



## **CHANGES IN THE HYDROLOGICAL CYCLE OVER THE USA DURING THE PAST CENTURY**

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Over the contiguous United States, precipitation, temperature, streamflow (in particular, base streamflow), heavy and very heavy precipitation and high streamflow in the East have increased during the 20<sup>th</sup> century. In the past 50 years, in addition to these changes, increases in evaporation, near-surface humidity, total, low, and convective cloudiness; earlier snow cover retreat, streamflow peak, and spring onset in the West; and a decrease in near-surface wind speed have been documented. Along the Atlantic coast, there was no noticeable century-long change in hurricane-related precipitation, while total precipitation and the frequency of “very heavy” precipitation *unrelated* to tropical storms has significantly increased. During the last four years (1999-2002) precipitation was below average over most of the country while temperature was well above the average values. The up to date consequences of this recent development for the hydrological cycle will be presented.

Alaska is one of the focal regions of global and high latitudinal warming. Here, during the past fifty years a significant warming has been accompanied by increases in the duration of the growing and frost-free seasons, degree-days above 15° C, the frequency of winter thaws, earlier snow cover retreat, and by decreases of heating degree-days. Total increase in precipitation over the state has not been spatially homogeneous. Changes have been accompanied by a redistribution between frozen and liquid forms. This redistribution complicates the accuracy of trends of precipitation due to changing biases of the cold season precipitation measurements but accounting for these biases has considered here. Along the northern slope of Alaska, where cold season precipitation has not increased, a strong permafrost warming is evident.