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Climate Impact Company Early AG Wire

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Highlight: "Blob" SSTA Regimes and "flash climate".

Summary Earlier in April research published in NATURE regarding a possible slowdown of the Atlantic Meridional Ocean Current (AMOC) attributed to human influence and causing climate change was published. Climate Impact Company does not agree with the findings. However, the research does give rise to a new phenomenon known as unexpected regional warming or cooling "blobs" of ocean water outside of the tropics or related to El Nino southern oscillation (ENSO) causing what Climate Impact Company calls "flash climate" which when present causes unexpected harsh weather dramatically affecting regional culture and economies.

Discussion: During 2013 evolution of 2 "blobs" of unexpected ocean surface warming in the northeast Pacific Ocean and cooling south of Greenland unexpectedly generated and caused dramatic influences on climate. The northeast Pacific Ocean warm blob lasted 4+ years and was linked to strong high pressure ridging over western North America during that time causing harsh drought. The lack of understanding of why this warm sea surface temperature anomaly (SSTA) zone formed lead scientists to simply call the warm zone a "blob". The cool "blob" in the North Atlantic only recently received attention from the research community. The cool "blob" south of Greenland beginning in 2013 is theorized to have contributed to a sudden downturn in North Atlantic hurricanes in 2013-2016. The theory is disrupted by the exceptionally active 2017 season in the North Atlantic although the cool blob south of Greenland was evident during the peak of season last JUL/AUG/SEP.

Climate Impact Company mentions this phenomena today due to the recent publication of research in NATURE conducted by the University of Potsdam

Institute for Climate Impact Research in Germany, University of Reading and University College London. There were several press releases on this research earlier in April. The research identified the North Atlantic cool blob evolving due to Greenland ice melt freshening the waters of the ocean surface south of Greenland slowing the approaching warm Gulf Stream. Normally, the Gulf Stream carries salty water through this region which grows more dense as the warm water travels into the cooler North Atlantic causing the surface water to sink and return toward the tropics in a subsurface counter current (known as the Atlantic Meridional Ocean Current or AMOC).

The research concludes the AMOC is slowing due to the increasing ice melt south of Greenland. While this potential dynamic became evident diagnostically in 2013 and (interestingly) coincided with the northeast North Pacific warm blob the research claims this regime is hundreds of years and possibly over a century old and is possibly induced by increased human activity. Frankly, as one reads a summary of the research there are disagreements to the conclusions and other scientists have concluded the research "depends on your trust in the models".

Climate Impact Company mentions these regional SSTA events not because of a potential climate change implication as attributed to human activity but due to the sudden influence on regional climate outside of the normal climate predictors such as El Nino southern oscillation (ENSO). The western North America drought (except for a brief wet interruption by El Nino in late 2015/early 2016) of 2013-2016 was profound. The upper ridge pattern persisting much of that time was also linked to the downstream intensity of the 2013-14/2014-15 "polar vortex winters" which also brought unexpected harsh cold and record snow to North America.

Conversely, the un-forecast dissipation of the warm blob in the northeast Pacific Ocean during the 2016-17 winter lead to flooding rain and heavy mountain snow for California. All of these events were mostly unrelated to ENSO.

In the North Atlantic a total of 14 of 18 years from 1995 to 2012 brought above normal numbers of hurricanes to the basin each summer and early autumn. Suddenly, in 2013 to 2016 below normal hurricane activity occurred

for 4 consecutive years which was unexpected and not forecast. The theorizing of a slow-down in the AMOC occurred during this time frame to help explain the lack of hurricanes. Scientists also proposed the long-term cycle of the Atlantic multi-decadal oscillation (AMO) which flipped to the warm phase in the mid-to-late 1990's might be reversing to the cool phase in 2013-2016 which would suggest a long-term slowdown in North Atlantic hurricanes, lowering risk of U.S. drought and a cooler climate in Europe.

The cool pool south of Greenland remained in-place last summer but otherwise the North Atlantic warmed dramatically and one of the strongest tropical cyclone seasons on record in the North Atlantic emerged. The super active 2017 tropical cyclone season in the North Atlantic seems to disrupt the AMO slow-down/reversal in AMO theory.

However, the first quarter of 2018 has brought a dramatic cool-down of the North Atlantic tropics and the AMOC slow-down may still be the link. The cooler waters in the tropics including upper ocean heat in this region has diminished such that unless a dramatic warming can generate during the next several months North Atlantic hurricanes could be surprisingly low again in 2018 and similar to the 2013-2016 climatology.

Most important, the commentary on the warm and cool blobs provided gives rise to the new emergence in different sectors of the global oceans able to produce regional SSTA regimes which cause dramatic change in local climate. The most recent less publicized examples are the warm blob east of Australia this past summer attributed to record heat in Eastern Australia and unusual warmth either side of central South America attributed to Argentina drought.

Sudden warming (or cooling) SSTA regions have influence on local regional climate which can affect climate throughout the hemisphere. As an example, the western North America ridge during winter 2013-14/2014-15 linked to the warm blob in the northeast Pacific caused the prevailing climate downstream across Europe and into Western Russia each winter season.

The blob SSTA phenomenon is now. These episodes were not persistent until this decade therefore watching for evolution of regional SSTA extremes becomes an important climate predictor and exceptionally critical for

influences on global markets due to the evolving and usually unexpected harsh climate that can develop.

“Flash drought” is a phrase used for the rapid onset of a drought climate. Flash drought was observed in California mid-to-late last year and in Argentina this past summer. Dramatic influence on water supply, crops and increased weather-related hazards dramatically affected economies. The regional SSTA warming/cooling zones lead to what Climate Impact Company refers to as a “flash climate”. Looking out for flash climate generally not linked to conventional climate predictors such as ENSO becomes extremely important for global economies going forward.