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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 June 2023 and an ensemble of forecasts issued the last week of June 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. We have also changed the baseline period for computing statistical distributions from 1950-2009 (60 years) to 1979-2018 (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.

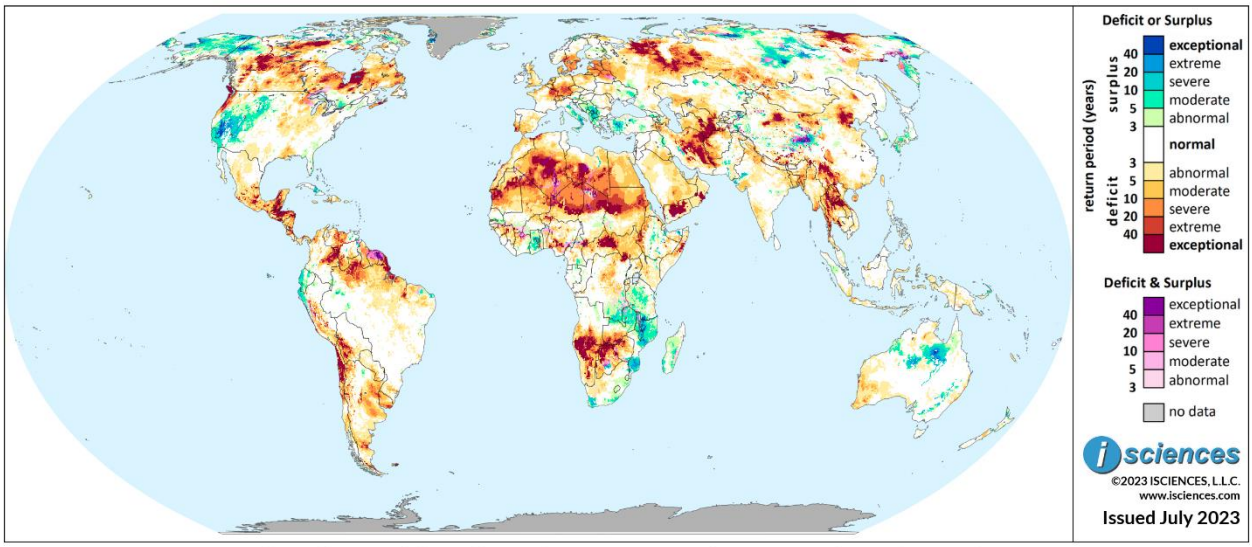
Please note that the WSIM model makes use of seasonal temperature and precipitation forecasts produced by the U.S. National Oceanic and Atmospheric Administration (NOAA) Climate Forecast System Version 2 (CFSv2). These forecasts predict broad temperature and precipitation patterns, but do not effectively 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.

Worldwide Water Watch List

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

ISciences Water Anomalies Forecast: April 2023 - March 2024



Based on observed data through June 2023 and forecasts through March 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 in western and southwestern states are expected to continue until December 2023 or longer.

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

Mexico, Central America, and the Caribbean: Exceptional deficits are expected to persist in areas of Mexico and Central America until September 2023 or longer.

South America: Exceptional deficits are expected in areas across the Southern Cone and northern South America, continuing until September 2023 or longer.

Europe: Isolated areas of southern Continental Europe are expected to experience extreme to exceptional surpluses until September 2023 or longer.

Africa: Deficits are expected to linger in the continent's northern countries, with a mixture of intense surplus and transitional conditions appearing in southeastern countries until September 2023 or longer.

Middle East: Deficits of varying intensity are expected to persist throughout much of the Middle East until December 2023 or longer.

Central Asia and Russia: Intense deficits are forecast for much of western Russia until September 2023 or longer.

South Asia: Much of the region is anticipated to observe mild deficits, with some deficits appearing in northern and eastern India until September 2023.

Southeast Asia and the Pacific: Mainland Southeast Asia can expect intense deficits throughout the region, which are expected to dissipate by September 2023.

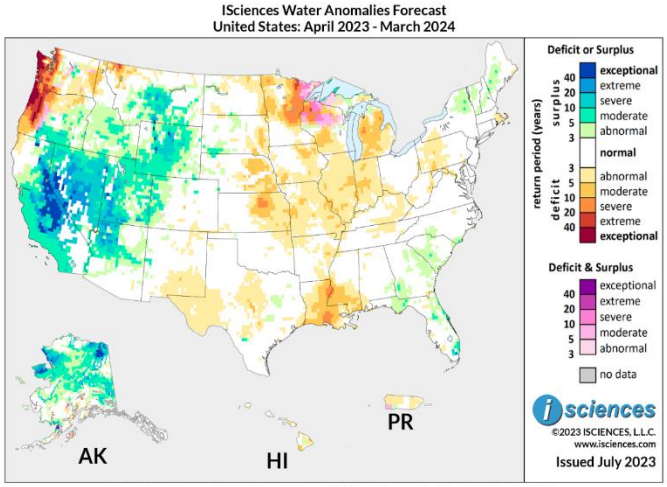
East Asia: Intense deficit anomalies are expected in pockets throughout northern China, but are expected to disappear by September 2023.

Australia & New Zealand: Extreme surpluses are forecast throughout much of northern Australia until December 2023 or longer.

Watch List: Regional Details

United States

The 12-month forecast ending in March 2024 anticipates widespread surpluses in western and southwestern states to continue, with some intense deficit anomalies appearing in the Pacific Northwest and northern states of the Midwest.



Based on observed data through June 2023 and forecasts through March 2024

The following states are expected to experience severe to exceptional surplus:

- Central **California,** widespread throughout the Sierra Nevada.
- **Nevada,** widespread throughout the state's southwestern and central regions. The highest concentrations are expected south and southwest of Pyramid Lake.
- Southwestern **Utah,** throughout Iron and Washington County. Anomalies continue south into northwestern **New Mexico**, into the Navajo Nation Off-Reservation Trust Land.
- Central **Montana,** near Judith Basin County, into central **Wyoming**, in surrounding areas of the town of Burlington.
- **Alaska**, across the state's northern areas. The highest concentrations are expected near Bering Land Bridge National Preserve and the Arctic National Wildlife Refuge.

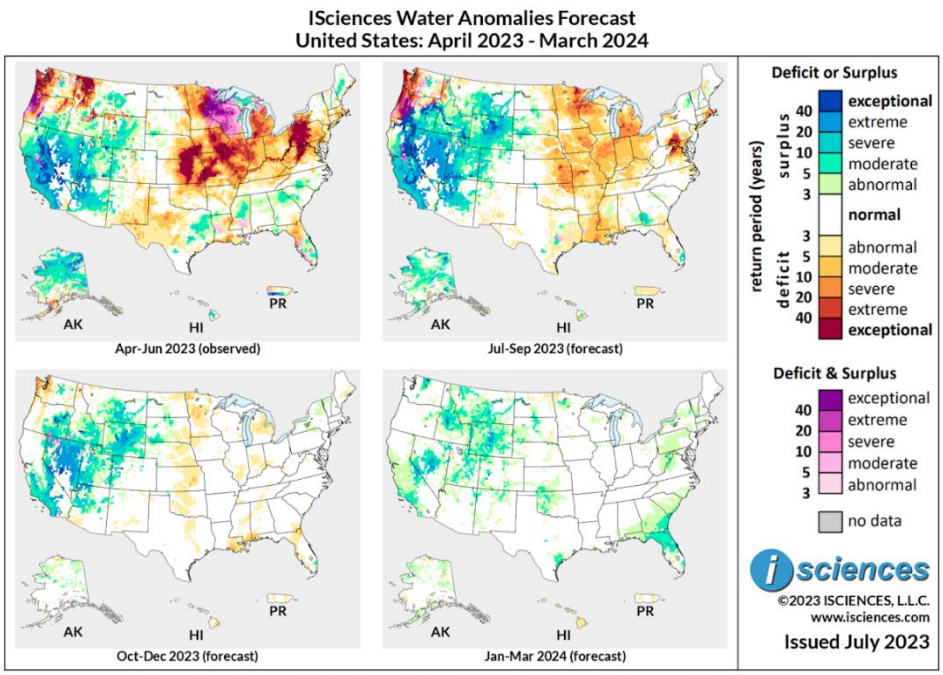
Severe to exceptional deficits are predicted in the following states:

- Western **Oregon** and western **Washington**, throughout the Cascade Range and Coast Range regions.
- Eastern to northeastern **Minnesota**, in areas east of Mille Lacs Lake, moving north into northeastern Koochiching County.
- Southern **Louisiana**, within the Vermilion Parish. Similar anomalies reappear further north, near Davis Island.
- Northwest **Montana,** near the Blackfeet Indian Reservation.

Transitional conditions are expected to emerge in:

- Northern **Wisconsin**, across Oneida and Bayfield County.
- Eastern **Minnesota**, near the Superior National Forest.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 anticipates moderate to severe deficits to intensify throughout much of the Midwest, with areas of eastern Minnesota, northern Virginia, Michigan, and southern Pennsylvania experiencing severe to exceptional deficits. Exceptional deficits are also expected to continue in the Coast and Cascade Ranges, with some intense transitional conditions appearing in western Washington. Extreme to exceptional surplus is expected to endure in California, Nevada, Utah, Wyoming, Idaho, and New Mexico, which is expected to expand into eastern Washington. Outside of the Continental U.S., surplus in Alaska is expected to persist but lessen in intensity to mostly moderate to severe anomalies.

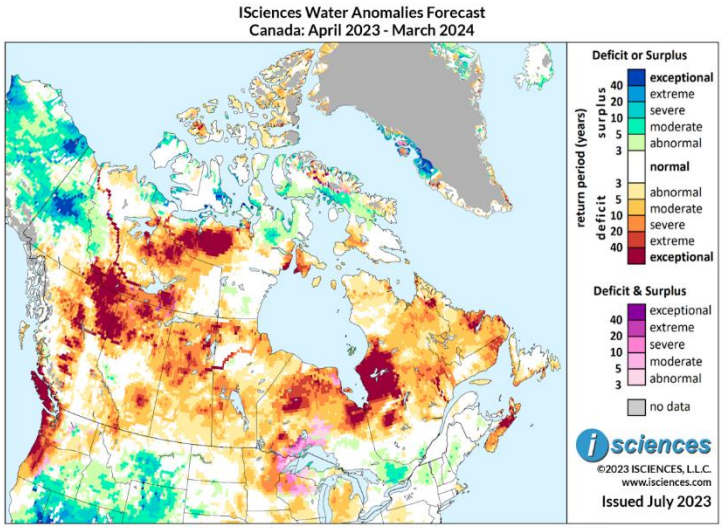
From October through December 2023, intense deficits in the Midwest are expected to diminish, becoming mostly normal conditions and mild deficit anomalies. Surpluses in most of the western and southwestern states are expected to continue, with the most concentrated areas appearing in northern to central Nevada and southern to central California. Deficits in the Pacific Northwest are predicted to lessen, with some severe to extreme deficits lingering in western Oregon.

The forecast for the final months – January 2024 through March 2024 – anticipates most deficits to disappear, with moderate surpluses continuing in central Nevada, central Idaho, central Wyoming, and appearing in northern Florida.

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

Canada

The 12-month forecast ending in March 2024 anticipates widespread deficits of varying intensity throughout much of the provinces, with some intense surpluses appearing in northwestern regions of the country.



Exceptional deficits are forecast in the following areas:

- Central to northern **British Columbia**, in areas south and northeast of Williston Lake. These anomalies expand across the province's northern and eastern border into northwestern **Alberta** and southeastern **Yukon**.
- **Northwestern Territories**, within the Fort Smith Region in areas north of the Great Slave Lake, continuing east into central regions of **Nunavut's** Kitikmeot Region.
- **Ontario**, throughout much of the Unorganized Kenora District, into west-central coastal regions of **Quebec** bordering the Hudson Bay.
- Central **Nova Scotia,** throughout the Municipality of the District of Guysborough, Pictou County, and Antigonish County.

Severe to extreme deficits are forecast in:

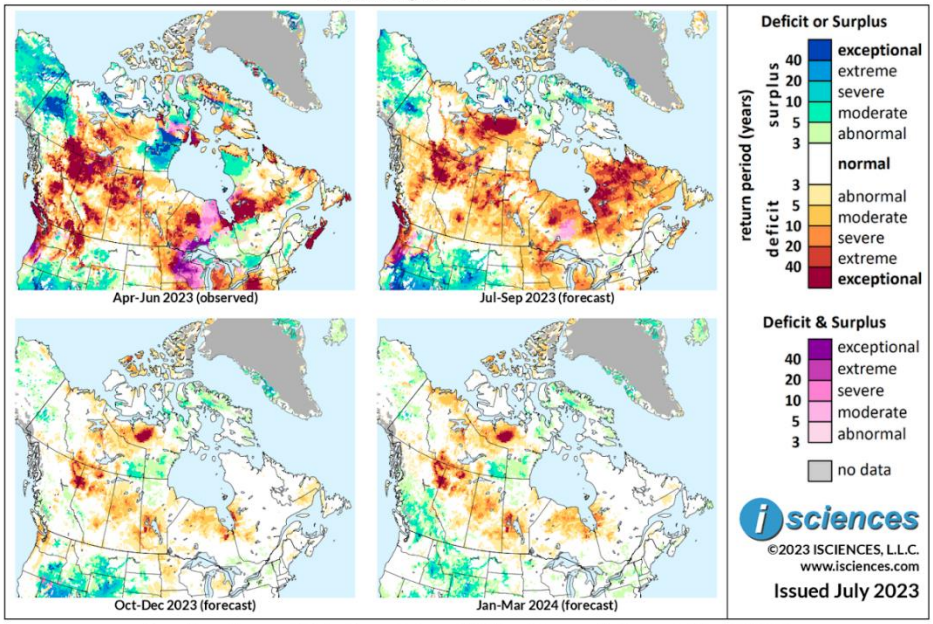
- **Saskatchewan**, throughout most of the province.
- **Manitoba**, in areas surrounding Lake Winnipeg.
- Northern and northeastern **Quebec**, across the Rivière-Koksoak and Caniapiscau Regional County Municipality, and into coastal regions of Newfoundland and Labrador near the Blanc-Sablon community and near the Labrador Inuit Lands.

Extreme to exceptional surplus is expected in:

- Central **Yukon**, in areas surrounding Dawson City.
- Central **Nunavut**, in sparse pockets throughout the Queen Elizabeth Islands.

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

ISciences Water Anomalies Forecast
Canada: April 2023 - March 2024



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 expects exceptional deficits to continue throughout much of the country, with deficits lingering in northwestern Alberta, Nunavut, and Saskatchewan. Extreme to exceptional deficits in Quebec are expected to expand, covering most regions of northern to central Quebec. Extreme to exceptional surplus is expected to persist in central Yukon.

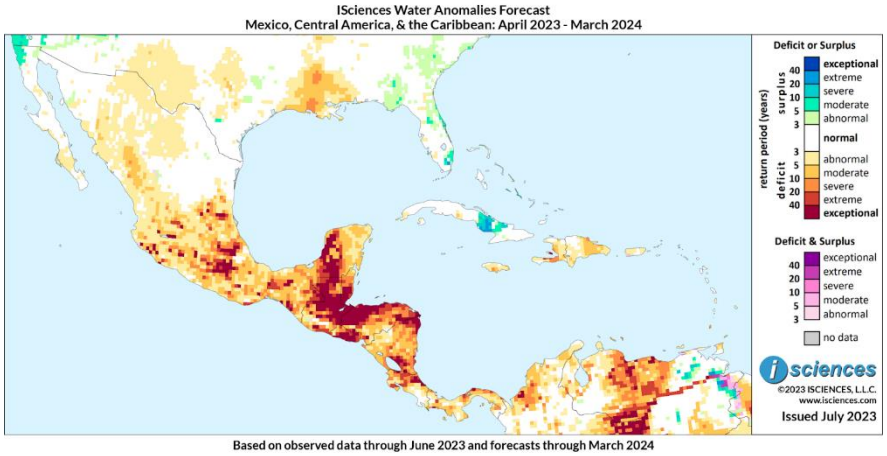
From October through December 2023, most intense anomalies are expected to significantly lessen in severity or disappear altogether. However, some deficits in northwestern Alberta, Nunavut, central Manitoba, northeastern Quebec, and Saskatchewan are expected to continue.

The forecast for the final months – January 2024 through March 2024 – expects deficits to continue in northern Alberta, Nunavut, central Manitoba, and Saskatchewan.

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

Mexico, Central America, and the Caribbean

The forecast ending in March 2024 anticipates intense deficits in concentrated areas of Mexico and Central America, with deficits of lesser intensity covering much of the remaining regions. Most areas in the Caribbean will experience a mixture of normal conditions and mild deficits, though Haiti may experience severe to extreme deficits.



The following areas are expected to experience extreme to exceptional deficits:

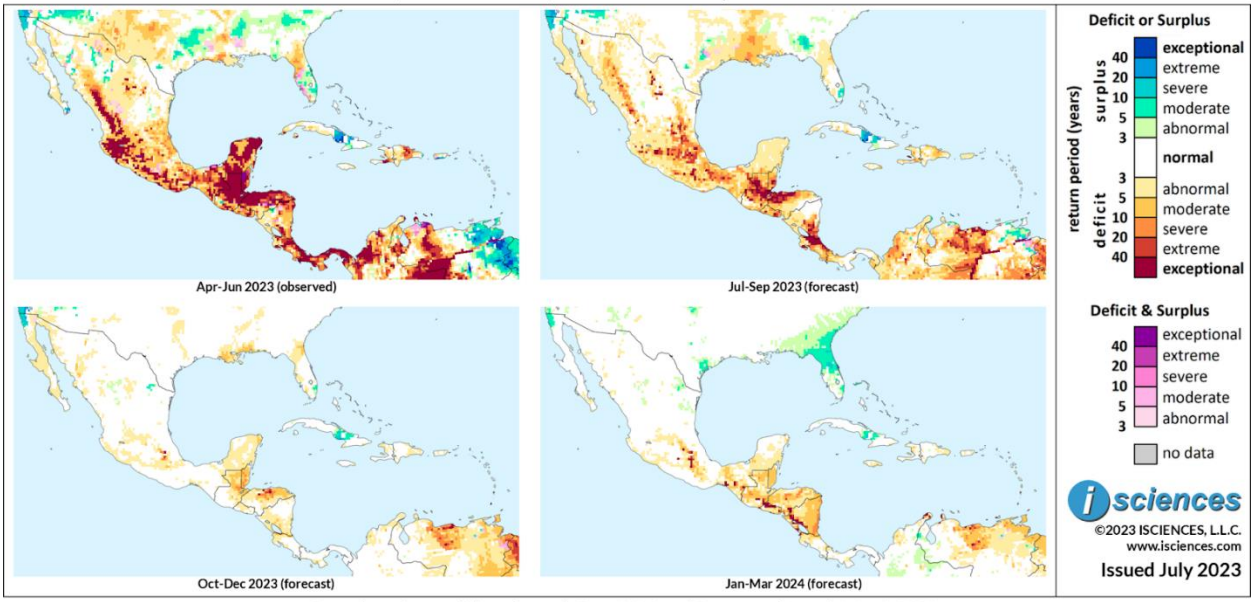
- Southeast **Mexico**, spread through the states of Yucatan and Campeche.
- South-central **Mexico**, appearing in pockets near Mexico City.
- Central **Guatemala**, continuing into southern to central **Belize.**
- Western **Honduras,** covering the Atlantida, Copan, Cortes, and Santa Barbara departments.
- Northern and southern **Nicaragua**, appearing in northernmost regions of the North Caribbean Coast Autonomous Region and in areas near Lake Cocibolca. These deficits continue into northern **Costa Rica.**

Severe deficits are expected to appear in the following areas:

- Northern **Belize**, appearing near Belize City and moving north into the Corozal District. **Haiti**, in coastal regions of the Ouest and Nippes departments.

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

ISciences Water Anomalies Forecast
Mexico, Central America, & the Caribbean: April 2023 - March 2024



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 expects intense deficits to continue in pockets throughout central and southern Mexico, with concentrated anomalies occurring in areas surrounding the city of Puebla, stretching both north and westward. Exceptional deficits will continue in central to northern Guatemala, and in northwestern Honduras. Isolated deficits of similar intensity are expected to appear in El Salvador and Belize, as well as in central to southern Nicuaragua and northern Costa Rica.

From October through December 2023, most intense anomalies in Mexico are expected to diminish. Anomalies in Central America are also expected to disappear, with the exception of extreme deficits persisting in north-central Honduras, near the city of Tocoa in the Colón department. Some moderate to severe deficits may continue throughout Belize and central Guatemala.

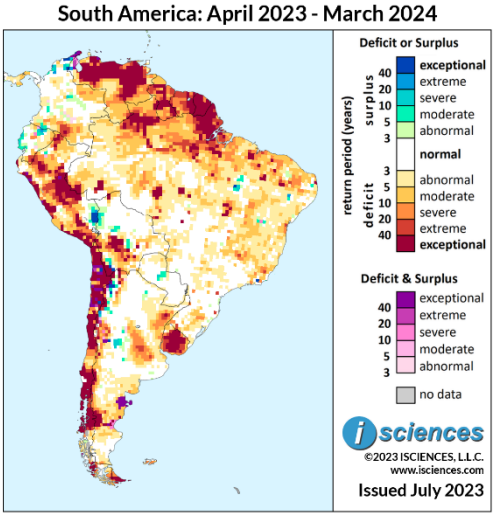
The forecast for the final months – January 2024 through March 2024 – forecasts exceptional deficits to reemerge near Mexico City, continuing southeast in pockets across the state of Chiapas into El Salvador and western Nicaragua. Much of the remaining regions in Central America can anticipate widespread moderate deficits, with some severe deficits along Nicuaragua's eastern coast.

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

South America

The forecast ending in March 2024 predicts that most of central South America will experience normal conditions, northern and southern regions of the continent will experience intense deficits of varying intensity.

ISciences Water Anomalies Forecast
South America: April 2023 - March 2024



Based on observed data through June 2023 and forecasts through March 2024

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.

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:

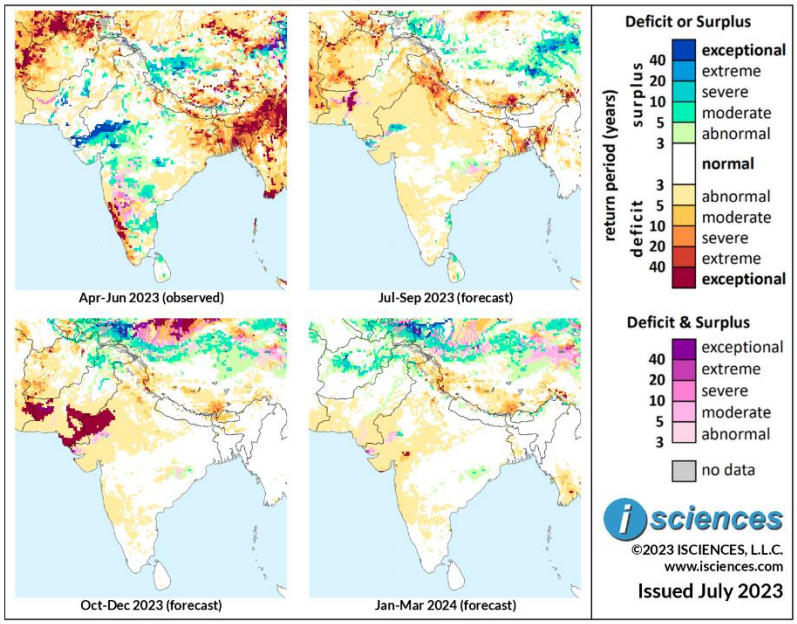
- Western coastal regions of **Ecuador** and **Peru**.

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.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 predicts that extreme to exceptional deficits in northern South America will increase in magnitude, stretching further across northeastern Colombia, northern Brazil, Venezuela, and into the Guianas. Similarly intense deficits will appear in pockets across eastern Brazil. In southwestern Bolivia, Paraguay, northern and central Argentina, and southern coastal regions of Uruguay, extreme to exceptional deficits are expected to occur.

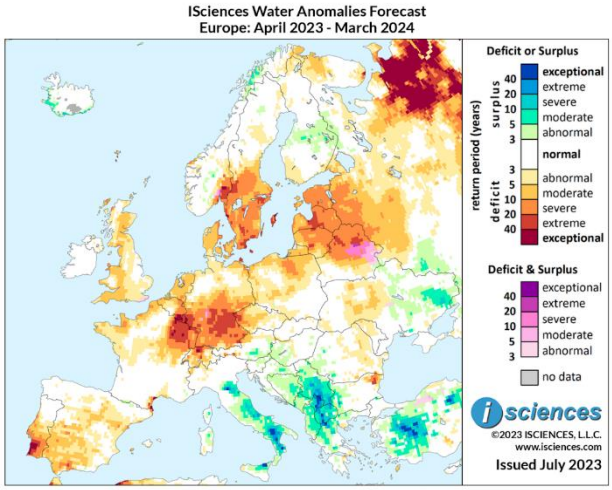
From October through December 2023, anticipates intense anomalies in central and southern South America to disappear, with deficits of severe to extreme intensity persisting in Guyana, Suriname, and nearby regions of northernmost Brazil. Deficits of moderate to severe intensity are predicted to linger in southwestern Bolivia and northern Chile.

The forecast for the final months – January 2024 through March 2024 – anticipates mostly normal conditions throughout the continent, with deficits persisting in the Guianas and northern Chile, but lessening in intensity. Similarly intense deficits are expected to emerge in central and southern Chile.

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

Europe

The forecast ending in March 2024 anticipates intense concentrations of deficit in isolated areas of northern and central Continental Europe, as well as similarly intense surpluses in southern Europe.



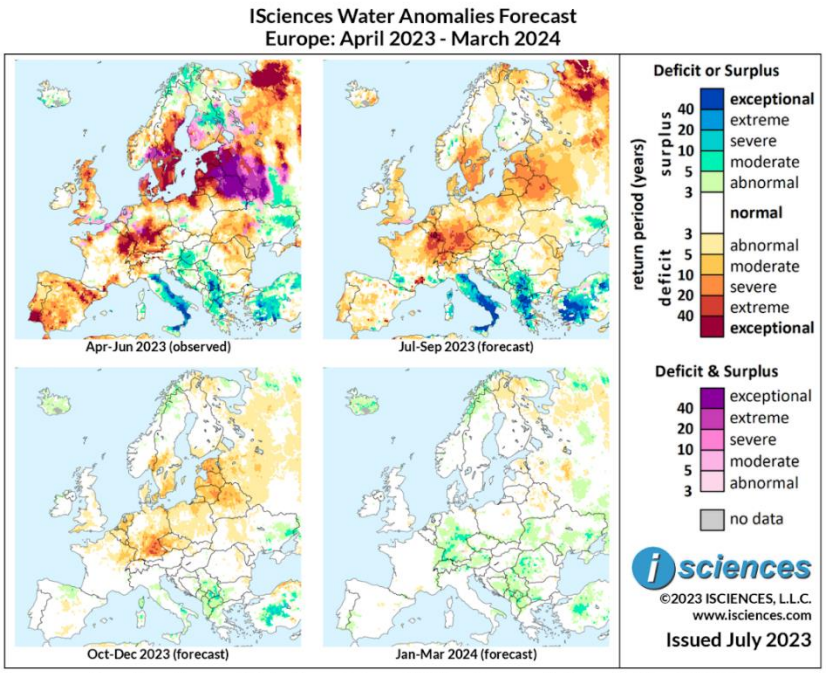
Severe to extreme deficits is expected in the following countries:

- Throughout the **Baltics** and continuing into northern **Belarus.**
- Southwest **Portugal,** near the city of Lisbon.
- Northeast **France** into southeastern **Belgium, Luxembourg,** and central **Germany.**
- Central to southern **Sweden**, appearing in Dalarna County and spreading far south into Skåne County, and eastern **Norway**, near the city of Oslo**.**
- Northern **Switzerland,** in areas west of Zurich.

Extreme to exceptional surplus is predicted to occur in the following regions:

- Western **Balkans**, spreading through **North Macedonia, Kosovo,** and southern **Serbia.** **Italy,** appearing throughout the Basilicata, Crotone, and Cosenza provinces, as well as near the city of Messina. These surpluses continue further north along Italy's eastern coast, expanding into areas near the city of Bologna.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 anticipates exceptional deficits in northeastern France, Luxembourg, and Belgium to increase in magnitude. Exceptional surplus throughout the Balkans, Italy, are expected to expand in magnitude and intensity, covering much of both regions in exceptional surplus. Additionally, moderate to severe deficits in the Baltics, Belarus, and southern Sweden are expected to continue.

From October through December 2023, most intense surpluses in Continental Europe are expected to disappear, though moderate to severe deficits will still remain in southeastern Germany and the Balkans. Deficits throughout Sweden, Belarus, and eastern Finland will linger but downgrade into mostly moderate anomalies.

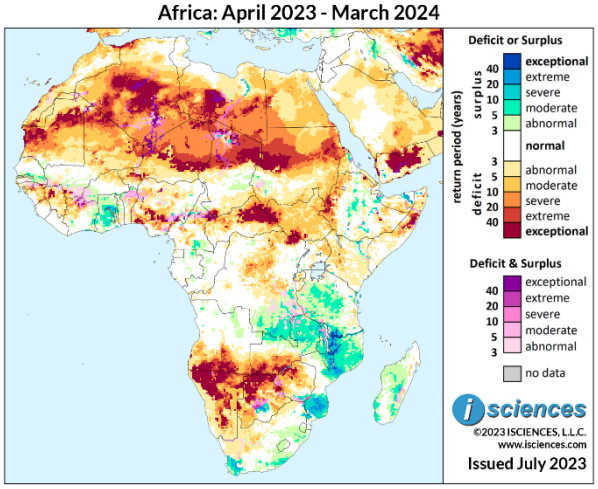
The forecast for the final months – January 2024 through March 2024 – anticipates that intense anomalies across Continental Europe will dissipate, becoming normal conditions and pockets of mild surplus.

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

Africa

The 12-month forecast ending in March 2024 indicates that intense deficits will continue throughout much of northern and southern Africa, with sparse instances of notable surpluses in the continent's southeastern countries.

ISciences Water Anomalies Forecast
Africa: April 2023 - March 2024



Based on observed data through June 2023 and forecasts through March 2024

Exceptional deficits are forecast in the following countries:

- Northern **Mauritania**, near the Fderik and Akjoujt departments, and into **Mali's** Salam region. Central **Algeria's** In Salah and Idles regions will also be affected, as well as west-central Libya, near the city of Sabha.
- Central **Niger**, in the country's Zinger Region, continuing near **Chad's capital of Fada** and into **Sudan**'s Al Malha region.
- **Nigeria**, near the state of Enugu, and into the Yalinga region of northeastern the **Central African Republic**.
- Southern **Angola,** along the country's southern border, expanding into pockets throughout **Namibia, Botswana,** and **Zambia.**

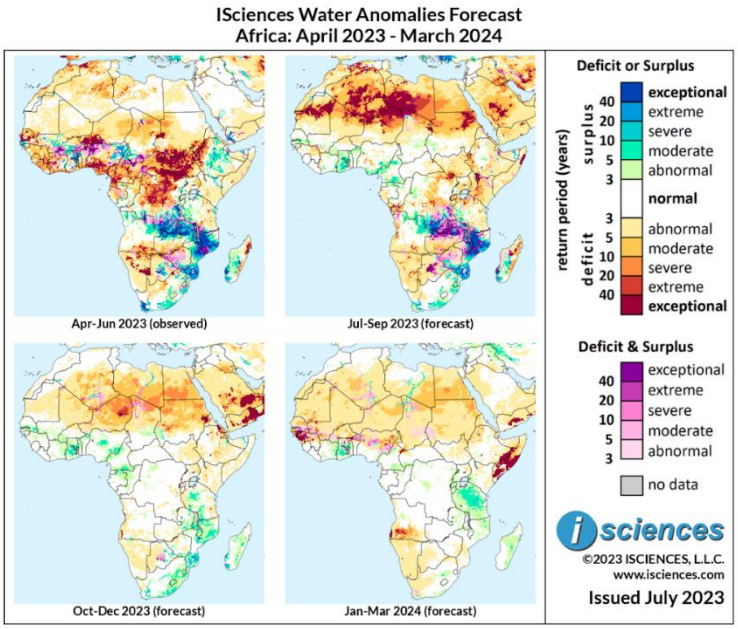
The following countries can anticipate severe to extreme deficits:

- **Zimbabwe**, throughout much of the country's northern and central areas.
- Northern **Niger**, throughout the Bilma region, continuing into the Tibesti Ouest region of **Chad**, and the Kufra District in southeastern **Libya.**
- Northwest **Sudan**, in the Halfa district.

Severe to extreme surplus is expected to appear in:

- Southern **Tanzania**, in regions along the country's southern border.
- Northern and southern **Mozambique,** spreading into regions throughout the Muembe District and surrounding areas. These anomalies continue further south in the Gaza and Moamba provinces.
- Eastern **Zambia**, in the country's northern province.
- **Ghana**, with severe surplus occurring throughout the country.

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



Based on observed data through June 2023 and forecasts through March 2024

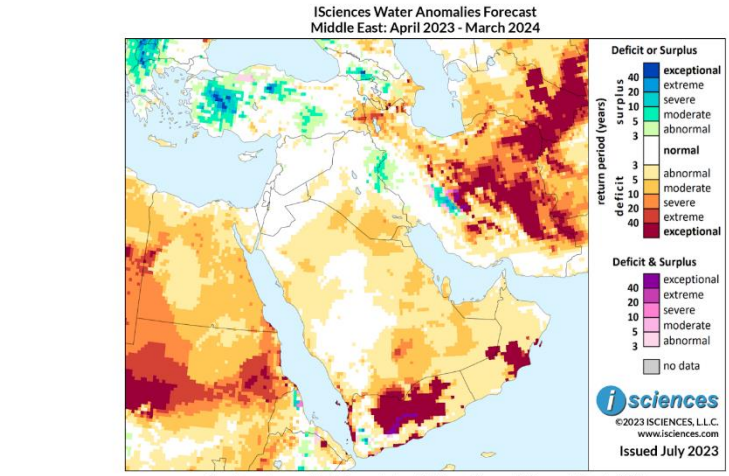
The forecast through September 2023 indicates that exceptional deficits in north-central Mauritania, Algeria, northern Niger, and southwestern Libya will persist and slightly expand. Northern Mozambique may observe widespread exceptional surplus, as well as southernmost areas of the Democratic Republic of Congo, with intense transitional conditions in northeastern Zambia to persist. Central Botswana can expect similarly intense transitional conditions. Madagascar is expected to observe intense anomalies of varying degrees, with exceptional surplus appearing in southwestern coastal regions, and exceptional deficits in northeastern coastal regions.

From October through December 2023, many intense anomalies are expected to lessen in severity, though extreme to exceptional deficits are predicted to occur in east-central Niger and eastern Sudan. A notable surplus anomaly of moderate to severe intensity is expected in southern Mozambique, with lesser intense anomalies spreading in northern Mozambique, eastern South Africa, Ghana, and southwestern coastal regions of Madagascar.

The forecast for the final months – January 2024 through March 2024 – anticipates most intense anomalies to continue to subside, though some exceptional deficits will emerge in the Horn of Africa, western Guinea, and southwestern Angola.

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

Middle East



Based on observed data through June 2023 and forecasts through March 2024

The forecast ending in March 2024 anticipates mostly normal conditions throughout much of the Middle East, but Iran, as well as countries in the region's southern areas, are expected to experience pockets of exceptional deficits. Some notable surplus is anticipated in isolated regions of Turkey.

Exceptional deficits are forecast in the following countries:

- **Yemen**, throughout the Hadhramaut Governorate and in western coastal regions near the town of Al Luhayyah.
- **Oman**, widespread within the Al Wusta Governorate.
- **Iran,** throughout much of the country's central, eastern, and northeastern regions.

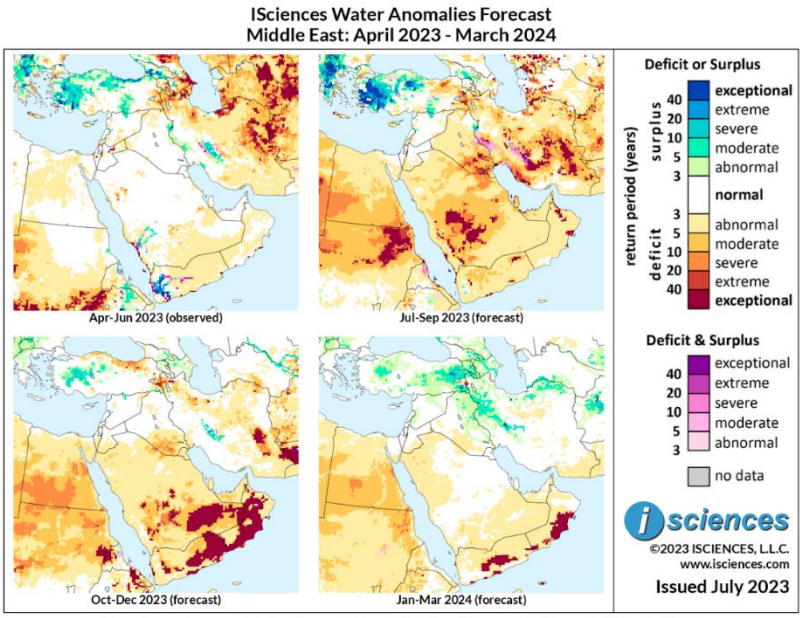
Severe to extreme deficits are expected in the following areas:

- Eastern **Turkey,** in regions near Van Lake.
- Western **Iran,** north of Lake Urmia.

Severe to extreme surplus is expected to appear in:

- Western **Turkey**, with the most intense anomalies occurring in the Manisa Province and surrounding areas.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 anticipates exceptional deficits in west-central Saudi Arabia to emerge near the region of Al Quwayiyah, while similar anomalies are expected to disappear in Yemen and Oman. Southern Iraq and central to southeastern Iran are predicted to experience severe to extreme deficits, as well as coastal areas of Iran near the Persian Gulf. In western Turkey, extreme to exceptional surplus will continue.

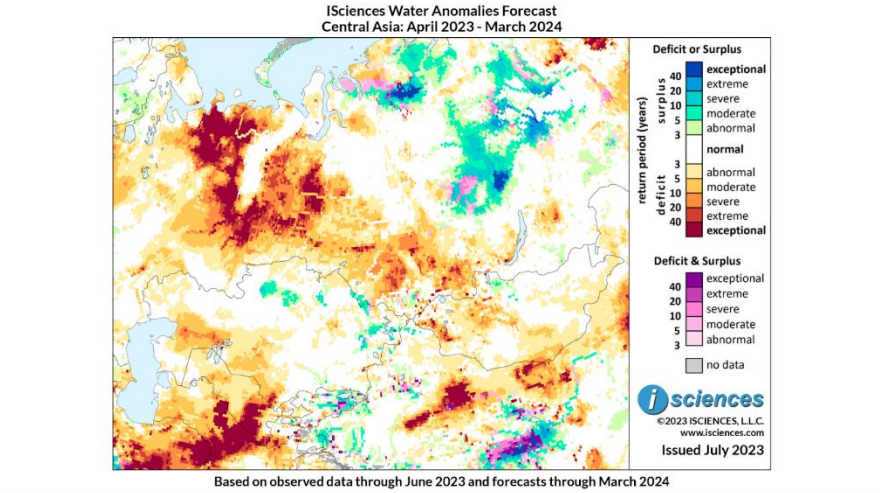
From October through December 2023, exceptional deficits are expected to expand in Yemen and Oman, covering much of eastern Yemen and the majority of Oman. Deficits in Saudi Arabia's Al Quwayiyah region will disappear, but similarly intense anomalies are expected to emerge in the country's Al Udeid region. Moderate to severe deficits may emerge in southern Iraq, as well as in northern coastal regions of Turkey.

The forecast for the final months – January 2024 through March 2024 – conditions are expected to be mostly normal, with some instances of mild anomalies throughout the region. Exceptional deficits in central Yemen and Oman are expected to diminish in magnitude but persist. Moderate to severe surplus is expected to reemerge in eastern Turkey, spreading into western regions of Iran, Armenia, and eastern Georgia.

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

Central Asia and Russia

The forecast ending in March 2024 anticipates widespread deficits of varying intensity in western and southwestern Russia, with northern and central regions of Russia experiencing small, isolated areas of notable surplus. Intense deficits are expected in most eastern Central Asian regions.



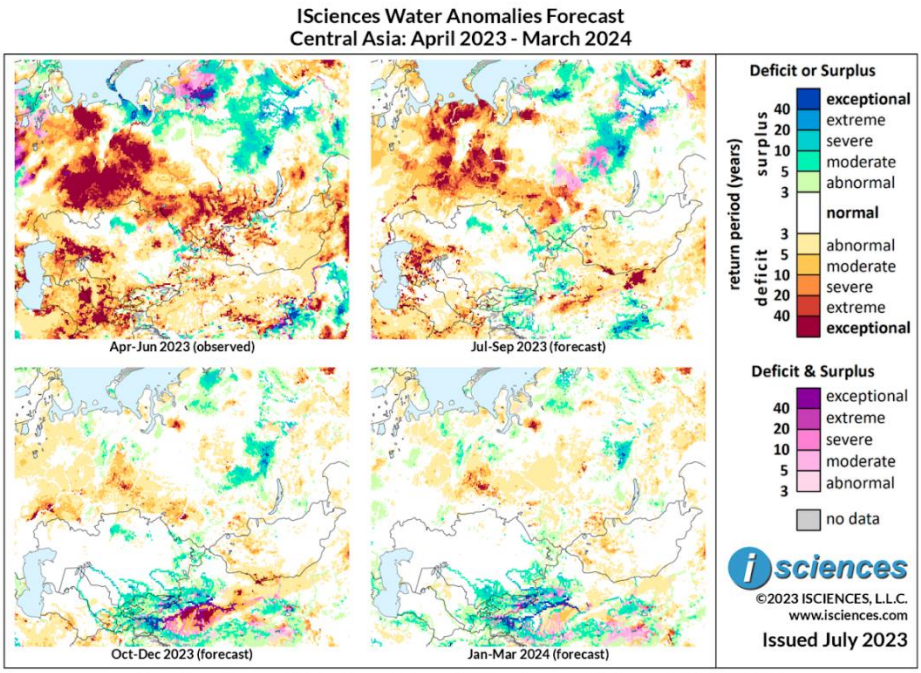
Exceptional deficits are forecast in the following areas:

- Northwestern **Russia**, throughout the Nenets Autonomous Okrug, Khanty-Mansi Autonomous Okrug, and the Komi Republic, continuing south into southern regions of the Sverdlovsk Oblast.
- Southern **Russia**, appearing in pockets across Irkutsk Oblast and the Tuva Republic.
- Easternmost regions of **Turkmenistan** and **Uzbekistan**.

A mixture of extreme to exceptional surplus and mild transitional conditions are expected in:

- Northern **Russia**, in western areas of the Taymyrsky Dolgano-Nenetsky District in the Krasnoyarsk Krai region.
- Central **Russia**, in areas throughout the Katangsky District, and into southern portions of the Sakha Republic.
- Eastern **Kyrgyzstan**, in areas south of the Issyk Kul Lake.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 anticipates exceptional deficits in western Russia, particularly near Nenets Autonomous Okrug and Khanty-Mansi Autonomous Okrug, are expected to persist, but slightly decrease in magnitude. Similar anomalies in Southern Russia across Irkutsk Oblast and the Tuva Republic are expected to remain, but similarly diminish in size. Sparse but concentrated areas of surplus are also expected to remain in central Russia, throughout the Katangsky District, and into southern portions of the Sakha Republic. Further south, intense deficits in Turkmenistan and Uzbekistan are expected to disappear.

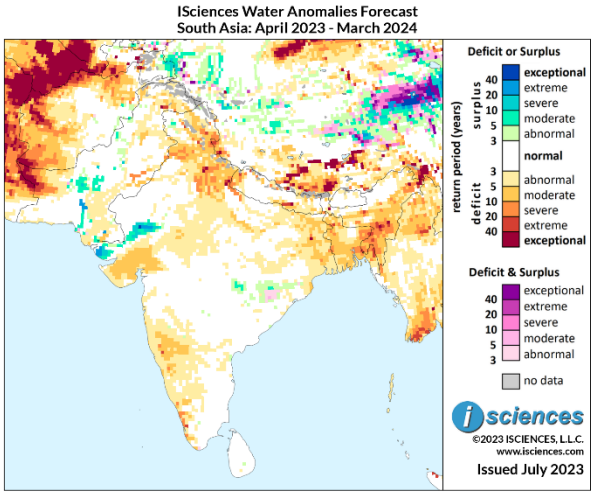
From October through December 2023, most notable deficits across Russia will decrease in severity, with most anomalies becoming mild. However, intense deficits are expected to remain in central areas of the Tyumen Oblast, as is intense surplus occurring in Central Russia, and across Kyrgyzstan and Tajikistan.

The forecast for the final months – January 2024 through March 2024 – indicates that anomalies across Russia and Central Asia will continue, with isolated deficits in western Russia near the Tyumen Oblast, and intense surplus occurring across Central Russia, Kyrgyzstan, and Tajikistan.

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

South Asia

The 12-month forecast ending in March 2024 indicates that while most of South Asia can expect normal conditions and mild anomalies, some regions will experience intense, concentrated areas of deficit.



Based on observed data through June 2023 and forecasts through March 2024

Exceptional deficits are predicted in:

- Western **Afghanistan,** in northwestern areas of the Herat province, as well as western portions of the Chahar Burjak District.
- Western **Pakistan**, in the westernmost areas of the Taftan region.

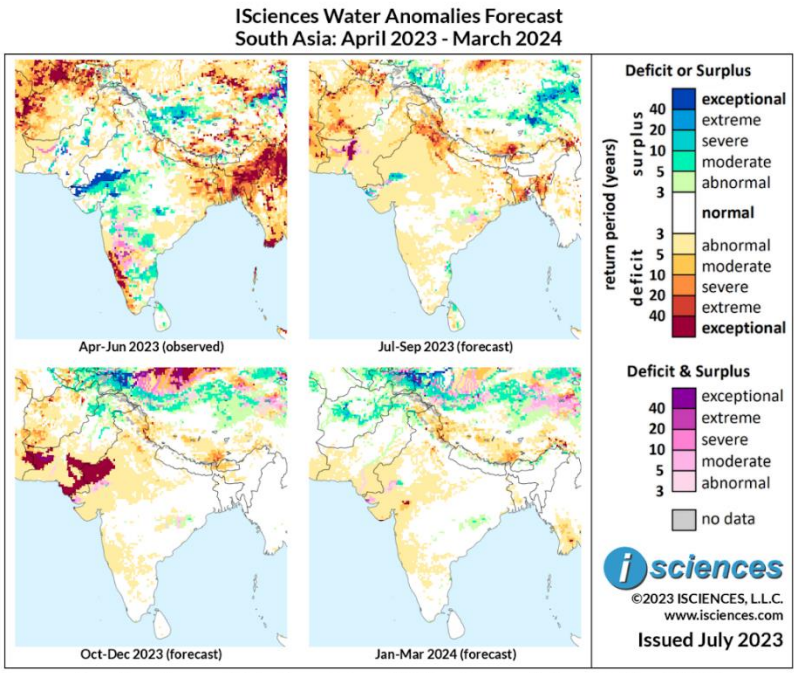
The following areas are expected to experience severe to extreme deficits:

- North **India,** appearing in the provinces of Punjab, Uttarakhand, and western Uttar Pradesh. These anomalies continue across the border into western **Nepal**, near the Dogadakedar region.
- Easternmost **India,** in the Manipur, Tripura, and Mizoram provinces, continuing into regions along the eastern border of **Bangladesh.**

Severe to extreme surplus is expected to appear in the following areas:

- West-central **India**, in western coastal regions of the province of Gujarat, continuing further inland into southern regions of the Rajasthan province.
- Central **Pakistan,** near the city of Khuzdar.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 expects extreme deficits to continue in northern and easternmost India, as well as southern Bangladesh. South-central and northern Afghanistan can expect similarly intense deficits to persist, while west-central Pakistan is forecast to observe a small concentrated area of intense transitional conditions in central areas of the Balochistan province.

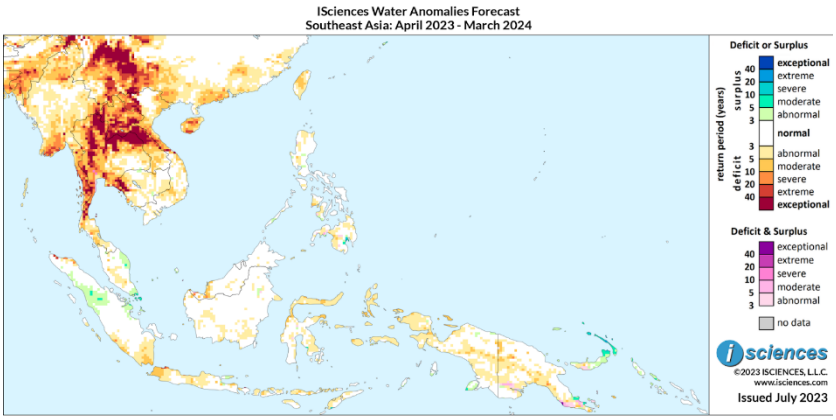
From October through December 2023, much of the region is expected to experience a mixture of normal conditions and mild anomalies. However, exceptional deficits are expected to emerge along western India and eastern Pakistan's border.

The forecast for the final months – January 2024 through March 2024 – expects intense anomalies throughout the region to disappear, with mild anomalies and normal conditions covering much of India. Some moderate to severe surplus is predicted to linger in central Afghanistan.

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

Southeast Asia and the Pacific

The forecast ending in March 2024 indicates that while much of Indonesia and the rest of the Pacific can anticipate mild anomalies and normal conditions, Mainland Southeast Asia is expected to experience widespread severe to exceptional deficits throughout much of the region.



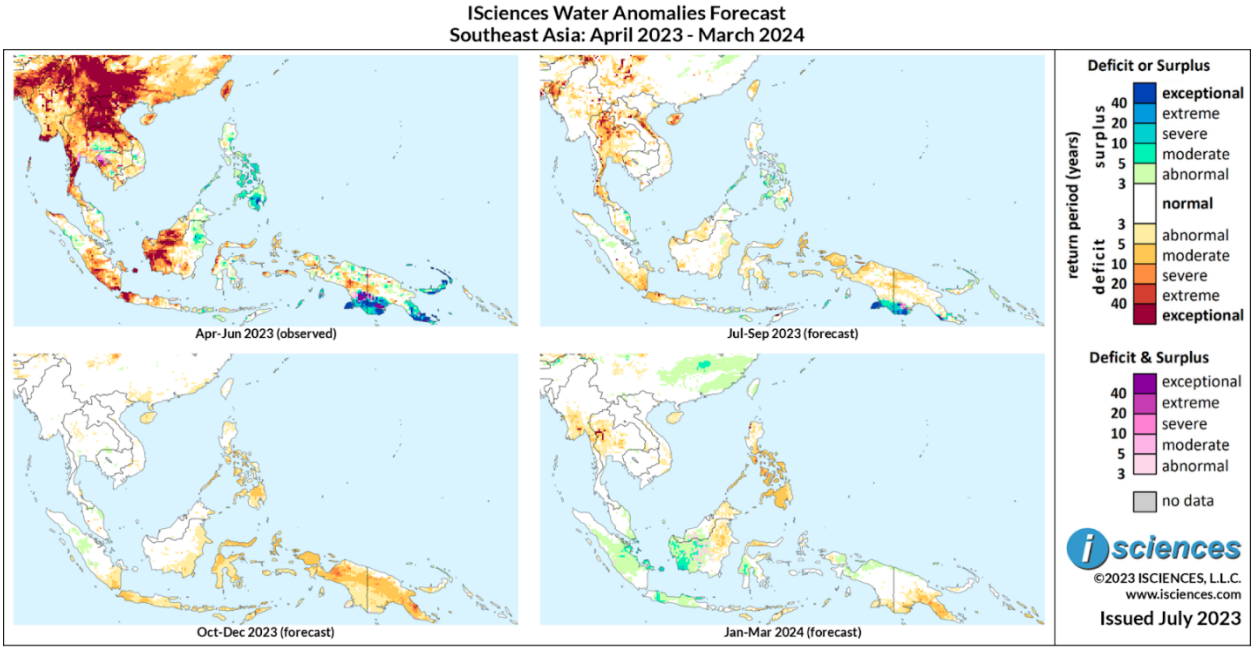
Exceptional deficits are predicted in:

- Northern and western **Thailand**, appearing throughout the Chiang Rai, Phayao, and Nan provinces, as well as throughout the Phrae province, continuing south into Central **Myanmar**.
- Central **Laos**, within the Bolikhamsai and Khammouane provinces, and the Vientiane Prefecture, which expands into the Loei, Nong Khai, Udon Thani, Sakon Nakhon, and Bueng Kan provinces of northeastern **Thailand**.
- Western **Cambodia**, in areas near the Roneam Daun Sam Wildlife Sanctuary.
- Northern **Vietnam,** across the Son La and Dien Bien provinces.

The following areas are expected to experience severe to extreme deficits:

- Central **Vietnam,** near the city of Vinh.
- Northern and southern **Myanmar**, near the Manton region and southern coastal regions of the Ayeyarwady Division.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 anticipates exceptional deficits across Mainland Southeast Asia to decrease in severity and magnitude, but continue in northern Thailand, northern Vietnam, and central coastal regions of the Gulf of Thailand. Small coastal areas in western Java can expect deficits to linger, as well as in southern Sumatra. In southernmost Papua and Papua New Guinea, extreme to exceptional surplus is expected to persist, but over a smaller area.

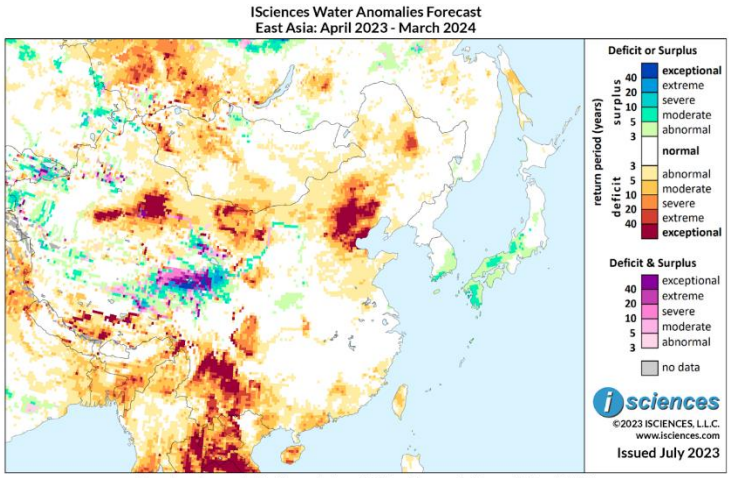
From October through December 2023, much of mainland Southeast Asia is predicted to observe normal conditions. Some occurrences of moderate to severe deficits are expected in various islands of Indonesia, including western Java, Sulawesi, and throughout the Banda Arc. Additionally, moderate to severe deficits in Papua and Papua New Guinea are expected to emerge.

The forecast for the final months – January 2024 through March 2024 – anticipates continued normal conditions in Mainland Southeast Asia, with the exception of exceptional deficits reappearing in western Thailand. Most Indonesian islands can expect mild to moderate surpluses, and the Philippines can expect widespread moderate deficits, as well as southern Papua New Guinea.

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

East Asia

The forecast ending in March 2024 anticipates pockets of intense anomalies in various regions of China, with exceptional deficits occurring in northern and southern provinces, and a notable mixture of surplus and transitional conditions in some central provinces.



Based on observed data through June 2023 and forecasts through March 2024

Exceptional deficits are forecast in the following areas:

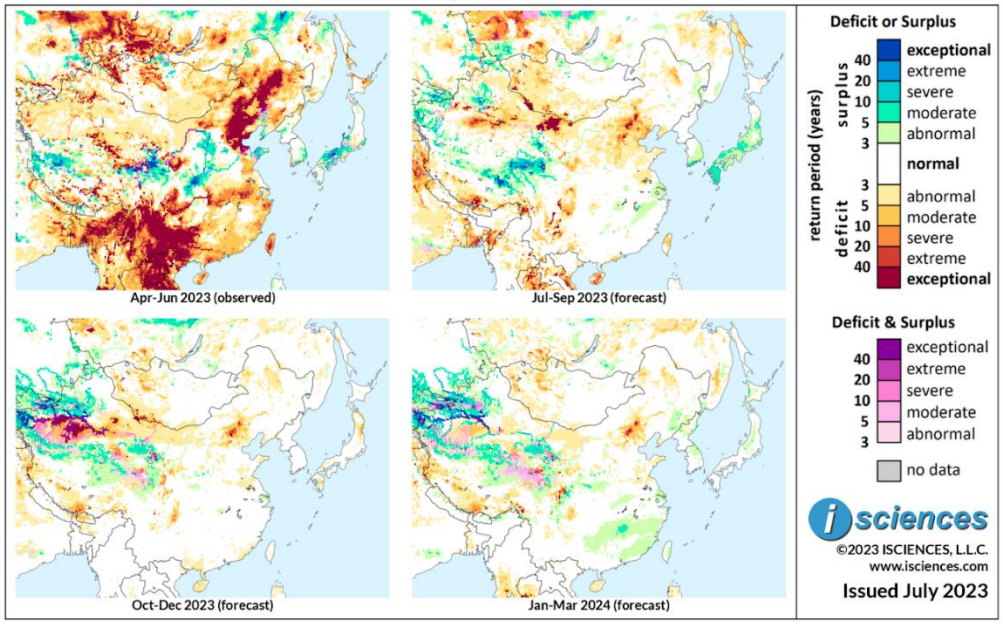
- Eastern **China**, in northeastern and central regions of the Hebei province, and northeastern regions of Inner Mongolia. Similarly intense deficits are expected in eastern areas of the Ejin Banner.
- Western **China,** in eastern regions of the Yizhou province.
- South **China,** throughout the Yunnan province, and in eastern portions of the Sichuan province. Further west, similarly intense deficits are expected in southwestern Tibet.

A mixture of extreme to exceptional surplus and transitional conditions are expected in:

- Central **China,** throughout southern portions of the Qinghai province and expanding eastern into northwestern Sichuan.

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

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 indicates that most of the exceptional deficits in southern and northern regions of China will disappear, with isolated events of exceptional deficits lingering near the Alxa League and the Chifeng regions of Inner Mongolia. Extreme to exceptional surpluses are expected to linger in southern areas of the Qinghai province, as well as northwestern Sichuan, with transitional conditions disappearing. Severe to extreme surpluses are expected throughout southern and central Japan.

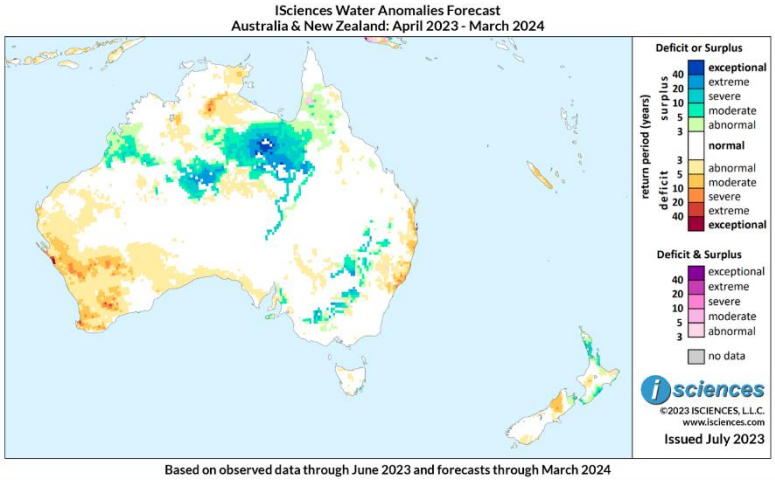
From October through December 2023, exceptional deficits are expected to appear in northern regions of the Aksu Prefecture of Xinjiang, with some instances of exceptional surplus occurring along the southern border of Zhaosu County. Some moderate surplus is expected in Kalpin County and its surrounding areas.

The forecast for the final months – January 2024 through March 2024 – most intense anomalies are expected to dissipate, with some intense surpluses emerging in northwestern China, near western regions of the Xinjiang province.

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

Australia and New Zealand

The 12-month forecast ending in March indicates that intense surpluses will lessen in size and severity in southeastern Australia, but will appear in north-central Australia. Intense deficits will emerge in southwestern and eastern coastal regions of the continent.



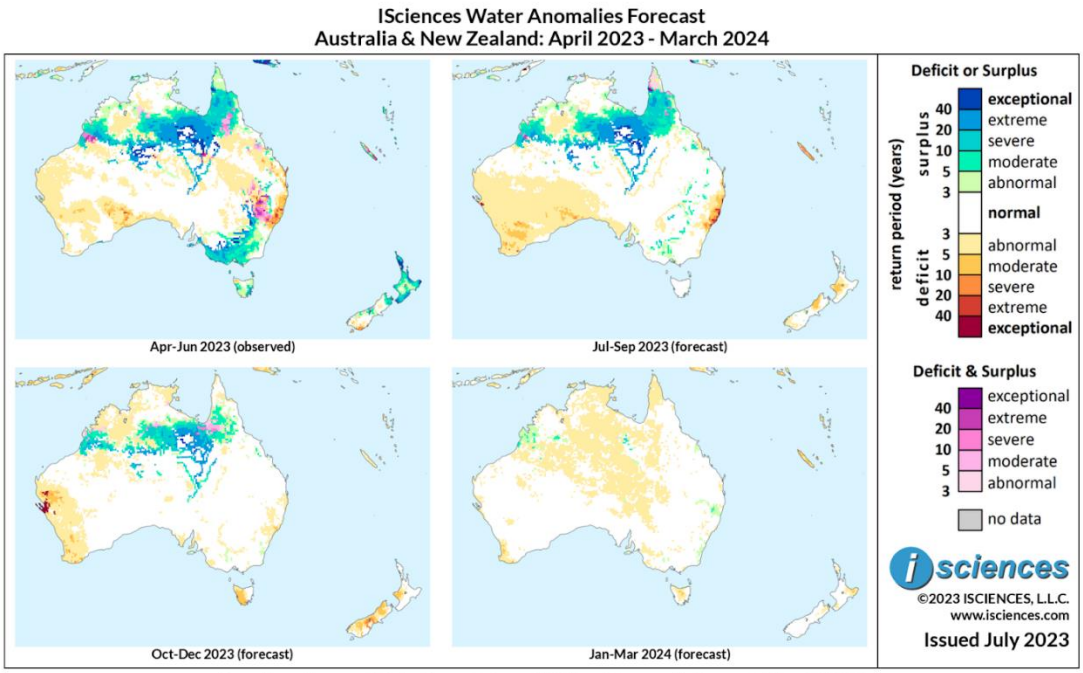
Severe to exceptional surplus is expected in the following regions:

- Eastern **Northern Territory,** in areas within the Tablelands and Ranken localities.
- Western **Queensland,** spreading southeast into the Shire of Boulia and near the Munga-Thirri National Park.
- South-central **New South Wales**, spreading in pockets in the Riverina region, moving southwest into northwestern **Victoria**.

Severe to extreme deficits are anticipated in:

- Westernmost **Western Australia**, appearing along the coast of the Indian Ocean, in coastal regions of the Tamala area. Severe anomalies continue further inland, continuing into the Shire of Sandstone.
- Southwestern **Western Australia,** in coastal regions near the Wilyabrup locality. These anomalies reappear further inland, north of Bremer Bay.
  Eastern **Queensland,** in coastal regions near the Mid-Coast Council area, continuing further north into areas near Brisbane.

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



Based on observed data through June 2023 and forecasts through March 2024

The forecast through September 2023 anticipates existing extreme surpluses in the Northern Territory to expand east, appearing throughout the Cape York Peninsula, and west, near the Drysdale River National Park. Extreme surpluses are also expected to move further north, spreading into regions throughout the Gulf of Carpentaria. Intense deficits are expected to persist in coastal regions of eastern Queensland within the Mid-Coast Council area.

From October through December 2023, intense surpluses in the Northern Territory, as well as in northern Western Australia, are expected to continue, though will slightly diminish in size. Deficits in eastern coastal regions of Queensland will disappear, though deficits on the western coast of the continent will continue, with exceptional deficits appearing within the Tamala area. In non-contiguous areas, western Tasmania can expect moderate to severe deficits, as well as southern to central New Zealand.

The forecast for the final months – January 2024 through March 2024 – anticipates most intense anomalies to disappear in both Australia and New Zealand, with normal conditions and mild anomalies across central Australia.

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