



Global climate change and associated precipitation inequality over the Ukraine

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The aim of presentation is the analysis of the climatology of precipitation inequality over the Ukraine and its change and variability associated with global climate processes.

Daily precipitation from 19 hydrometeorological stations of Ukraine in XIX-XXI centuries and global Had CRU data sets were analyzed. The method based on Gini index (GI) calculation was used for estimation of precipitation inequality (in this case GI characterizes the contribution of the heavy rainfalls into the total amount of precipitation). Comparison of GI trends with the surface temperature trends permits to analyze the role of regional warming in change of precipitation inequality. In addition, the standard statistical methods were applied to study the variability of this irregularity associated with North Atlantic oscillation (NAO), El-Nino-Southern oscillation (ENSO), Atlantic Multidecadal oscillation (AMO) and Pacific Decadal oscillation (PDO).

At first, the typical GIs were estimated for the cold and warm seasons and for the entire year. They vary on the Ukrainian stations from 0.58 at the North-West and North-East to 0.64 at the southern regions.

Next, the GI trends in winter (DJF) and summer (JJA) seasons and for entire year were estimated. Their spatial distribution over the Ukraine shows the following features. Yearly GI trends are negative (about -0,0005/100 years) for the most regions of the country, including the Carpathian, forest and forest-steppe zones where intense warming occurs. Positive trends dominate in the steppe regions of Ukraine. They increase southwards and reach 0,0003/100 years in the seaside of the Crimea where warming is mostly insignificant. Principal seasonal differences in the GI trends were found. In summer, over the most territory of Ukraine, except the steppe zone, GI trends are negative, while in winter they are mostly positive. It is shown that contribution of summer heavy precipitation into the total amount of precipitation is 2-3 times more than in winter.

Finally, the interannual and decadal variability of GI induced by AMO, PDO, NAO and ENSO is studied. It is shown that up to 60% of precipitation inequality in XIX-XXI centuries over the Ukraine is associated with joint influence of global processes in the ocean-atmosphere system.