

The **purpose** of this study is a comprehensive analysis of drought indicators and atmospheric processes to identify the conditions for formation of severe agricultural drought in the Odessa region.



Position of the Odessa region on the map of Ukraine

Material and Methods

1. Monthly grid dataset of SPI index (0.5 degree) from the IRI Analyses SPI. The values of $SPI \leq -1$ indicate a drought.
2. Monthly index of NDVI anomalies:

$$NDVIA = \frac{NDVI_i - \overline{NDVI}}{\sigma_{NDVI}}$$

The values of $NDVIA \leq -1$ indicate a drought.

3. The ECBI (European Continental Blocking Index), based on assessment of the state of zonal flow at level 300 hPa. This index is calculated using data of NCEP-NCAR reanalysis for the area (10-60 E and 40-60 N):

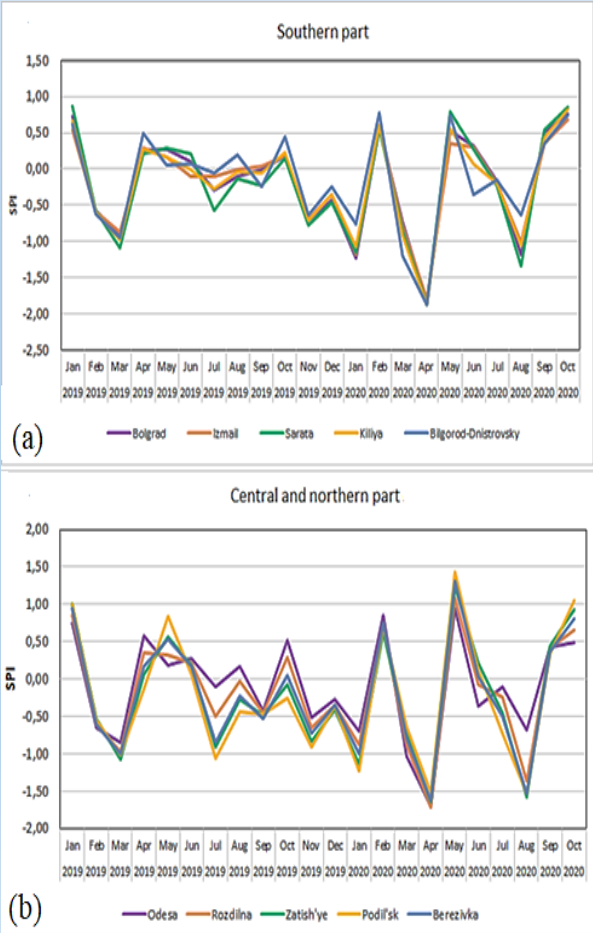
$$ECBI = 1 - \frac{\overline{u}_{pt}}{\overline{u}_{cl}}$$

The values of $ECBI > 0$ indicate a blocking event.



Results

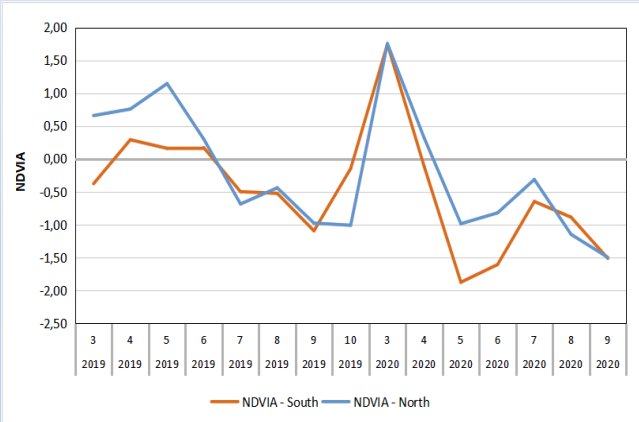
Time course of the SPI



Some meteorological aspects of severe agricultural drought in the Northern Black Sea region in 2019-2020

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Time course of the NDVIA



Conclusions

The analysis shown that the long-term deficit of precipitation was caused by the high frequency of the high pressure field in the lower and middle troposphere, as well as the lack of conditions for the accumulation of soil moisture in the previous winter period due to the high air temperatures and the absence of cyclogenesis processes.

Time series of the ECBI

