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## Climate Impact Company Season 1-3 Ahead Outlook for North America

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## *Highlight: Nationally, warmer than normal summer and autumn season*

**Executive Summary:** The Climate Impact Company season 1-3 ahead climate forecast valid summer 2018 to winter 2018-19 is updated. Most of the U.S. is warmer-than-normal for both JUN/JUL/AUG and SEP/OCT/NOV 2018. Normally cold weather is expected much of the U.S. next winter season.

**Climate discussion:** The North America climate forecast is based on primarily 2 factors: 1.) An expected climate transition from weak La Nina TOWARD (and possibly) into weak El Nino and 2.) The influence on the upper level pattern of a vast cool pool of ocean water south of Greenland.

Climate Impact Company constructed analog forecast are produced primarily with analog years occurring within the current climate cycle. The climate cycle is defined by the long-term phase of El Nino southern oscillation (ENSO), Pacific decadal oscillation (PDO) and Atlantic multidecadal oscillation (AMO). Both ENSO and PDO flipped to the long-term cool phase in the mid-to-late 1990's at the same time AMO changed to the warm phase.

La Nina started 2018 and the La Nina CLIMATE (as defined by multi-variate ENSO index) is transitioning toward neutral phase. MEI identifies the atmospheric reaction to the eastern equatorial Pacific Ocean SSTA and SLPA regime. Since the middle 1990's a weak La Nina starting the year and fading to neutral phase by late spring (using MEI) occurred on 6 occasions: 1996, 2001, 2006, 2009 and 2012. Climate Impact Company projects at least weak El Nino ahead based on the current warming of the subsurface East Pacific (*Fig. 1*). Of the analog years listed above 2006, 2009 and 2012 transitioned into El Nino although the 2012 episode was brief (*Fig. 2*). The Climate Impact Company ENSO forecast component of the season 1-3 ahead climate forecasts is based on the average scenario produced by averaging analog years 2006, 2009 and 2012.



*Fig. 1:* The NMME global SSTA forecast for JUN/JUL/AUG 2018 indicates regional SSTA governing the North America climate outlook.



*Fig. 2:* The 2018 North America climate forecast ENSO component is based on analog years 2006, 2009 and 2012.

The North Atlantic cool pool has re-emerged in recent weeks (*Fig. 3*) and is widening while strengthening according to the 14-day trend (*Fig. 4*). Across and nearby the cool pool during the past 90 days a persistent upper trough has shaped the North America and Europe climate (*Fig. 5-6*).



*Fig. 3-4:* The North Atlantic cool pool (left) is intensifying based on the 14-day change analysis (right).



*Fig. 5-6:* Past 30/90 days 500 MB anomaly analysis identifying persistence of an upper trough near or in vicinity of the cool pool south of Greenland.

The cool pool will be present during early summer 2018. During June, the cool pool has been present since 2009 with varying intensity. The cool pool is likely to persist through the summer season. On average, the upper air pattern during the 9 years of influence of the cool pool south of Greenland has featured a blocking ridge over Greenland, weak trough in the eastern U.S. and deep trough just west of Europe (*Fig.* 7).



*Fig. 7:* During summer 2009-2017 when the cool pool south of Greenland was present the average 500 MB anomaly pattern is indicated.

The combination of the ENSO analogs (2006, 2009 and 2012) and the cool pool climatology (2009-2017) govern the North America forecast for the remainder of 2018 (and through next winter.

JUN/JUL/AUG 2018: The meteorological summer season is warmer-thannormal across most of North America. The persistent trough over eastern Canada and into the North Atlantic shifts east and is replaced by a blocking high pressure ridge over Greenland. The upper ridge is present over western North America. The ridge pattern drives the anomalous warmth. Hottest anomalies are across Texas and the Northwest U.S. to Northwest Canada while very warm and humid conditions emerge in the Mid-Atlantic region. The precipitation outlook indicates dryness in the Central U.S. especially Texas while wet weather is likely along the U.S. East Coast. A focus on the Great Plains precipitation anomalies yields a drier depiction especially Texas while the Ohio Valley has a wet risk.





*Fig. 8-10:* The Climate Impact Company constructed analog temperature and precipitation anomaly forecast for JUN/JUL/AUG 2018 across North America. The projected 500 MB anomaly pattern is below.



*Fig. 11:* The Climate Impact Company constructed analog precipitation anomaly forecast for JUN/JUL/AUG 2018 across the Central U.S.

**SEP/OCT/NOV 2018:** The dominant upper ridge pattern holds during autumn. Implied is widespread anomalous warmth except the Southeast U.S. In the Southeast, a weak upper trough is semi-permanent. Clearly, an El Nino climate is developing. Typical of an El Nino autumn the tropics are quiet pertaining to any risk of coastal strikes as the Gulf of Mexico is drier than normal and anomalous wet climate is mostly off the East Coast. Dryness is still dominant for much of the Great Plains.



*Fig. 12-14:* The Climate Impact Company constructed analog temperature and precipitation anomaly forecast for SEP/OCT/NOV 2018 across North America. The projected 500 MB anomaly pattern is below.

**DEC/JAN/FEB 2018-19:** Susceptibility to a cold trough is indicated across the Upper Midwest due to persistence of a Greenland blocking pattern. An upper ridge is lodged over Alaska. The outlook is essentially normally cold across the U.S. with marginal warmth in the Southwest and Northeast U.S. The West Coast is drier than normal while additional dryness is expected in the Mid-South, normally a wetter zone if El Nino is present. Wet weather is likely for parts of the Southeast U.S.



*Fig. 15-17:* The Climate Impact Company constructed analog temperature and precipitation anomaly forecast for DEC/JAN/FEB 2018-19 across North America. The projected 500 MB anomaly pattern is below.