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Abstracts

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Atmospheric Teleconnection and Crop Yield in North Kazakhstan

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Presents the results of studying the spatio-temporal patterns of atmospheric droughts as one of the most important factors in the formation of crop yields. The influence of some potential predictors characterizing teleconnection in the coupled "atmosphere-ocean" system affecting their formation is analyzed. The spatial relationships between atmospheric aridity at the individual stations of the investigated area and the wheat yield in Kazakhstan as well as its relationship with potential predictors using econometric methods were determined. High correlation was shown between El-Nino-South Oscillation (ENSO), North Atlantic Oscillation (NAO) and crop yield fluctuation. The model could be modified further so that the individual components could be forecasted into the future using various forms of time series in ARIMA model.

In the Article adduced the important results connecting the Multivariate ENSO Index (MEI) and North Atlantic Oscillation (NAO) indices with standardized moisture index Kσ.

In most cases (56%) of drought in Kazakhstan, especially strong (80%) arise in the negative phase of the MEI. In 1983 and 1998, was celebrated at least there is a strong MEI and El Nino in Kostanai region observed catastrophic drought. Positive NAO index values determine the formation of drought in the area under 72% of cases.

Our results reflect the most recent discoveries in the climatic drivers for crop yields. We have identified several effects to be significant in the model of wheat yield in Kazakhstan, most importantly, the connection between El-Nino and soil moisture, resulting from precipitation and temperature dynamics. The model could be modified further so that the individual components could be forecasted into the future using various forms of time series ARIMA model. The resulting integration of these forecasts allows to predict the wheat yields into the future.