

# **On The Role of The Regional Weather and Climate To Air Pollutant Transport over Ukraine**

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### **Abstract**

In the work, we study the impacts of regional weather and climate on the transboundary transport of pollutants from the atmospheric boundary layer (ABL). Like many other regions, the state of the regional climate is characterized by a long-term increase in the near-surface air temperature in all seasons. Steady changes in the complex of meteorological parameters are noted, warming is accompanied by a negative trend in the amount of precipitation and an increase in the sunshine duration and incident solar radiation. As a result, the climate vulnerability of most regions is increasing, especially in summer when the probability of droughty events and heat waves increases in most regions. Last years air quality in Ukraine was assessed as “Moderate”, corresponding with figures suggested by the WHO. Climate vulnerability is coupled with increased pollution in the southern and eastern industrial regions. The largest share of emissions comes from the Donetsk-Krivbass region which contributes a massive 79% of total emissions in the country. The same region is subject to increasingly frequent droughts, which have also spread further north and west over the past decades. Ongoing warming is accompanied by changes in atmospheric circulation, with greater temporal residence of weather patterns, including the greater intensity of like-blocking events. On the other hand, winter weather implies northward displacement of cyclone tracks, which leads to an intensity in westerlies, and the deepening of cyclonicity in the Mediterranean sector, which can be illustrated by MOI indices. The main routes of pollutant transport are different in different seasons, the most intense in winter, the least intense in summer. In winter, the main direction is east-northeast, that is, beyond the borders of Ukraine; in summer, the transport of pollutants is much less intense and they can accumulate over southern and eastern regions in stable ABL.

### **Early Career Scientist**

NO, I am not an early career scientist.

### **IGAC Activities**

MAP-AQ: Monitoring, Analysis and Prediction of Air Quality