

Climate changes in the Atlantic can affect drought in distant regions

June 16 2010

Cyclical changes in atmospheric pressure and sea surface temperature in the North Atlantic Ocean affect drought in the Sahel region on the southern Sahara rim. This has been revealed in an international study carried out by researchers from the University of Haifa, the French National Meteorological Service, Columbia University and the University of San Diego. The study was published recently in the scientific journal *Atmospheric Science Letters* (Royal Meteorological Society).

That [climate](#) variability in one region can have an effect on more distant areas is known in the [climate research](#) literature - the challenge being to locate these far-connections and understand their projections. The current study, co-authored by Dr. Shlomit Paz of the Department of Geography and Environmental Studies at the University of Haifa, analyzed a number of climate parameters in the North Atlantic over the 20th century, including atmospheric pressure at sea level and [sea surface temperature](#). They revealed two "natural climate signals": a multi-decadal signal of a period exceeding 40 years, and a quasi-decadal signal with periodicity ranging from 8 to 14 years. These two signals may cancel or enhance one another.

In order to establish these findings, the scientists compared them with climactic fluctuations as observed in coral and tree-ring studies, by which the temperature values of the past few hundred years can be reconstructed. The signals were identified in this case too.

Next the researchers identified a correlation between the cyclical waves and droughts in the Sahel region: When the [Atlantic Ocean](#) cools, there are droughts in the region, and when the Ocean temperature rises, rain returns to the Sahel region. They also found that during drought periods in the Sahel, the force of hurricanes in the Atlantic drops; and vice versa.

This is not merely a theoretical study, Dr. Paz explains. The Sahel region suffered drought over more than 20 years, from the 1970s to the mi-1990s, which caused deep environmental and social crises, such as hunger, civilian desertion, ethnic conflicts, and more. In 2007 the UN published a report stating that the situation in Darfur was intensified by the ongoing [drought](#) in the Sahel region and its surroundings.

This study contributes to information availability for climatic models, thereby improving their prediction capability. The researchers are currently investigating whether current human activity has an impact on these phenomena and are examining the effects of the signals on today's climate in Europe. They note that the thermal imbalance caused by urban development makes the research more challenging. "Today we are able to gain a better understanding of how the oceans play an important role in the earth's 'climate memory'. Once we become familiar with the natural signals, we will be able to better understand how the human factor correlates with climate," Dr. Paz states.

Provided by University of Haifa

Citation: Climate changes in the Atlantic can affect drought in distant regions (2010, June 16) retrieved 19 April 2024 from

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