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ABSTRACT BOOK

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Using CORDEX data to estimate future hydro-ecological conditions in North-Western Black Sea coast

Valeriy Khokhlov, *Odessa State Environmental University, Ukraine*

Valeriy Khokhlov, Yurii Tuchkovenko, Larisa Nedostrelova,
Odessa State Environmental University, Ukraine

The future hydro-ecological conditions in small watersheds of Southern Ukraine were estimated using the outcomes from the CORDEX Project – the 14 runs of 5 regional climate models (RCM). In the nearest future, 2021–2050, the rising temperature (about 0.8 °C per 30 years) and steady precipitation (~470 mm per year) during 2021-2050 in Southern Ukraine will be probably observed. Let's note that precipitation will usually decrease in Ukraine and the southern region is rather an exception to the rule. In this Figure, we can see (i) changeable increase of temperature and a sharp decrease of precipitation during the 2023-26; (ii) sharp increase of temperature following a decrease of precipitation during the 2028-31; and (iii) sharp decrease of temperature against the steady precipitation background during 2037-40. We used the standardized precipitation evapotranspiration index (SPEI) to investigate spatiotemporal droughts variability caused by climate change. The SPEI is the multi-scalar drought index and allows determining the onset, duration and severity of drought conditions on different time scales. It is common practice to assess the hydrological droughts on the time scale 13–24 months. The analysis of nearest-future SPEI time series showed that the trend to drier conditions will be expected in North-Western Black Sea coast – the next long and severe droughts can be registered about 2025 and after 2030. Moreover, we can expect in all likelihood that the period 2031-2040 will be driest, and duration of drought in that region will be a few years. We also considered a connection between time series of the SPEI on the 24-month time scale and annual runoff on a few hydrological sites in some small watersheds. The temporal features of water flow changes are in close agreement with the SPEI24 during the nearest future – all years with high water flows were registered during the wet years, i.e. the absence of atmospheric droughts.

Keywords: Termperature, Droughts, Runoff