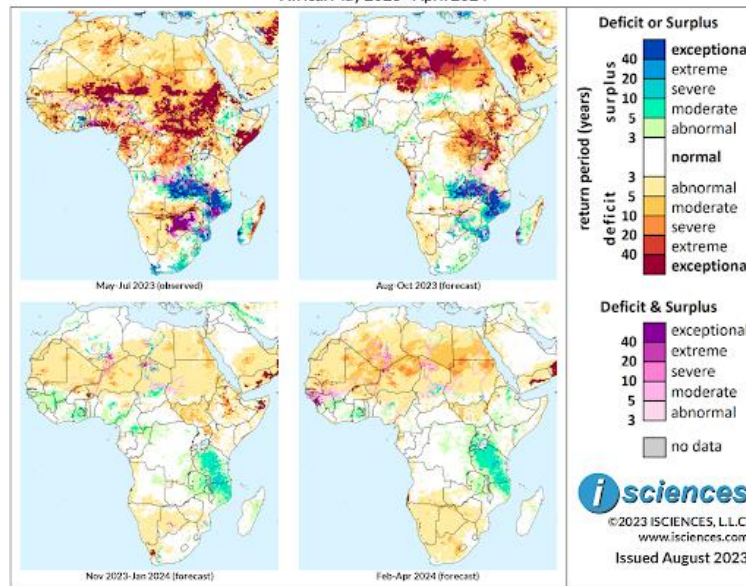
- **South Sudan**, throughout much of the country.
- **Zambia**, throughout the country's Southern Province.
- Central **Democratic Republic of Congo**, in areas north of the De La Salonga-Nord.
- Throughout northeastern **Uganda** and western **Kenya**.

Surpluses of varying intensity are expected in the following countries:

- **Tanzania**, with moderate to severe surpluses appearing throughout most of the country. Exceptional surpluses appear in southwestern areas in the country's Ruvuma region, continuing south into northwestern **Mozambique**.
- Southern **Mozambique**, in the Gaza provinces, as well as surrounding areas.
- Central **Botswana**, near western regions of the Kweneng District.
- **Malawi**, with moderate to severe surplus throughout most of the country, continuing into southernmost **Zimbabwe**.
- Ghana, with severe surpluses occurring throughout the country, spreading east into the Abengourou Department in **Ivory Coast**.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Africa: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 indicates that moderate to severe surpluses in Tanzania and Mozambique will intensify, becoming extreme to exceptional. Deficits in Botswana are expected to disappear, though exceptional deficits are expected to persist throughout northern Africa, specifically in northern Mali, Algeria, northeastern Niger, and Libya. Exceptional deficits will also emerge in northeastern Democratic Republic of Congo, spreading further east into Uganda and western Kenya. Nearby, moderate to severe deficits are expected to linger in South Sudan, as well as extreme to exceptional deficits in western and central Ethiopia.

From November 2023 through January 2024, intense surpluses in Africa’s southeastern countries will lessen in magnitude and intensity, with exceptional anomalies in Zimbabwe and northern Mozambique becoming mild to moderate anomalies. In most other areas of Africa, mostly normal conditions to mild anomalies are expected, with exceptions such as moderate deficits throughout South Sudan, moderate to severe deficits in central Ethiopia, and exceptional deficits in isolated areas of northern Somalia.

The forecast for the final months – February 2024 through April 2024 – mostly normal conditions and mild anomalies will continue across the continent, with moderate surpluses persisting in Zimbabwe. Additionally, severe deficits are expected in northern Sudan and northeastern Niger. Isolated pockets of transitional conditions are expected in western Guinea.

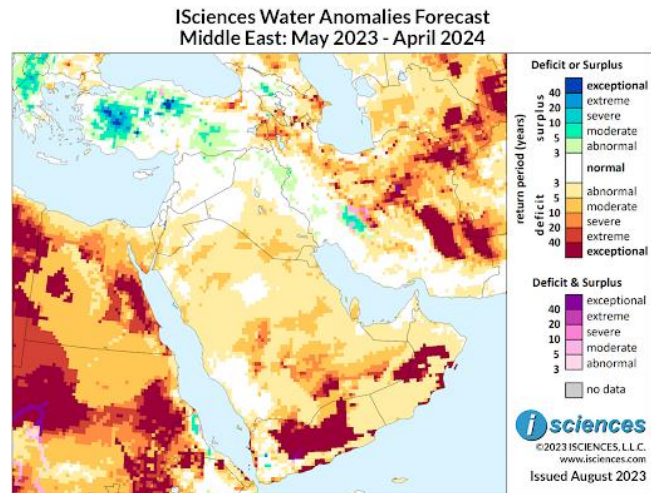
Please note that WSIM forecast skill declines with longer lead times.

Middle East

The 12-month forecast ending in April 2024 anticipates widespread deficits throughout most countries within the region, with the most intense anomalies occurring throughout Iran. Notable surplus is expected in portions of Turkey.

These countries should expect extreme to exceptional deficits:

- **Yemen**, throughout most central areas of the country, as well as western and southern coastal regions of the Abyan and Al Hudaydah governorates.
- **Oman**, with pockets across western regions, as well as eastern coastal regions, of the Al Wusta Governorate.
- Eastern **Iran**, near the city of Mashhad and throughout the Sistan and Baluchestan Province.
- Eastern **Turkey**, appearing east of Van Lake and crossing into western Iran, near the city of Khoy.



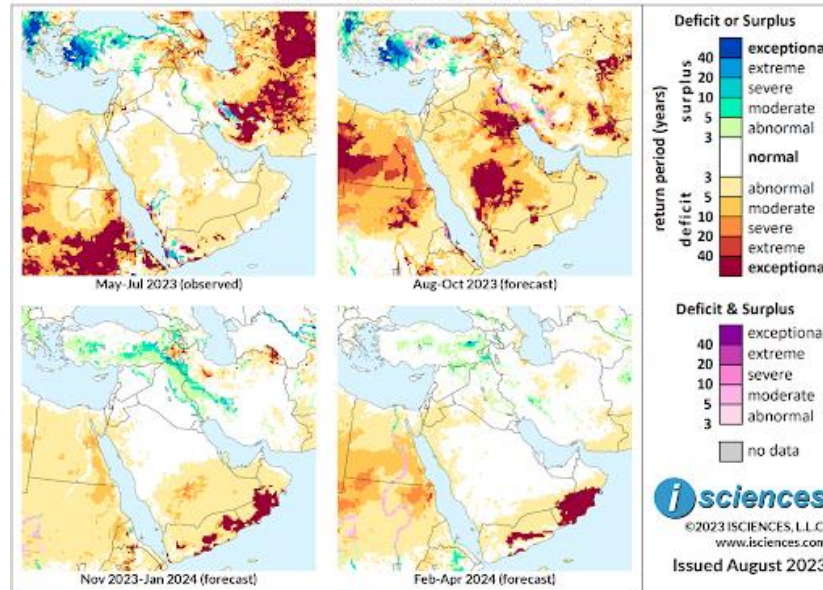
Based on observed data through July 2023 and forecasts through April 2024

Extreme to exceptional surplus is anticipated in the following regions:

- Western **Turkey**, throughout much of the Aegean region and western areas of Central Anatolia. Similar surplus is expected in the central Black Sea Region, near the city of Çorum.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Middle East: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 indicates that exceptional deficits will arise in Saudi Arabia throughout the Riyadh province, as well as in southern Iraq, throughout the Al Muthanna Governorate. Extreme to exceptional deficits are expected to emerge in northeastern coastal regions of Turkey, near the city of Rize. Deficits in Iran are expected to persist but lessen in scope, only persisting in areas within the Sistan and Baluchestan Province. Surplus in western Turkey is expected to broaden, expanding further into the Aegean, Central Anatolia, and western Mediterranean regions.

From November 2023 through January 2024 expects surplus in western Turkey to dissipate, and moderate surpluses to emerge in eastern regions of the country. Small areas of intense deficits are expected in northwestern and northeastern Iran, as well as in Yemen. Much of central to southern Oman can expect exceptional deficits.

The forecast for the final months – February 2024 through April 2024 – anticipates that most surplus in northern regions of the Middle East will mostly vanish, with exceptional deficits continuing in central Yemen and Oman.

Please note that WSIM forecast skill declines with longer lead times.

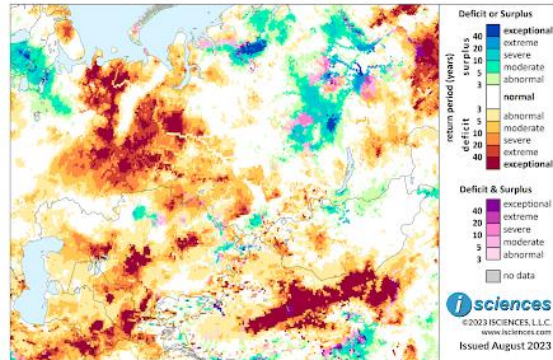
Central Asia and Russia

The 12-month forecast ending in April 2024 anticipates widespread deficits in European Russia, with some pockets of intense surplus in central regions of the country. Widespread deficits are also expected in Central Asia.

The following areas should expect extreme to exceptional deficits:

- Throughout most of **European Russia**, including areas of the Zapolyarny District, into the Komi Republic and the federal subject of Kirov Oblast.
- Eastern **Russia**, throughout southern regions of the Sakha Republic.
- Western **Russia**, throughout the Lovozersky District.
- South-central and eastern **Kazakhstan**, in areas north of the Aral Sea, near the city of Kyzylorda, and within the Karaganda Region.
- Central and eastern **Uzbekistan**, within the Navoiy and Surxondaryo regions, as well as in south-eastern **Turkmenistan**, in the Mary Province.

ISciences Water Anomalies Forecast
Central Asia: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

Moderate to exceptional surplus is anticipated in:

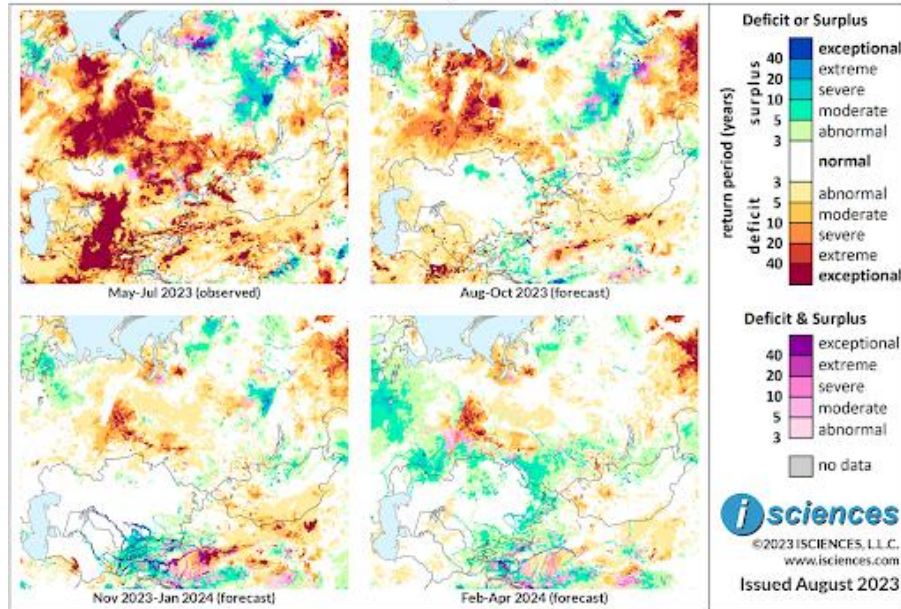
- Central **Russia**, in the northern regions of Yamalo-Nenets Autonomous Okrug.
- Central **Russia**, in southern areas of Krasnoyarsk Krai, appearing in the Evenkiysky and Katangsky districts.
- Western **Russia**, throughout the Republic of Karelia.

Transitional conditions are expected in:

- Central **Russia**, in the northern regions of Irkutsk Oblast.
- Northern **Russia**, in northwestern coastal regions of Taymyrsky Dolgano-Nenetsky District, near the Leskino area.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Central Asia: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 indicates that intense, widespread deficits are expected to continue in European Russia in the Taymyrsky Dolgano-Nenetsky District, as well as southern regions of the Sakha Republic. Deficits emerge near the settlement of Novy Port and in northern coastal regions of the Nenets Autonomous Okrug. Most deficits in Central Asia are expected to dissipate, becoming near normal conditions. Surplus will persist in central Russia in northern regions of Yamalo-Nenets Autonomous Okrug.

From November 2023 through January 2024, deficits in European Russia are expected to lessen in magnitude, but will persist in the Taymyrsky Dolgano-Nenetsky District, near the settlement of Novy Port, and in southern regions of the Sakha Republic. In Central Asia, intense surplus is expected to arise in southern Kazakhstan, eastern Turkmenistan, and eastern Uzbekistan.

The forecast for the final months – February 2024 through April 2024 – anticipates that deficits in European Russia are expected to persist, as well as near the settlement of Novy Port. Further east, deficits are expected to persist in southern regions of Sakha Republic. Southernmost regions of Russia along the borders of Kazakhstan and Mongolia can also expect mild to moderate surplus. In Central Asia, moderate surpluses are expected in eastern regions of Kazakhstan, Uzbekistan, and Turkmenistan.

Please note that WSIM forecast skill declines with longer lead times.

South Asia

The 12-month forecast ending in April 2024 anticipates that eastern regions of South Asia will observe exceptional deficits, while small areas of severe to extreme surplus will arise in western and southern regions.

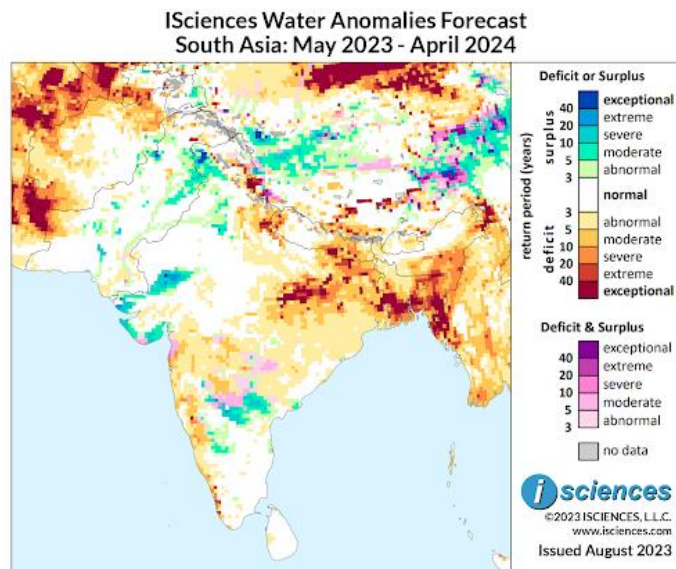
The following countries should expect extreme to exceptional deficits:

- Eastern **India**, near the Son River and in surrounding areas, re-emerging north in central **Nepal**, in the Narayani Zone.
- Northern **India**, in the state of Uttarakhand and Uttar Pradesh.
- Southern **Bangladesh**, throughout the Khulna Division and spreading further east into the Division of Chittagong and the eastern **Indian** state of Mizoram.
- Western **Pakistan**, in northwestern regions of the Balochistan province.

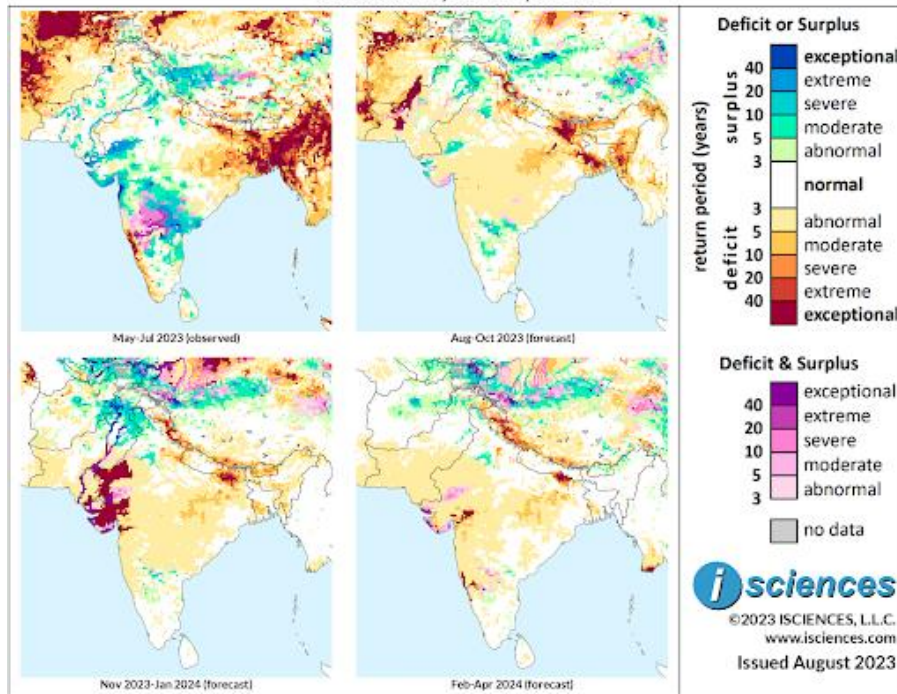
Extreme to exceptional surplus is anticipated in:

- Western and south-central **India**, appearing in coastal regions throughout the state of Gujarat, as well as southern portions of the state of Rajasthan.
- Northern **India**, in western regions of the Jammu and Kashmir provinces.

The 3-month maps (below) show the evolving conditions in more detail.



ISciences Water Anomalies Forecast
South Asia: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 anticipates exceptional deficits to emerge in eastern Nepal, near the city of Kathmandu. Previous deficits in eastern India and Bangladesh are expected to mostly diminish, though continuing in southern Bangladesh and parts of Mizoram. Exceptional deficits are also expected to emerge in western Pakistan, in eastern to central areas of the Balochistan province. Further north, moderate to severe surpluses are expected near the Pakistani city of Lahore, spreading further east into the Indian city of Amritsar.

From November 2023 through January 2024, exceptional deficits are expected to appear in western India throughout the state of Gujarat and Rajasthan, along with small instances of transitional conditions. Extreme to exceptional deficits will continue in eastern Nepal, though similar previous deficits in eastern India and Bangladesh will dissipate, becoming normal conditions and mild deficits. However, deficits of severe intensity are expected throughout Bhutan. Extreme to exceptional surplus is expected to emerge in northern Pakistan, in northern regions of the Punjab province. Nearby, isolated pockets of exceptional deficits are expected nearby in northern India.

The forecast for the final months – February 2024 through April 2024 – most intense anomalies are expected to disappear, though small areas along the shared border of Nepal and eastern India may observe exceptional deficits.

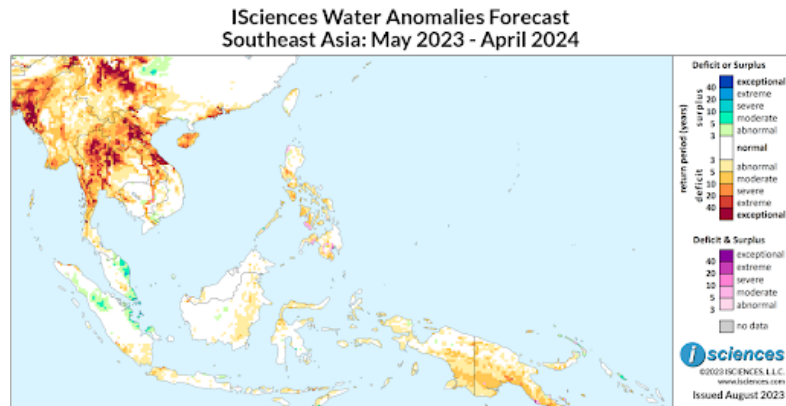
Please note that WSIM forecast skill declines with longer lead times.

Southeast Asia and the Pacific

The 12-month forecast ending in April 2024 expects intense deficits in Mainland Southeast Asia to continue, with mostly normal conditions and moderate deficits occurring in the Pacific.

These areas should expect exceptional deficits:

- Northern **Thailand**, throughout the Lamphun and Nakhon Sawan provinces.
- Eastern **Laos**, widespread throughout the Houaphanh district, as well as in central **Vietnam**, near the city of Đồng Hới.
- Western **Myanmar**, in the state of Rakhine.



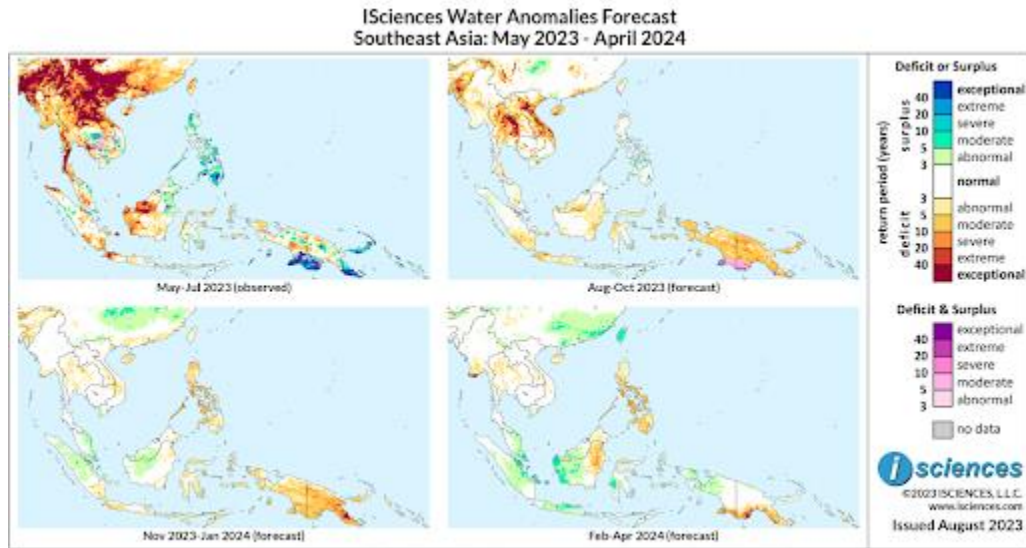
The following regions should anticipate moderate to severe deficits:

- **Laos**, widespread throughout most of the country.
- Northern to central islands of the **Philippines**.
- Southern **Papua** and **Papua New Guinea**, with moderate deficits covering most of both areas' southern regions.
- Throughout most of **Myanmar**.

Isolated instances of mild to moderate surpluses are expected in the following regions:

- Eastern coastal regions of Peninsular **Malaysia**.
- North-central regions of the Indonesian island of **Sumatra**.

The 3-month maps (below) show the evolving conditions in more detail.



The forecast through October 2023 anticipates exceptional deficits in central Thailand and in regions along the borders of Laos and Vietnam to persist, along with moderate to severe deficits continuing in central Laos and northern to central Vietnam. Most Indonesian islands are expected to experience continued normal conditions with small areas of mild deficits. However, moderate to severe deficits are expected to intensify in Papua and Papua New Guinea.

From November 2023 through January 2024, anticipates severe to exceptional deficits to arise in southeastern regions of Papua New Guinea, while the remaining areas in the country, as well as Papua, to experience continued moderate to severe deficits. Normal conditions and isolated instances of mild deficits and surplus are expected to continue in most of the Indonesian islands, though the Philippines should anticipate widespread moderate to severe deficits throughout the majority of the region. Intense deficits in Mainland Southeast Asia are expected to dissipate.

The forecast for the final months – February 2024 through April 2024 – anticipates exceptional deficits to linger in southernmost regions of Papua and Papua New Guinea, while disappearing in the rest of both regions. Moderate deficits are expected to linger in the Philippines, while deficits are expected to arise in northeastern Kalimantan. Moderate surpluses are expected to arise in western Kalimantan, eastern Sumatra, and central Java.

Please note that WSIM forecast skill declines with longer lead times.

East Asia

The 12-month forecast ending in April 2024 anticipates intense deficits throughout western Inner Mongolia and into the Xinjiang province. Surpluses and some transitional conditions are expected near the provinces of Tibet and Qinghai.

The following regions should expect extreme to exceptional deficits:

- Northern **China**, spanning throughout western Inner Mongolia, Gansu, and eastern Xinjiang provinces. Further east, northwestern Liaoning can expect similar deficits.
- Southern **China**, throughout northern portions of Yunnan and into southern Sichuan.
- Throughout the island of Hainan.
- Northern **Japan**, in the eastern regions of Hokkaido.

Moderate to severe surplus is anticipated in:

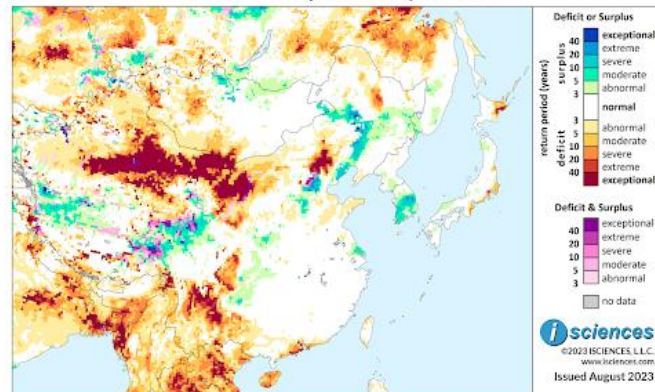
- West-central **China**, in western Tibet, near Lake Bangongcuo.
- Northeastern **China**, near the city of Zhalantun and into central regions of the Heilongjiang province.
- **South Korea**, spanning the South Chungcheong Province and most regions further south.

Transitional conditions are forecast in:

- West-central **China**, in western regions of Qinghai.

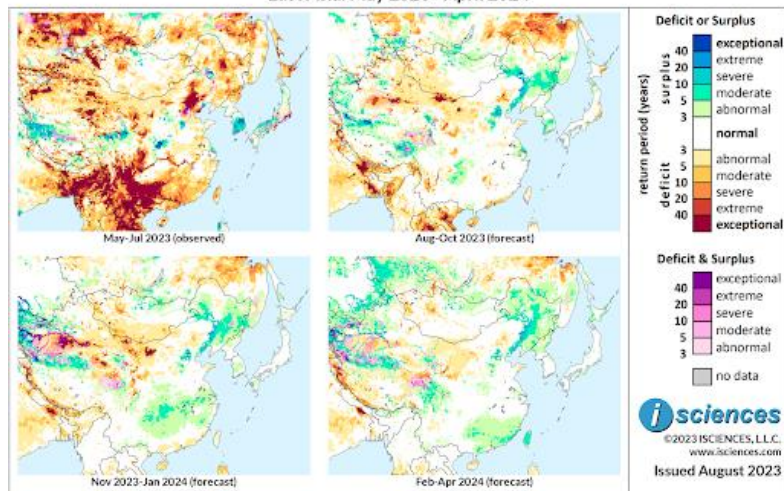
The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
East Asia: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

ISciences Water Anomalies Forecast
East Asia: May 2023 - April 2024



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 expects most intense deficits in the south to subside, with surpluses in both western and eastern Tibet and Heilongjiang expected to continue. Similar surpluses are expected to emerge further north in southwestern Xinjiang. Exceptional deficits are expected to arise in regions along the borders of Mongolia and in northern areas of the Ejin Banner.

From November 2023 through January 2024, most deficits in Inner Mongolia are expected to further dissipate, though still persisting in central Xinjiang. Surpluses are expected to continue in western Tibet and in Heilongjiang. The majority of the rest of the region can expect near normal conditions.

The forecast for the final months – February 2024 through April 2024 – indicates that deficits in western China will continue to diminish, with some isolated anomalies occurring along the southwestern border of Tibet. Further north, surplus will continue in western Tibet, as well as in Heilongjiang.

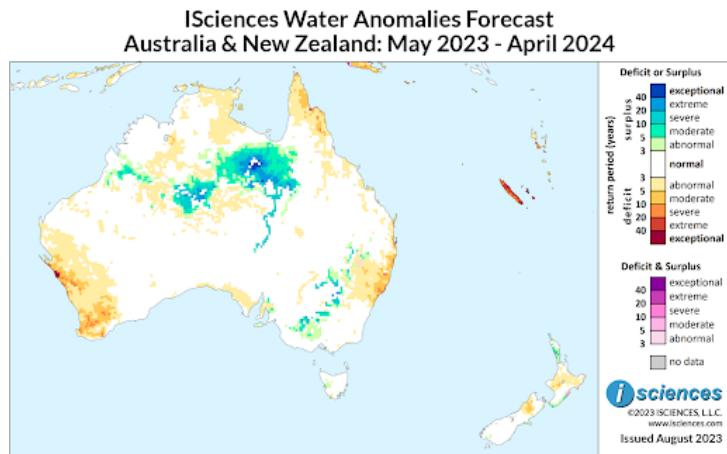
Please note that WSIM forecast skill declines with longer lead times.

Australia and New Zealand

The 12-month forecast ending in April 2024 anticipates mostly normal conditions across Australia and New Zealand, with some isolated instances of intense deficits in western and eastern coastal regions, and surpluses in north-central provinces.

These areas should expect extreme to exceptional surplus:

- Central **Northern Territory**, widespread in the Ranken Region and spreading into surrounding areas.
- Western to southwestern **Queensland**, appearing near Mount Isa City and spreading further south into regions near the Munga-Thirri National Park.



Exceptional deficits are anticipated in:

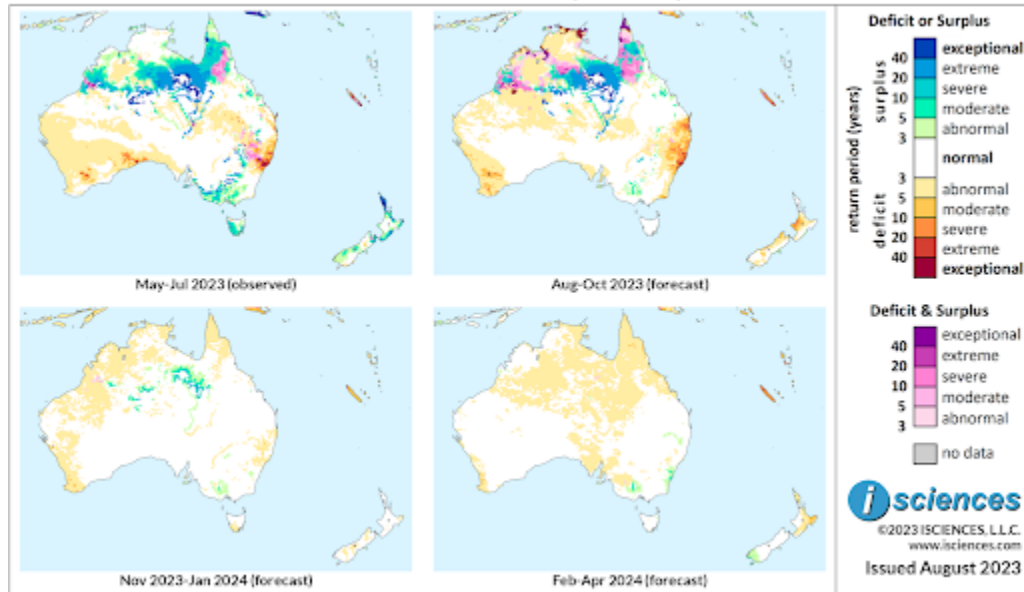
- Westernmost coastal regions of **Western Australia**, in areas west of the Toolonga National Reserve.
- Throughout most of **New Caledonia**.

Isolated instances of moderate to extreme deficits are expected in the following regions:

- Southwestern **Western Australia**, widespread throughout most of the Great Southern Region.
- Eastern coastal regions of **New South Wales**, in the Mid-Coast Council local government area.

The 3-month maps (below) show the evolving conditions in more detail.

**ISciences Water Anomalies Forecast
Australia & New Zealand: May 2023 - April 2024**



Based on observed data through July 2023 and forecasts through April 2024

The forecast through October 2023 anticipates that intense deficits will continue in eastern coastal regions of New South Wales, in the Mid-Coast Council local government area, as well as further north, near Brisbane. Intense surpluses are expected to continue throughout eastern Northern Territory and western Queensland, with some transitional conditions appearing nearby in the Yorke Peninsula and in coastal regions near the Dampier Peninsula. Pockets of exceptional deficit are forecast in coastal regions near the Drysdale River and near Kakadu National Park.

From November 2023 through January 2024 expects most intense anomalies in Australia to vanish, with small areas of moderate surplus remaining in northeastern Northern Territory and western Queensland, throughout areas near Mount Isa City. Deficits in New Caledonia are expected to persist but lessen in intensity, becoming moderate to severe anomalies.

The forecast for the final months – February 2024 through April 2024 – indicates that normal conditions will continue across the region, and intense anomalies near Mount Isa City will subside, becoming mild deficits. Deficits in New Caledonia are expected to increase in intensity, with exceptional deficits returning in most of the territory.

Please note that WSIM forecast skill declines with longer lead times.