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Mar 12, 2015

### Atlantic multi-decadal oscillation dominates Chinese drought

For many years, China's climate patterns have been linked to the Pacific Decadal Oscillation (PDO), a pattern of warming and cooling that shifts phases every 20 to 30 years. This pattern is so well established that many modelling tools are based on the assumption that the PDO is the dominant influence on China's climate; the influence of the Atlantic Multi-decadal Oscillation (AMO) has received less attention.

Researchers from the US and China have discovered that in the early 1990s the balance shifted, and the AMO is now the dominating factor for China's climate. The scientists have also shown that this shift is a consequence of global warming.

"After the early 1990s, drought patterns in China are no longer

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influenced by the PDO, but rather the AMO," said Jin-Yi Yu from the University of California, Irvine. "We believe climate tools should be revised to include first-order effects of the AMO."

Yu and colleagues examined the decadal variations of summer-drought frequency across Eastern China from 1956 to 2005, to identify their linkages to the PDO, AMO and climate change. They looked at monthly precipitation, surface air temperature, the PDO index, the AMO index and annual-mean northern-hemispheric surface temperatures.

The team found that while the PDO used to be the dominant controlling factor, its importance to China summer droughts has diminished since the early 1990s. Since then, drought patterns in China have been more strongly influenced by the AMO.

"This positive phase of the AMO has happened before," said Yu. "It happened some time before the 1960s, but a global cooling occurred at the same time, cancelling out the AMO's influence. The summer-drought pattern in China after the early 1990s has entered a new era that is more controlled by the conditions in the Atlantic Ocean than by the conditions in the Pacific Ocean. We want to make people aware of this, as many still assume that the PDO dominates."

This study builds on Yu's previous work, which found a shift in El Niño location around the same time as the shifting emphasis for climate patterns in China from the PDO to the AMO.

"This is a new central-Pacific El Niño," said Yu. "In the coming



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years, at around 2020, the AMO is due to go into another negative phase. Now that we better understand the influence of the Atlantic Ocean on drought patterns in China, we hope that our work will help to improve climate predictions in the region."

The team reported the findings in [Environmental Research Letters \(ERL\)](#).

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#### About the author

Nadya Anscombe is a contributing editor to [environmentalresearchweb](#).

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