Global Water Monitor & Forecast Watch List

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For more information, contact:
Thomas M. Parris, President, 802-864-2999, parris@isciences.com

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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 1-9 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 is 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 January 2018 and an ensemble of forecasts issued the last week of January 2018. 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.

All maps have half-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 in a given month. These cases are depicted on the maps in shades of purple, with the more extreme value (deficit or surplus) used to determine the shade.

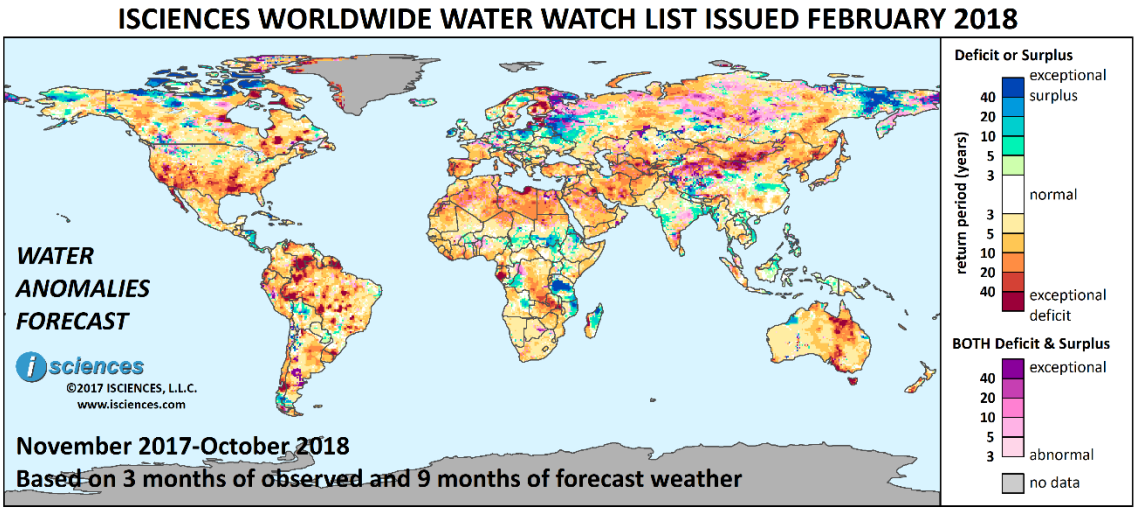
Deficits and surpluses are stated in terms of return period – a measure that characterizes the rarity of an anomaly. For example, a return period of 10 years indicates an anomaly that would occur, on average, once every ten years. Higher return periods indicate more extreme and, therefore, more disruptive anomalies. 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. Return period is computed by comparison to cell-specific distributions of data from 1950 through 2009.

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 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 judgement 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 November 2017 and running through October 2018 using 3 months of observed temperature and precipitation data and 9 months of forecast data.



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: The forecast for the next few months indicates relief from exceptional water deficits observed during the prior three months in the West and the Lower Mississippi states. However, widespread deficits remain in the forecast from California to the Mississippi, and from the Gulf of Mexico northward along the Eastern Seaboard through Massachusetts. Deficits will be especially intense in New Mexico, Missouri, and Virginia. Surpluses are forecast for Washington, Idaho, western Montana, and along the Missouri and Yellowstone Rivers. The widespread distribution of deficits is expected to persist through July or longer.

Canada: The forecast through April indicates water conditions much the same as in the prior three months, with some overall shrinkage of anomalies in the eastern half of the country. One notable difference is the emergence of widespread intense surplus conditions in southern British Columbia. After April, much of the eastern half of the country will transition to deficit, retaining exceptional deficits in eastern Quebec, central Quebec, and the central Quebec/Ontario border. Deficits in the western provinces will diminish slightly, and intense surpluses will persist in parts of southern BC.

Mexico, Central America, and the Caribbean: In the next few months, exceptional water deficits will retreat in northwestern Mexico but persist in southern Baja and emerge in Nayarit. Severe deficits are forecast in the north-central states and along the Rio Grande. Some pockets of surplus are expected in

southern Mexico and northern Guatemala, and more intense surpluses in Honduras, Nicaragua, and Costa Rica. Severe deficit is forecast for western Cuba and the Bahamas. After April, deficits will downgrade in southern Baja and surpluses will emerge in western Mexico from Durango into Oaxaca.

South America: Exceptional water deficits are forecast to diminish considerably in the coming months, but pockets are forecast through April in southern Venezuela, Amapá (Brazil), western Brazil, western Ecuador, and around the Gulf of Corcovado in southern Chile. Deficits are also forecast in southern Colombia, northern Peru, Uruguay, Rio Grande do Sul (Brazil), and northeastern Argentina. Surplus is forecast in northeastern Venezuela, scattered throughout eastern Brazil, northern Bolivia, and eastern Paraguay. After April, the extent of anomalous water conditions will shrink.

Europe: Exceptional water surpluses will retreat but widespread surpluses will persist in European Russia and in parts of Central and Eastern Europe. Surpluses will emerge in southern Norway and northern Sweden. Intense deficits will persist in Estonia, Latvia, central Finland, and central Sweden. Deficits in southern France and the Mediterranean are expected to moderate but severe deficits will continue in Portugal, and deficits will emerge in Albania and eastern Greece. After April, much of Central and Eastern Europe will transition away from surplus to moderate deficit, joining southern Europe.

Africa: A notable improvement is forecast for southern Africa and the Horn of Africa where conditions will transition from intense to mild water deficit. Intense deficits are, however, forecast scattered across the southern Sahara and the Sahel, and in a stretch from southern Democratic Republic of the Congo through eastern Zambia into Malawi. Deficits of varying severity remain dominant in many other regions, but surpluses are forecast for northeastern South Sudan and Tanzania, and will be exceptional in Tanzania. After April, severe deficits will emerge across northern Africa and will persist in Zambia.

Middle East: Widespread exceptional water deficits are expected to moderate considerably through April, though deficits reaching extreme intensity are forecast in southeastern Iran. After April, deficits will increase overall in extent and severity, and are expected to be especially intense in Iran from the Persian Gulf to the Afghan border, and in southern Iraq near Basrah. Moderate deficits will emerge in Azerbaijan.

Central Asia and Russia: Exceptional water surplus in European Russia will shrink and downgrade, though widespread surpluses will continue to emerge and will remain intense from St. Petersburg to the Rybinsk Reservoir and in Murmansk. Exceptional surpluses will emerge in the Vakh River Basin stretching east across the Yenisei River between the Angara and Podkamennaya Tunguska Rivers. Deficits near Yekaterinburg will upgrade, deficits around Yamal will downgrade, and deficits in Turkmenistan and Uzbekistan will moderate. Kazakhstan will transition from surplus to deficit. After April, much of the region will transition to deficits of varying severity.

South Asia: Intense water deficits will persist in central India through April, after which a transition to surplus is forecast stretching coast to coast across the country's middle. Until the transition, deficits will be extreme in Madhya Pradesh, western Chhattisgarh, western Karnataka, and eastern Andhra Pradesh, and moderate deficits will emerge in Odisha, Telangana, and southern Tamil Nadu. Intense surplus will

persist in Bangladesh, nearby Indian states, and Nepal. Deficits in Afghanistan will downgrade but persist, as will deficits in northern Sri Lanka.

Southeast Asia and the Pacific: Exceptional water deficits will persist in western Cambodia through April. Deficits of varying severity are expected in Sumatra, Java, western Borneo, and Papua New Guinea. Intense surpluses are forecast for western and eastern Myanmar, northern Laos, along the Mekong River until it reaches Cambodia, and central Philippines. Surpluses are also forecast for Vietnam, pockets of Thailand, Brunei, and northeastern Borneo. After April, surpluses will retreat, Cambodia will transition to near-normal, and deficits are expected in Malaysia, Sumatra, and western Borneo.

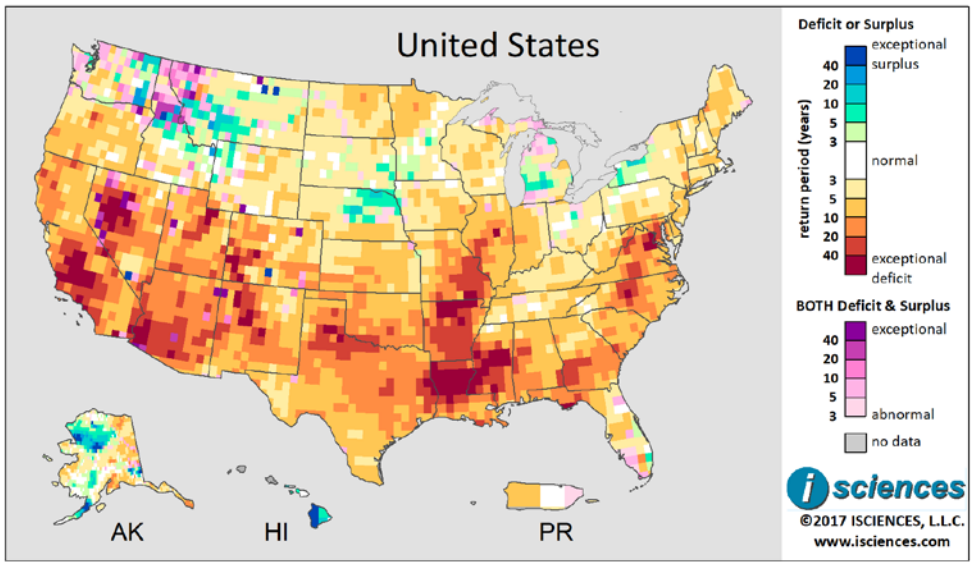
East Asia: Exceptional water deficits will increase in Mongolia and China through April, creating a vast stretch from Xinjiang through Inner Mongolia. Exceptional deficits will emerge in Liaoning and extreme deficits in Hunan. Deficits are forecast to spread on the Korean Peninsula and may be intense near Seoul. Conditions of intense surplus remain in the forecast from Shanghai west through the Han River (Hanjiang) watershed, and exceptional surpluses will continue to emerge in northern Sichuan and Qinghai. Moderate to severe surpluses will continue to emerge around the Gulf of Tonkin and in Hainan.

Australia: Widespread, exceptional water deficits observed in recent months in Australia are forecast to nearly disappear, though intense deficits will persist in Tasmania and near Busselton, WA. Through April, primarily moderate deficits are forecast from the Eyre Peninsula in South Australia through much of Victoria and into New South Wales; for central Queensland to the Gulf of Carpentaria; and, northwest to Darwin, where deficits may be more severe. Deficits are expected to retreat significantly in New Zealand, but will continue to emerge in New Caledonia.

Watch List: Regional Details

United States

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

The 12-month forecast indicates widespread intense water deficits across much of the southern two-thirds of the nation, reaching from California to Maryland. Deficits are expected to reach exceptional severity – a return frequency of 40 years or more – in central California, western Nevada, northern Arkansas, northern Louisiana, and central Mississippi.

Primarily moderate deficits are forecast for Oregon, northeastern North Dakota, northwestern Minnesota, central Wisconsin, New Jersey, eastern Massachusetts, and Maine.

Moderate surplus conditions are forecast for southwestern Montana, northeastern Nebraska, central Michigan, and western New York. Both deficits and surpluses are expected in Washington, northern Idaho, and northwestern Montana.

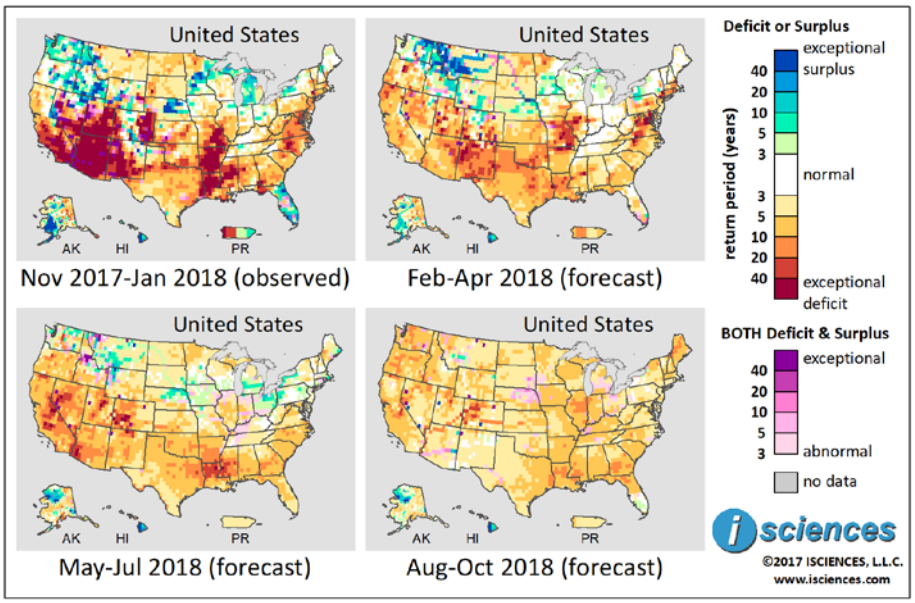
Outside the contiguous US, surpluses are forecast for northwestern Alaska and the northern half of the Alaskan Peninsula, and some deficits in the eastern half of the state; surpluses are forecast in Hawai'i, which may be exceptional in the western half of the Big Island; and, moderate deficits are forecast for western Puerto Rico.

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

The near-term forecast – February through April – shows significant relief from widespread exceptional deficits observed during the prior three months in the West and the Lower Mississippi states, as deficits downgrade somewhat overall. However, deficits of varying severity remain in the forecast from

California to the Mississippi, and from the Gulf of Mexico northward along the Eastern Seaboard through Massachusetts. Severe to extreme deficits may be especially pervasive in New Mexico, Missouri into central Illinois, and Virginia. Relatively normal water conditions are expected in the Great Lakes States, the Ohio River Valley, and in the Northeast. Deficits will emerge in Oregon and persist in North Dakota and northwestern Minnesota. Surpluses will continue to emerge in eastern Washington, Idaho, and western Montana and along the Missouri and Yellowstone Rivers, and may be exceptional in western Montana.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

From May through July, deficits will spread in the West, and will upgrade in severity to extreme – a return period of 20 to 40 years – in central California, western Nevada, southwestern Arizona, northeastern Utah, and southwestern Colorado. Primarily moderate deficits will continue to emerge across southern states, emerging in Florida and reaching northward through Maryland. Deficits are expected to be extreme in northern Louisiana, spreading into surrounding states. Deficits in southern Illinois and in Missouri will moderate. Surpluses in the Northwest will diminish but moderate surpluses will continue to emerge in south-central Montana. Moderate surplus will also persist in northeastern Nebraska and will emerge in southern Michigan and northeastern Ohio into Pennsylvania and New York.

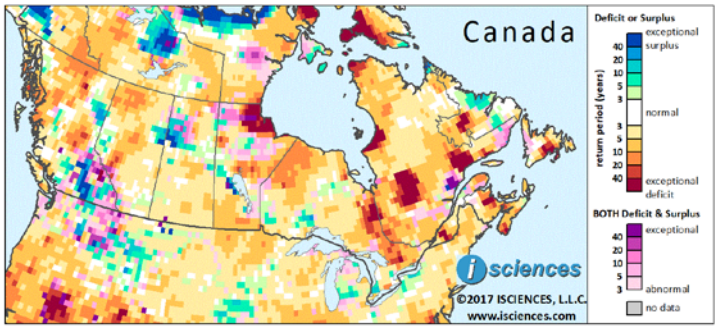
The forecast for the final months – August through October – indicates moderate deficits throughout much of the country with some areas of greater severity.

(It should be noted that forecast skill declines with longer lead times.)

Canada

The 12-month outlook for Canada through October 2018 (right) indicates exceptional water deficit in: southeastern Newfoundland; eastern New Brunswick; western Labrador around Churchill Falls; eastern Quebec at the mouth of the St. Lawrence River near Sept-Îles; southern Quebec near Sherbrooke; central Quebec; along the central Quebec/Ontario border; and on the southeastern and southwestern shores of Hudson Bay.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



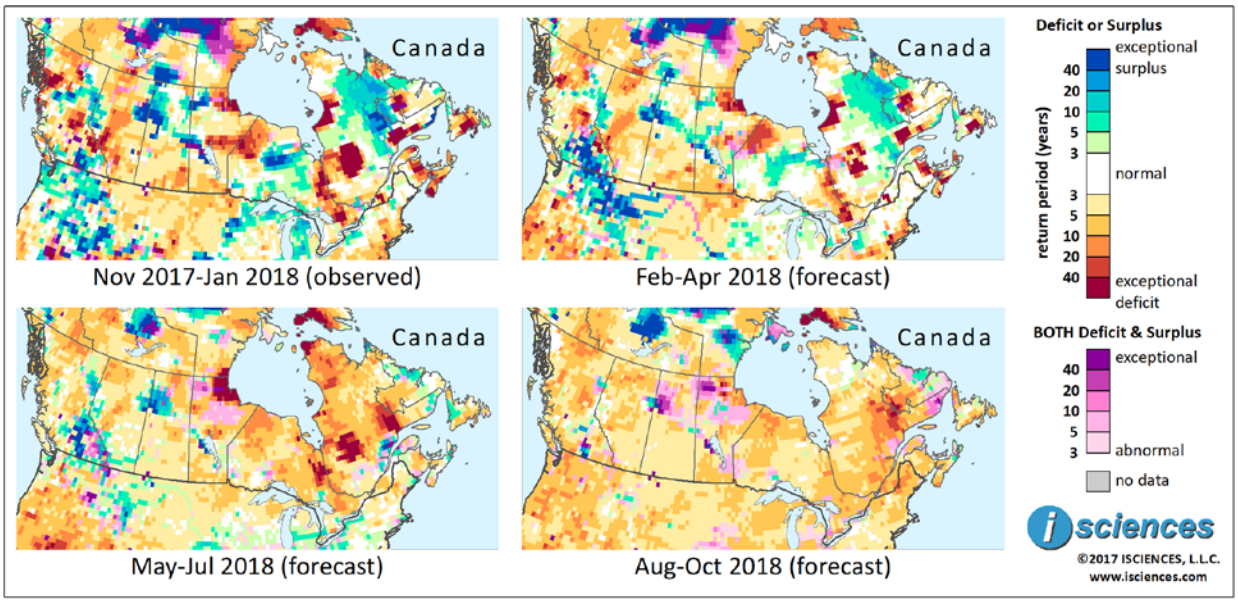
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Severe to extreme deficits are forecast for the Quebec/Ontario border corridor; northwestern Ontario into central Manitoba; central Alberta west of Edmonton, and northwestern Alberta; and large pockets in British Columbia surrounding Prince George and in the northwest. Moderate deficits are forecast in southern Manitoba.

Surpluses are forecast for central Manitoba west of Lake Winnipeg and into Saskatchewan; northwestern Saskatchewan around Churchill Lake westward to Ft. McMurray, Alberta; and near Kelowna, British Columbia.

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

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

The near-term forecast, February through April, indicates a distribution of water anomalies persisting in a pattern much the same as observed in the prior three months, though with some overall shrinkage of anomalous conditions in the eastern half of the country. One notable difference is the emergence of widespread intense surplus conditions in southern British Columbia from Kamloops past the US border.

From May through July, much of the eastern half of the country will transition to moderate to severe deficit, with exceptional deficits continuing to emerge in eastern Quebec from Sept-Îles northward, in central Quebec west of Lake Mistassini, and along the Quebec/Ontario border near Lake Abitibi. Intense surplus conditions are forecast near the mouth of the St. Lawrence River. Ontario will transition to nearly province-wide deficit. Moderate deficits will diminish in southern Manitoba and will downgrade to merely mild in southeastern Saskatchewan. Deficits in central and northern Alberta and BC will downgrade to primarily moderate. Intense surpluses are forecast to persist in southern BC from Cariboo Mountains Provincial Park down through Kamloops and Kelowna to the US border, but will transition to conditions of both surplus and deficit in southeastern BC. Moderate surplus will emerge in southern Alberta.

The forecast for the final three months – August through October – indicates mild to extreme deficits throughout much of country.

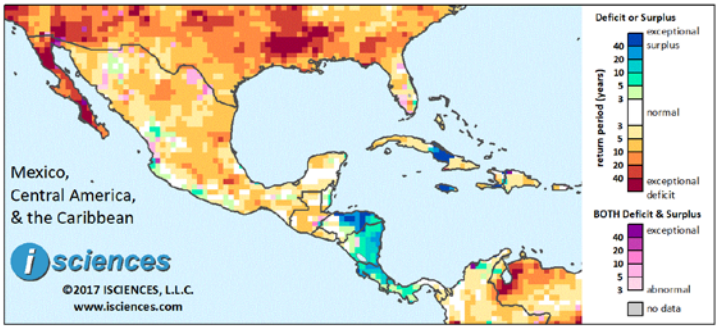
(It should be noted that forecast skill declines with longer lead times.)

Mexico, Central America, and the Caribbean

The 12-month forecast ending October 2018 (right) indicates severe to exceptional water deficits in Baja, Mexico. Primarily moderate deficits are forecast for northern and central states, with slightly more intense deficits in Tamaulipas and farther south in Puebla.

Severe to exceptional surplus is forecast for eastern Honduras. Surpluses of lesser severity are expected in Nicaragua, Costa Rica, western Panama, Jamaica, and central Cuba.

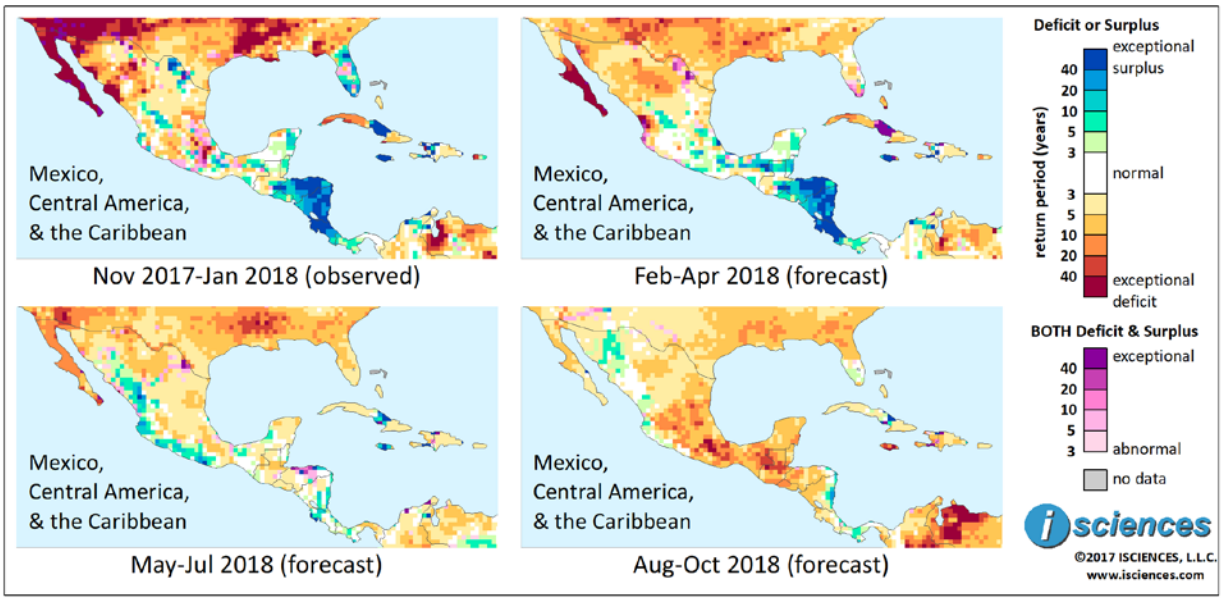
ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

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

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

In the next few months exceptional deficits are forecast to retreat in northwestern Mexico but will persist in the southern Baja Peninsula and will emerge farther south in Nayarit. Severe deficits, with a return frequency of 10 to 20 years, are forecast in north-central states at the intersection of Chihuahua, Coahuila, and Durango, as well as along the Rio Grande. Pockets of surplus will continue to emerge in southern Mexico and into northern Guatemala. Surplus conditions will continue to be intense in Honduras, Nicaragua, and Costa Rica, and moderate surpluses will persist in western Panama. In the

Caribbean, severe deficits are forecast for western Cuba and the Bahamas; exceptional surpluses are forecast in Jamaica.

From May through July, deficits will downgrade to severe in southern Baja and upgrade from mild to severe in northern Baja. Moderate deficits will continue to emerge in north-central Mexico, along with severe deficits along the Rio Grande. Closer to the western coast, a band of surplus will emerge reaching from Durango through western portions of Jalisco, Michoacán, Guerrero, and into Oaxaca. Surplus conditions in Central America are forecast to diminish considerably, leaving some moderate conditions in Nicaragua and Costa Rica. Aforementioned deficits in the Caribbean will become merely mild, and surpluses in Jamaica will retreat but persist.

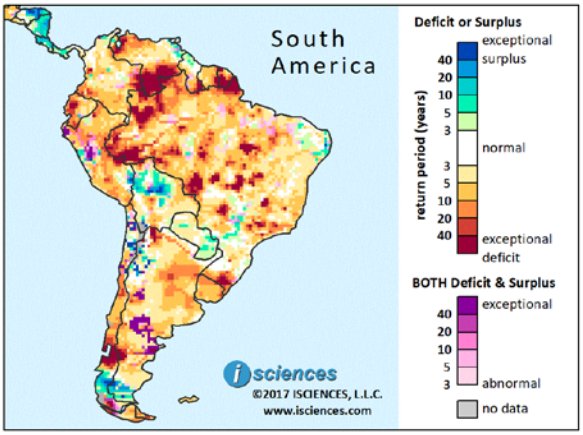
The forecast for the final three months – August through October – indicates the emergence of moderate to extreme deficits reaching from northeastern Mexico through northern Central America.

(It should be noted that forecast skill declines with longer lead times.)

South America

The 12-month forecast through October 2018 indicates mild to severe water deficits as the dominant condition in South America with significant pockets of exceptional deficit. Exceptional deficits are forecast for southern and northeastern Venezuela, western Ecuador, French Guiana into Amapá (Brazil), pockets scattered in central and western Brazil, and southern Chile around the Gulf of Corcovado.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



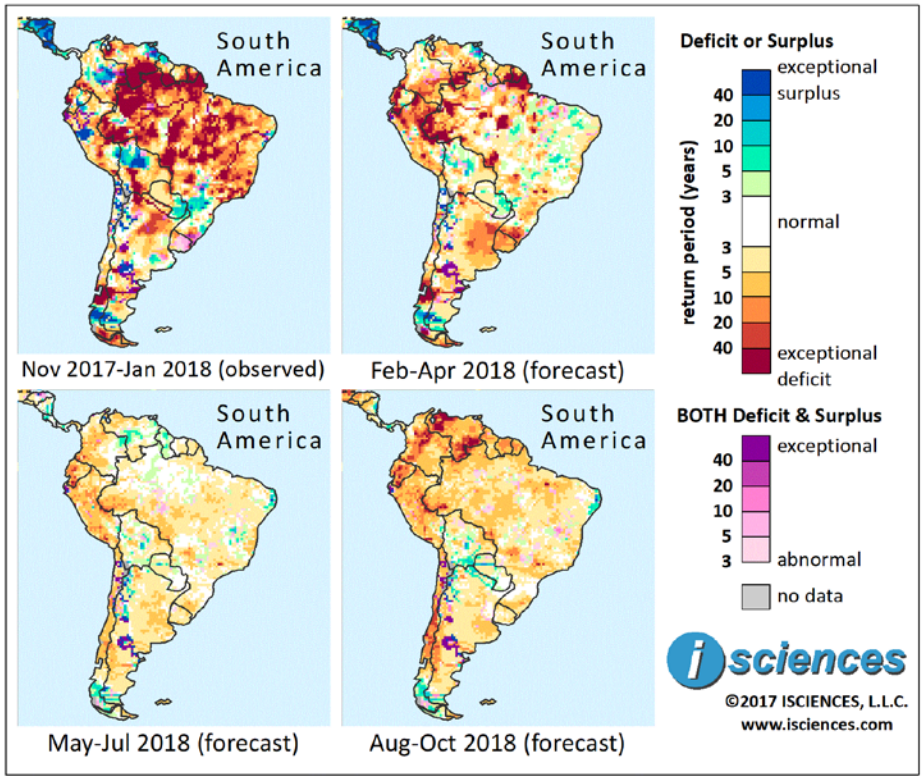
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Severe deficits are forecast scattered from southern Colombia through Peru and central Chile, and in Uruguay, northeastern Argentina, the Bermejo River in northern Argentina, and the Chubut and Chico Rivers in the south.

Intense surpluses are forecast for northern Bolivia, and surrounding O'Higgins/San Martín Lake in Patagonia.

The 3-month maps (below) for the same 12-month period show the evolving conditions in greater detail.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

The extent of exceptional deficits is forecast to diminish considerably through April. However, pockets of exceptional deficit are forecast in southern Venezuela, Amapá (Brazil) into Suriname and French Guiana, western Brazil and along the Amazon River, western Ecuador, and around the Gulf of Corcovado in southern Chile. Notable deficits are also forecast in southern Colombia, northern Peru, Uruguay and Rio Grande do Sul (Brazil), northeastern Argentina, and along the following rivers: the Javari and Purus River in western Brazil, the Pardo in the State of São Paulo, the Bermejo River in northern Argentina, and the Chubut River in the south.

Surplus is forecast in northeastern Venezuela, pockets scattered throughout eastern Brazil, northern Bolivia, eastern Paraguay, and around O'Higgins/San Martín Lake in Patagonia.

From May through July the extent of anomalous conditions, both deficit and surplus, will shrink. Notably, northern Brazil will transition to near-normal conditions, the east will see merely mild anomalies, and some primarily moderate deficits are forecast trailing south through the western states. Exceptional deficits in western Ecuador will downgrade slightly. Moderate deficits will emerge in western Colombia, eastern Ecuador, much of Peru, and much of Chile. Deficits in eastern Argentina will moderate. Surpluses will shrink in Bolivia and will moderate near O'Higgins/San Martín Lake in

Patagonia. Exceptional surpluses may re-emerge in southern Argentina between the Desaguadero and Neuquén Rivers. Some moderate surpluses may emerge along the Orinoco River in central Venezuela, in Guyana, and in Brazil's easternmost tip.

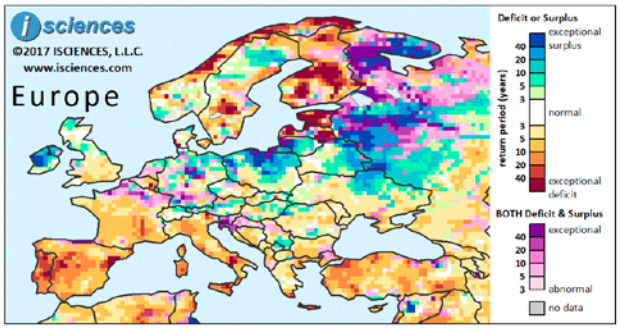
In the final quarter – August through October – deficits will emerge in much of the continent but with greater severity in the north and throughout much of Chile.

(It should be noted that forecast skill declines with longer lead times.)

Europe

The 12-month forecast ending October 2018 indicates exceptional water deficits in Finland, Estonia, Latvia, and along the Norwegian Sea coast and in central Sweden. Deficits are also forecast in Mediterranean Europe including the Iberian Peninsula, southern France, Italy, Corsica, Sardinia, Sicily, Malta, and Crete.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018

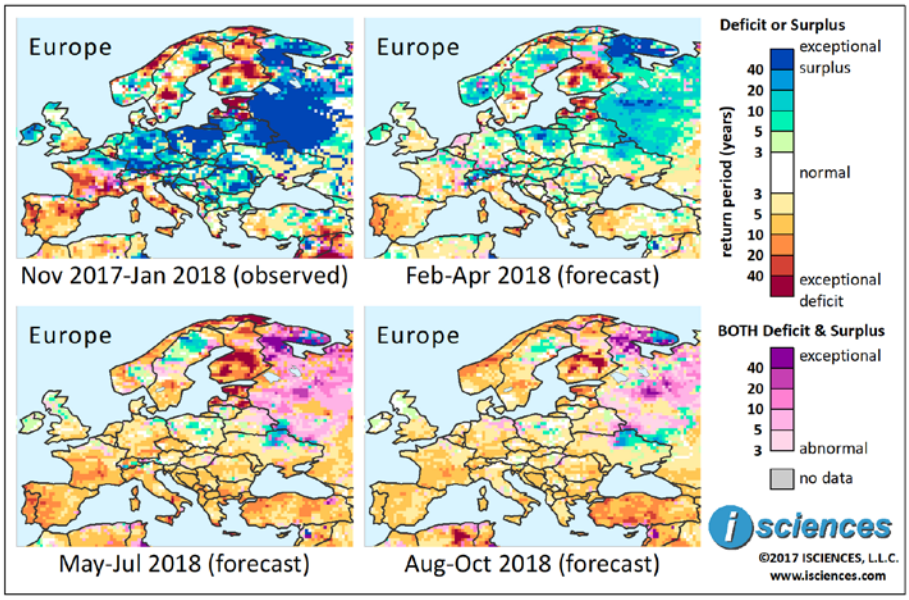


Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Surplus is forecast for Ireland, northern Germany, Poland, Lithuania, eastern Belarus, northern Ukraine, European Russia, and along many rivers. These conditions are expected to be exceptional in Ireland, northern Poland, and parts of European Russia, though both deficit and surplus conditions are forecast in Russia as transitions occur.

The 3-month composites (below) for the same 12-month time period show the evolving conditions.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Readily apparent in the map sequence above is the gradual transition in the region from predominantly surplus conditions to deficit. Note, however, that deficits have been and will continue to be the prevailing water condition on the Iberian Peninsula and in Finland.

From February through April exceptional water surplus will retreat except in Murmansk, Russia. However, widespread surpluses with a return period of 10 to 40 years will persist in European Russia and in parts of Central and Eastern Europe including Switzerland, Poland, eastern Belarus, and northern Ukraine. Surpluses will emerge in southern Norway and northern Sweden.

Intense deficits will shrink slightly but persist in Estonia, Latvia, central Finland, and central Sweden. Deficits in southern France and the Mediterranean are expected to moderate but severe deficits will continue in Portugal, Corsica, Sicily, and parts of Italy. Deficits will emerge in Albania and eastern Greece.

From May through July, much of Central and Eastern Europe will transition away from surplus to moderate deficit, joining southern Europe where deficits will be more intense, with severe conditions in Portugal, western Spain, southern France and along the Loire River, southern Italy, and Crete. Severe to exceptional deficits will continue to emerge in Estonia and Latvia and will spread in Finland. Moderate deficits will emerge in southern Sweden and Norway. Surpluses will shrink but continue in north-central Ukraine. Conditions of both deficit and surplus are forecast for European Russia as deficits emerge in areas of previous surplus.

The forecast for the remaining months – August through October 2018 – indicates moderate deficit throughout the region.

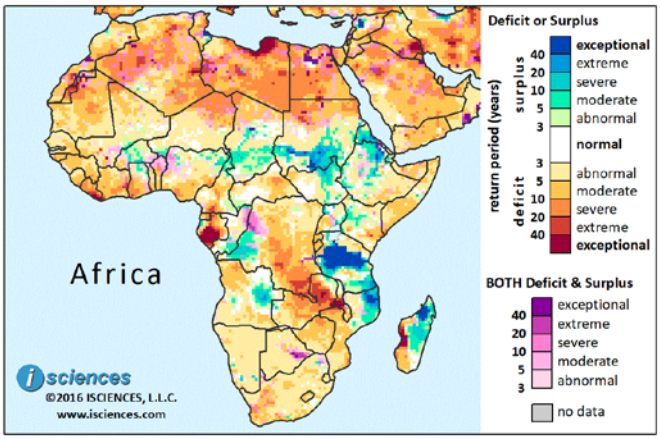
(It should be noted that forecast skill declines with longer lead times.)

Africa

The 12-month forecast (right) indicates severe water deficits across much of northern Africa with exceptional deficits around Benghazi, Libya. Exceptional deficits are also forecast for Gabon and central Malawi. Other regions with a forecast of intense deficit include Liberia, Zambia, southern Democratic Republic of the Congo, and west-central Madagascar.

Primarily moderate deficits are expected around the Gulf of Guinea, eastern Central African Republic, Somalia, northeastern Angola, Zimbabwe, southern Mozambique, western South Africa, and southwestern Madagascar.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018

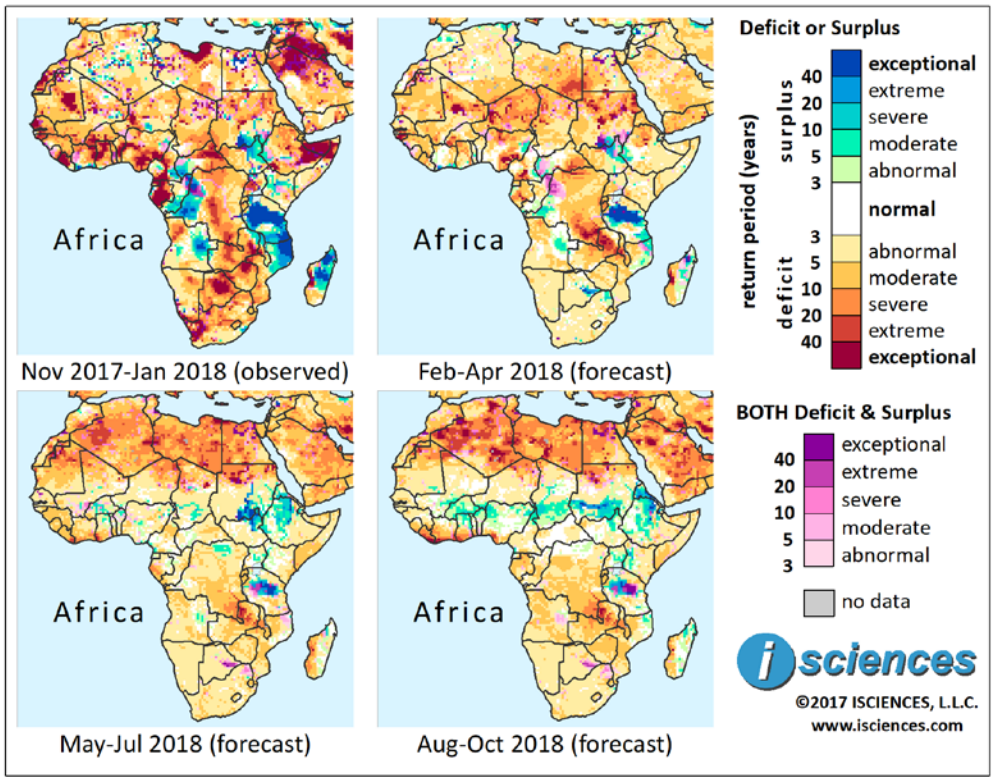


Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Surplus is forecast in southern Chad, southern Sudan, northeastern South Sudan, northern Ethiopia, Eritrea, western DRC, eastern Angola, Tanzania, northeastern Mozambique, and eastern Madagascar. Surplus conditions are expected to be exceptional in a large block of central Tanzania.

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

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

The near-term forecast through April indicates notable improvement in southern Africa where conditions will transition from intense to merely mild deficit. However, severe to exceptional deficits are forecast from central Malawi through much of eastern Zambia and into southern Democratic Republic of the Congo. Deficits of similar intensity are forecast scattered across the southern Sahara and the Sahel, in Guinea-Bissau, and in pockets of Nigeria, southern Cameroon, and west-central Madagascar. Deficits of varying severity remain the dominant in many other regions, but conditions in the Horn of Africa will downgrade to mild.

Surplus conditions are forecast for northeastern South Sudan, in DRC near Kinshasa, and eastern Angola, Tanzania, northern Madagascar, and eastern Botswana. Surpluses are expected to be widespread and exceptional across central Tanzania.

From May through July widespread severe to extreme deficits will emerge across northern Africa. Deficits of similar severity are expected to persist in eastern Zambia and into DRC and Malawi, and will emerge in coastal Liberia, Côte d'Ivoire, and Ghana. Moderate deficits will emerge in southern Somalia. The extent of surplus will increase in Sudan and South Sudan around the White Nile. Surpluses will emerge in Eritrea and the Ethiopian Highlands, and, with lesser intensity, southern Chad, central Uganda, and along the Black and the White Volta Rivers in Burkina Faso (Mouhoun and Nakanbe Rivers).

In Tanzania, surpluses will remain intense but will shrink slightly. Conditions in north-central DRC will transition from deficit to moderate surplus around the Uele River.

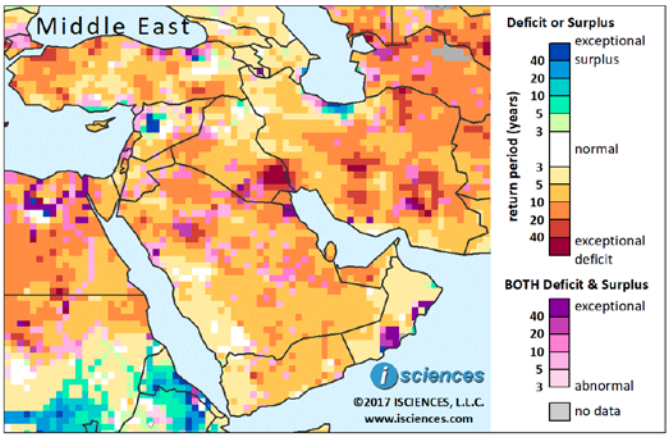
The forecast for the final quarter – August through October 2018 – indicates conditions similar to those forecast for the preceding three months.

(It should be noted that forecast skill declines with longer lead times.)

Middle East

The forecast for the 12-month period ending October 2018 (right) indicates water deficits of varying severity throughout the region, including a large pocket of exceptional deficit in southeastern Iraq near Basrah.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



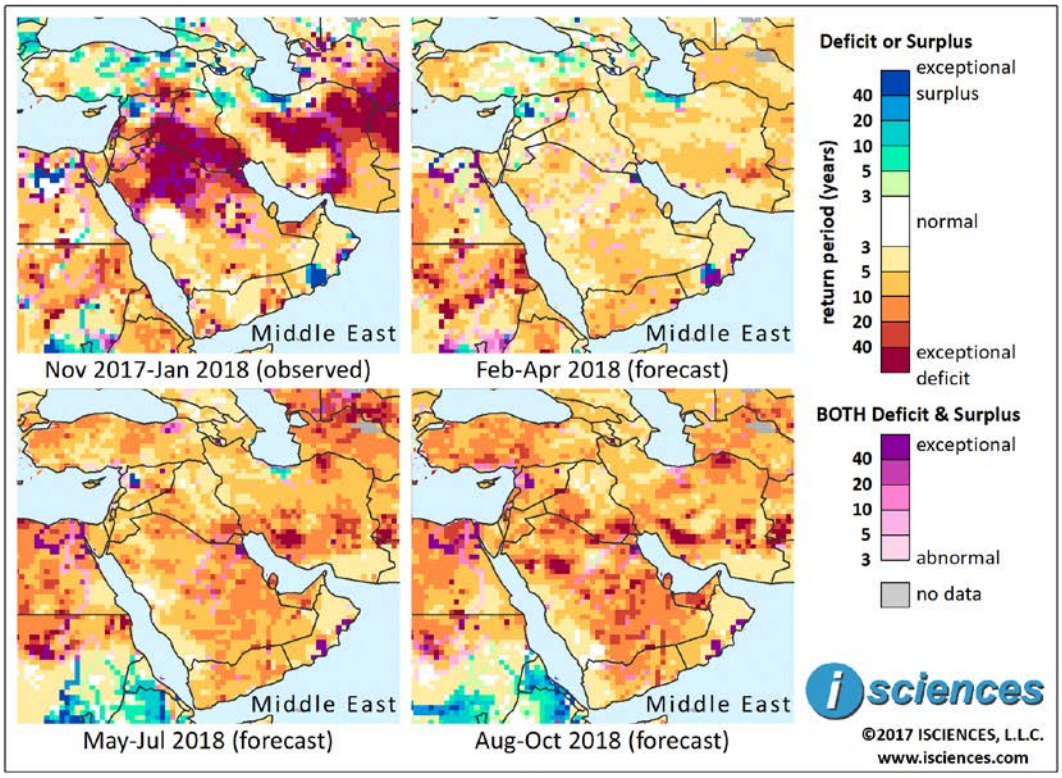
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Deficits with a return period of 10 to 40 years are forecast for much of Iran, severe deficits are expected in western Turkey with deficits of generally lesser intensity throughout much of the remainder of the country.

Moderate to severe deficits are forecast for Lebanon, West Bank, Jordan, Saudi Arabia, Qatar, and United Arab Emirates. Primarily moderate deficits are expected in Yemen.

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

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

As is apparent in the map series, widespread exceptional deficits observed in the prior three months are expected to moderate considerably through April. The forecast indicates moderate deficits – with a return period of 5 to 10 years – in western Turkey and along its southeastern border, the Tigris River, central Iran, southern Saudi Arabia, Qatar, and Yemen. Some deficits of greater severity are forecast in southeastern Iran.

After April deficits in the region will increase in extent and severity. Severe to exceptional deficits will emerge in Iran from the Persian Gulf to the Afghan border, and in the northeast near Turkmenistan. Severe deficits will emerge in Turkey, Iraq, Kuwait, Saudi Arabia, Qatar, United Arab Emirates, and Yemen. Extreme deficits – a return period of 20 to 40 years – are forecast for southern Iraq near Basrah. Moderate deficits will emerge in Azerbaijan.

The forecast for the final quarter – August through October – indicates increasing pockets of more intense deficits.

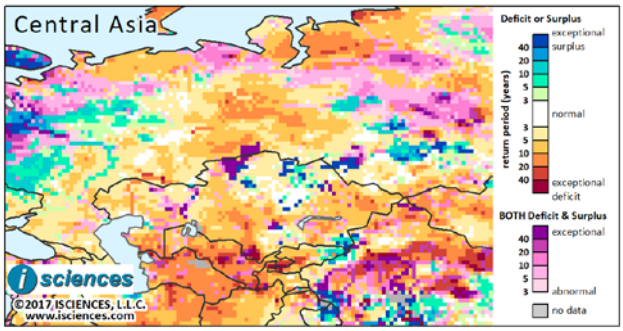
(It should be noted that forecast skill declines with longer lead times.)

Central Asia and Russia

The 12-month forecast indicates that conditions of water deficit will prevail over much of the region, with surpluses in European Russia.

Severe deficits are forecast for Turkmenistan and Uzbekistan, and primarily moderate deficits in western Kyrgyzstan and Tajikistan. However, deficits may reach exceptional levels in the Fergana Valley and other pockets.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



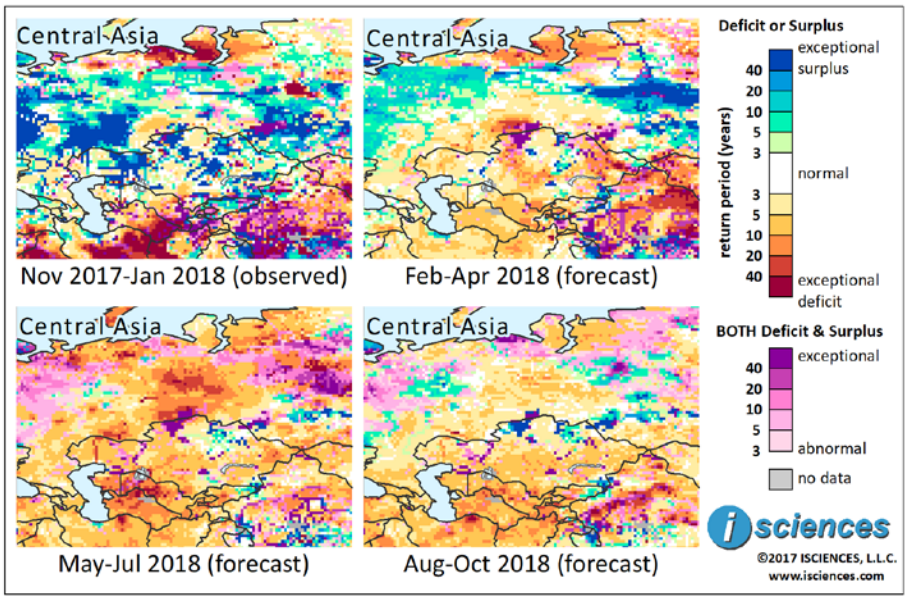
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Deficits are forecast in the Syr Darya Basin in Uzbekistan and leading northward through Kazakhstan. Deficits are also forecast farther west along the Ural River as it flows through Kazakhstan and Orenburg, Russia, and also in eastern Kazakhstan. In Russia, moderate to severe deficit conditions are forecast for the Ob River Basin, along the Pechora Sea in the north, and from the Yamal Peninsula along the Kara Sea.

Both deficits and surplus conditions are forecast in western Russia with intense surpluses near Rybinsk Reservoir and moderate surpluses along the Volga River. Farther east, past the Urals, surplus conditions are forecast for the Vakh River Basin and the Tom River Basin.

The 3-month composites (below) for the same 12-month period show the evolving conditions in more detail.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

The near-term forecast through April indicates that exceptional surpluses in European Russia will shrink and downgrade in severity, though widespread severe surpluses will continue to emerge, and will remain intense from St. Petersburg to the Rybinsk Reservoir, and in Murmansk. Conditions of exceptional surpluse will emerge in the Vakh River Basin stretching east across the Yenisei River between the Angara and Podkamennaya Tunguska Rivers.

Deficits east of Yekaterinburg, Russia will upgrade from moderate to extreme, while deficits in and around the Yamal Peninsula downgrade from exceptional to severe. Deficits in Turkmenistan and Uzebekistan will downgrade to moderate. Conditions in Kazakhstan are expected to transition away from surplus to deficit.

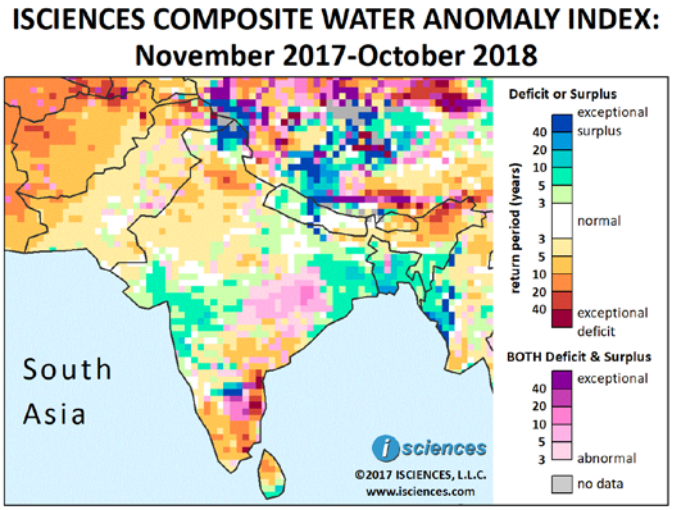
From May through July much of the region will transition to deficits of varying severity, with conditions of both deficit and surplus in European Russia and in the Yenisei River Basin. Deficts in Turkmenistan and Ukbekistan are expected to become intense, as will deficits in western Kazakhstan, particularly along the Ural River. A vast stretch of severe to extreme deficits will emerge in the Ob River Basin, including the Irtysh and its tributary, the Tobal River.

The forecast for the final months – August through October – indicates diminished extent of defict conditions in Russia and a slight downgrade of deficits in Central Asia.

(It should be noted that forecast skill declines with longer lead times.)

South Asia

The 12-month forecast indicates intense water deficits in western Afghanistan, and in parts of northern, southern, and far northeastern India.



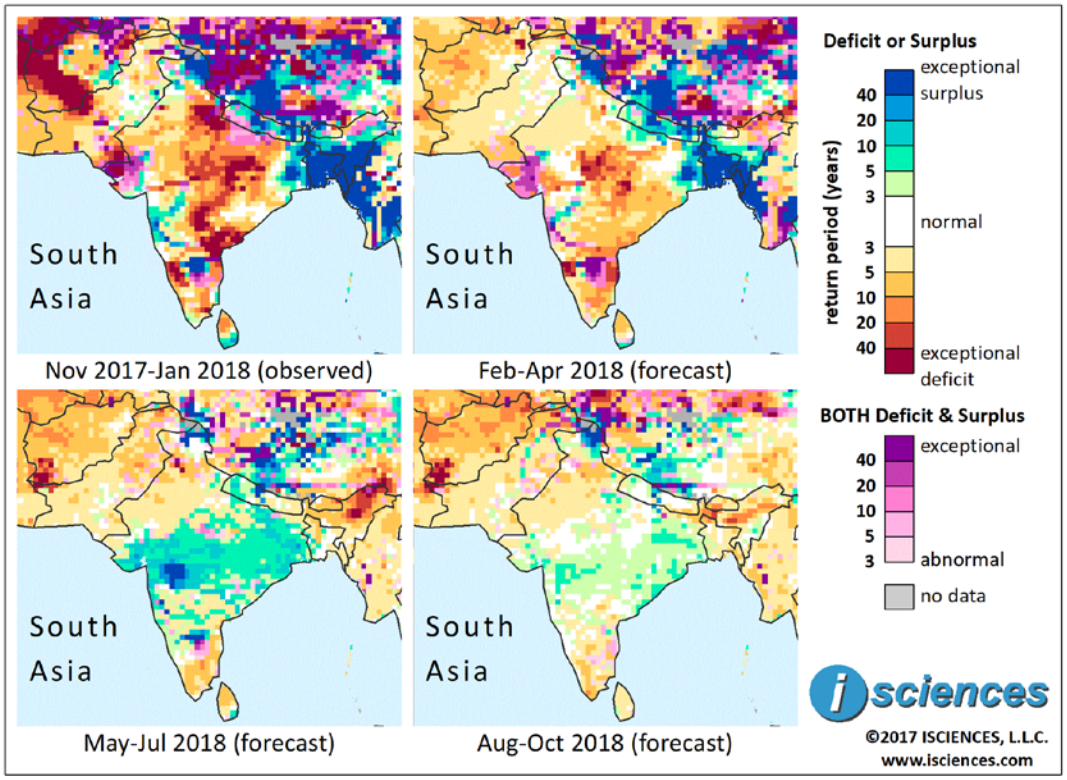
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Surplus conditions are forecast for Bangladesh and Indian states to the east and west, as well as along India's west coast from eastern Gujarat through Maharashtra. Exceptional surpluses are forecast in western Andhra Pradesh.

Deficits are forecast in Sri Lanka's northern half, and surpluses along the southern coast. Mild surpluses are expected in western Nepal with exceptional surplus along the Gandaki River. Moderate deficits are forecast for Bhutan.

The 3-month composites (below) show the evolving conditions.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

As is apparent in the map progression above, the forecast for India indicates the persistence of intense water deficits in central and parts of southern India through April 2018. After April a dramatic transition to surplus conditions is forecast for a wide belt stretching coast to coast across the country's middle.

In the next several months, through April, deficits will blanket much of the southern two-thirds of India, punctuated by pockets of both deficit and surplus conditions (pink/purple) as transitions occur. Deficits are expected to be extreme or even exceptional in Madhya Pradesh, western Chhattisgarh, western Karnataka, and eastern Andhra Pradesh. Primarily moderate deficits will emerge in a vast stretch from the Bay of Bengal inland, encompassing Odisha, Chhattisgarh, Telangana, and southern Tamil Nadu. Deficits in northern Sri Lanka will downgrade to moderate. Gujarat, in western India, will see conditions of both deficit and surplus, as will the western stretch of the Krishna River and much of the Penner River Basin.

Exceptional surplus conditions will persist throughout Bangladesh and India states to the east, as well as in eastern Jammu and Kashmir in India's far north. Severe to exceptional surpluses remain in the forecast for West Bengal, and throughout Nepal.

Exceptional deficits will nearly disappear in Afghanistan, but moderate to severe deficits will continue to emerge throughout much of the country.

From May through July a transition from widespread deficit to surplus is forecast for a vast belt across India's middle, stretching from eastern Gujarat on the Arabian Sea to West Bengal on the opposite coast. Surpluses are expected to be moderate to severe with a block of exceptional surplus in Maharashtra between the Godavari and Tapi Rivers. Surpluses will emerge along the Godivari and Krishna Rivers, and exceptional surpluses will re-emerge in western Andhra Pradesh. Intense deficits are forecast to emerge in India's far northeastern states.

Conditions in Bangladesh will transition from exceptional surplus to near-normal, surpluses will persist in western Nepal, and moderate deficits will emerge in Bhutan. Deficits will persist throughout most of Afghanistan and will intensify in the southwest, becoming exceptional. Moderate deficits will emerge in northern Pakistan.

The forecast for the final period – August through October 2018 – indicates a downgrade to mild surplus across central India, and a pattern of deficits in Afghanistan similar to the forecast in the prior three months.

(It should be noted that forecast skill declines with longer lead times.)

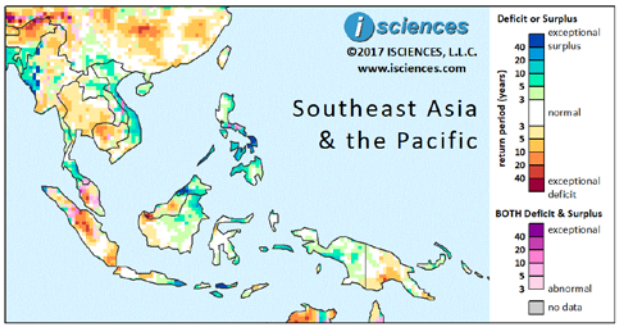
Southeast Asia and the Pacific

The 12-month map (right) indicates water surplus of varying intensity in western Myanmar, Laos, much of Vietnam, southern Thailand, Philippines, Brunei, and scattered pockets in Indonesia.

Severe water deficit is forecast for western Cambodia, central and southern Sumatra, a small pocket in western Malaysian Borneo, and south-central Papua New Guinea.

Mild deficits are expected in Thailand and pockets of Myanmar.

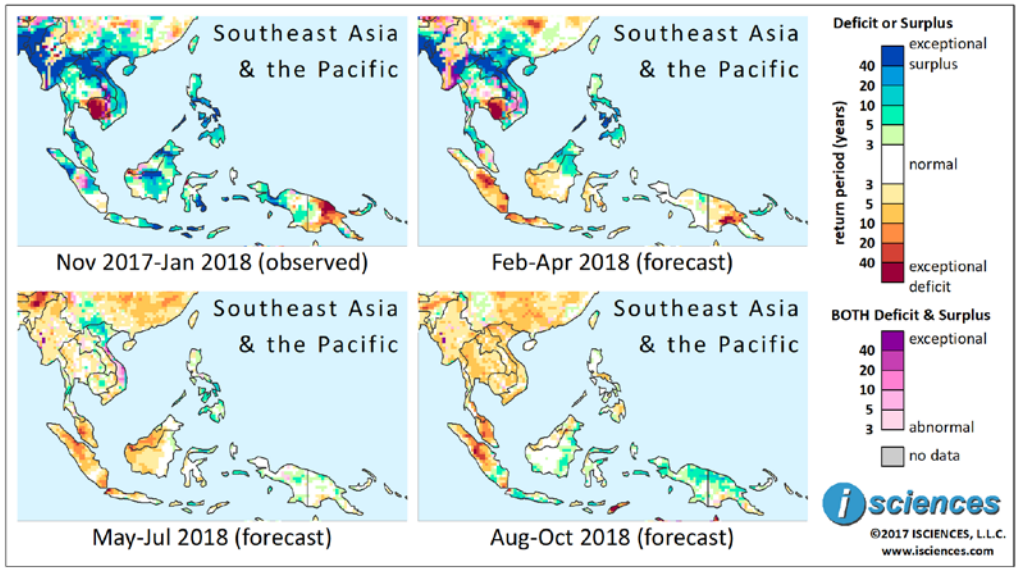
ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

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

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

In the near-term forecast through April Cambodia continues to stand out with exceptional water deficit in the west. Moderate to extreme deficits are expected to emerge in central and southern Sumatra and Java, and milder deficits in western Borneo. Deficits around the Gulf of Papua in Papua New Guinea will intensify, reaching exceptional severity, while deficits farther north and in the central Highlands retreat.

Surplus conditions are expected to remain intense in western and eastern Myanmar, northern Laos, along the Mekong River until it reaches Cambodia, and central Philippines. Surpluses of varying intensity are forecast for much of Vietnam, pockets of Thailand, Brunei and northeastern Borneo, and isolated pockets in Indonesia.

From May through July surpluses will retreat considerably, leaving primarily moderate conditions in northern Vietnam, Philippines, and scattered pockets in New Guinea and nearby islands. Notably, Cambodia will transition away from long-term exceptional water deficits in the west to near-normal conditions. Moderate to severe deficits will emerge in much of Malaysia, and will continue to emerge in Sumatra, but will shrink in Java. Deficits of lesser severity will continue to emerge nearby in western Borneo. Some primarily mild deficits will begin to emerge in Southeast Asia.

After July, moderate deficits are forecast throughout Southeast Asia with more severe deficits in the southern Malay Peninsula, Sumatra, and Timor-Leste. Scattered surpluses are forecast for the remainder of Indonesia and for New Guinea.

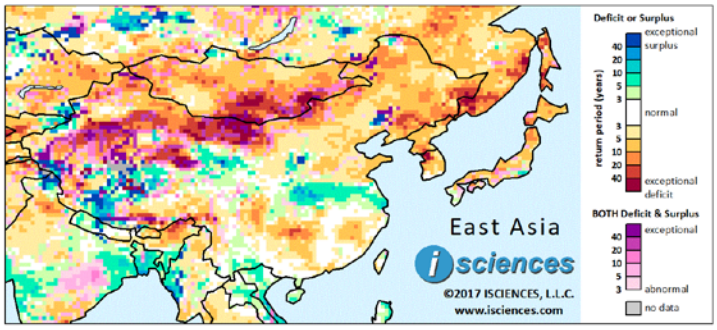
(It should be noted that forecast skill declines with longer lead times.)

East Asia

The 12-month forecast map for East Asia (right) indicates widespread deficits reaching exceptional severity across Mongolia and northern China from Xinjiang through Inner Mongolia.

Moderate deficits are forecast for Northeast China and the Korean Peninsula, but conditions may be more severe in eastern Liaoning and eastern Heilongjiang, China and surrounding Seoul, South Korea. Severe deficits are forecast for Guizhou and Hunan, China.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



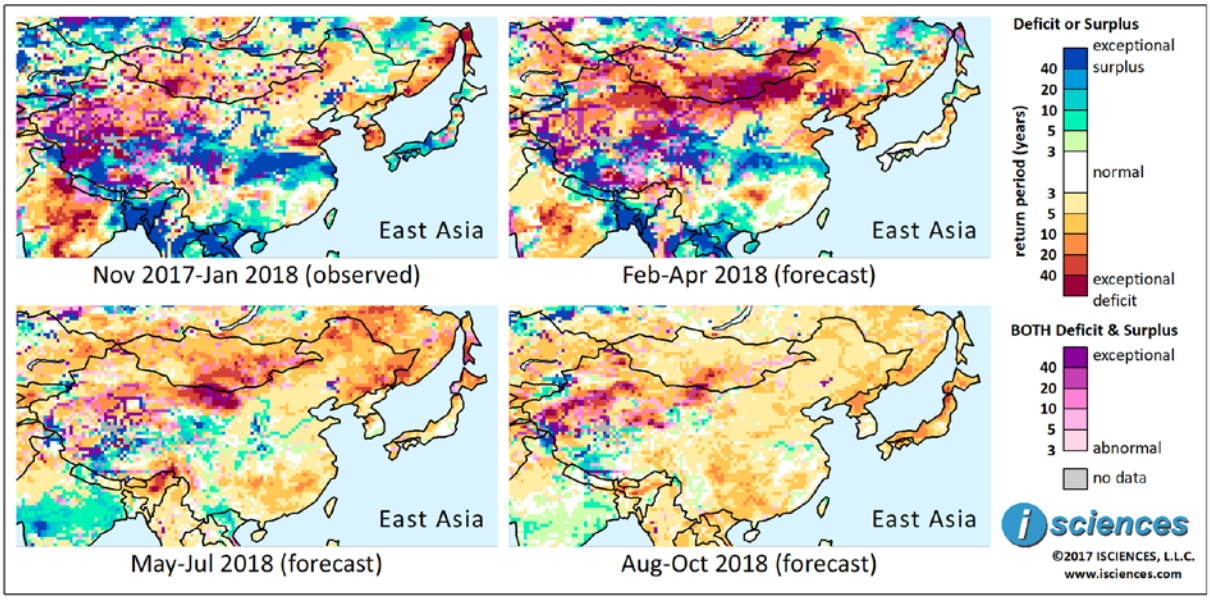
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Conditions of moderate to extreme surplus are expected in the Han River Basin in Hubei, China and eastward to Shanghai.

Primarily moderate deficits are forecast for Japan.

The 3-month time series maps below show the evolving conditions in more detail.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

The near-term forecast through April indicates that the extent of exceptional deficits in Mongolia and across the border into China will increase, creating a vast stretch from Xinjiang through Inner Mongolia. Exceptional deficits are also expected to emerge in Liaoning during this period, extreme deficits will

emerge in Hunan, and deficits in Shandong will downgrade from exceptional to severe. Deficits are forecast to spread on the Korean Peninsula and are expected to be intense in Seoul.

Surpluses ranging from severe to exceptional remain in the forecast from Shanghai west through the Han River (Hanjiang) watersheds, and the eastern stretch of the Ordos Loop of the Yellow (Huang) River. Exceptional surpluses will continue to emerge in northern Sichuan and Qinghai but conditions of both deficit and surplus are indicated as deficits emerge. Moderate to severe surpluses will continue to emerge around the Gulf of Tonkin and in Hainan.

Conditions in Japan will transition from surplus to nearly normal in the south and some pockets of deficit in the north.

The forecast for May through July indicates some retreat of exceptional deficits across northern China and Mongolia, but a large block will emerge in western Inner Mongolia, and moderate to extreme deficits will continue to emerge in Northeast China. Deficits on the Korean Peninsula are expected to shrink but will persist near Seoul. Aforementioned widespread surpluses in China will diminish considerably and downgrade in severity. Moderate surpluses will emerge on lower and middle reaches of the Yellow River. Widespread moderate to severe deficits are expected to emerge in southeastern China. Conditions around the Gulf of Tonkin and in Hainan will become nearly normal.

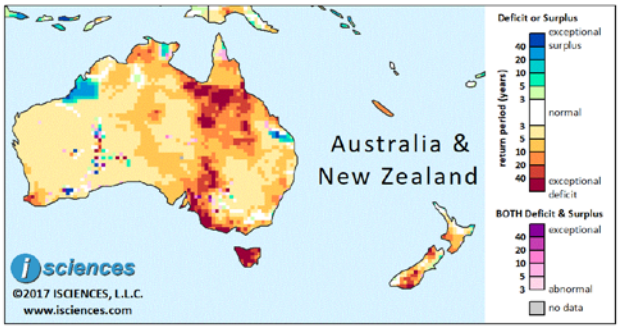
The forecast for the final months, August through October, indicates persistent, intense deficits from Xinjiang through western Inner Mongolia and south-central Mongolia, and deficits of lesser severity in southern China, North Korea, and Japan.

(It should be noted that forecast skill declines with longer lead times.)

Australia & New Zealand

The 12-month forecast (right) continues to show exceptional water deficits in Tasmania and along Australia's southern coast from Adelaide to Melbourne. Moderate to exceptional deficits lead from Adelaide north, spanning the border of South Australia and New South Wales. Intense deficits are forecast for much of central Queensland to the Gulf of Carpentaria.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



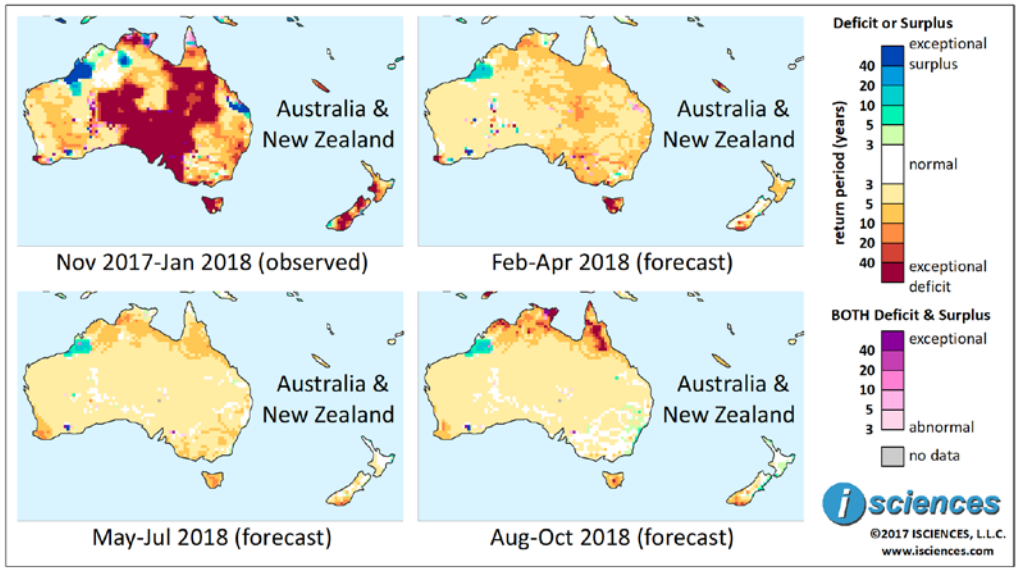
Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

A wide path of moderate deficits splits the country down the middle, leading to slightly more severe deficits in Northern Territory's Top End surrounding Darwin. Severe deficits are expected to persist in the southwest tip of Western Australia near Busselton. Farther north in WA's Kimberley region surpluses are forecast. Some moderate deficits are forecast along eastern Australia from Canberra to Brisbane, and surpluses are forecast west of Bundaberg, Queensland.

Deficits of varying severity are expected in pockets of New Zealand and moderate deficits are forecast for New Caledonia.

The 3-month maps (below) for the same 12-month period show the evolving conditions.

ISCIENCES COMPOSITE WATER ANOMALY INDEX: November 2017-October 2018



Based on observed data through January 2018 and forecasts issued January 25-31, 2018.

Widespread, exceptional deficits observed in recent months in Australia are forecast to nearly disappear. However, severe to exceptional deficits are expected to persist in Tasmania, particularly in

the west, and near Busselton, WA through April, downgrading thereafter. The forecast through April indicates primarily moderate deficits from the Eyre Peninsula in South Australia through much of Victoria and into New South Wales. Some severe deficits are forecast for parts of Riverina, NSW. Moderate deficits are forecast for central Queensland to the Gulf of Carpentaria, and stretching northwest to Darwin, where deficits may be more severe. Deficits are expected to retreat significantly in New Zealand, though pockets of intense deficits will continue to emerge in the south and moderate deficits in the north. Intense deficits will continue to emerge in central New Caledonia.

From May through July deficit anomalies in Australia will be primarily mild, with moderate deficits across the north and some severe deficits near Darwin (NT), Busselton (WA), and Tasmania. Moderate surpluses are expected to persist in Kimberley region (WA). Conditions in New Caledonia are forecast to return to near-normal. Deficits may linger in southern South Island, New Zealand

The forecast for the final months – August through October – indicates intense deficits emerging across northernmost Australia.

(It should be noted that forecast skill declines with longer lead times.)