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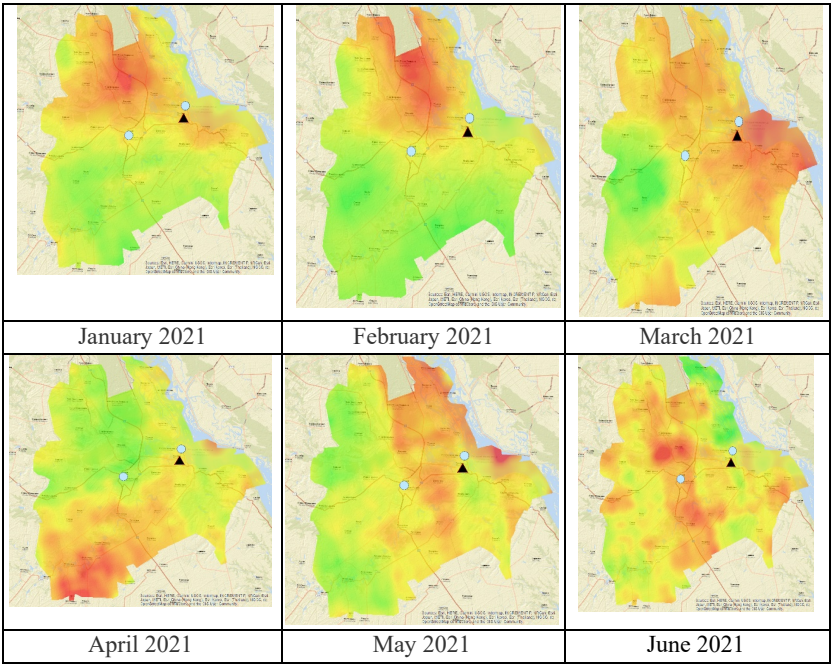
Monitoring of air quality using the remote satellite approach

An approach to the definition and mapping of air pollution around thermal power plants is proposed based on heterogeneous satellite imagery data and the web platform for cloud geospatial calculations Google Earth Engine.

Satellite monitoring

In recent years, remote satellite sensing has become one of the most important method of monitoring of air pollutants such as CO, CO_2, NO_x, SO_2, including the monitoring changes of these pollutants regionally and globally, estimating their emissions, tracking of their movements and determining concentrations in the surface atmosphere.

Observation and mapping of air pollution in the area of the TPP (thermal power plant) by remote satellite methods was provided on the example of Trypillya TPP, which is located near Ukrainka, Obukhiv district, Kyiv region.



January 2021	February 2021	March 2021
April 2021	May 2021	June 2021

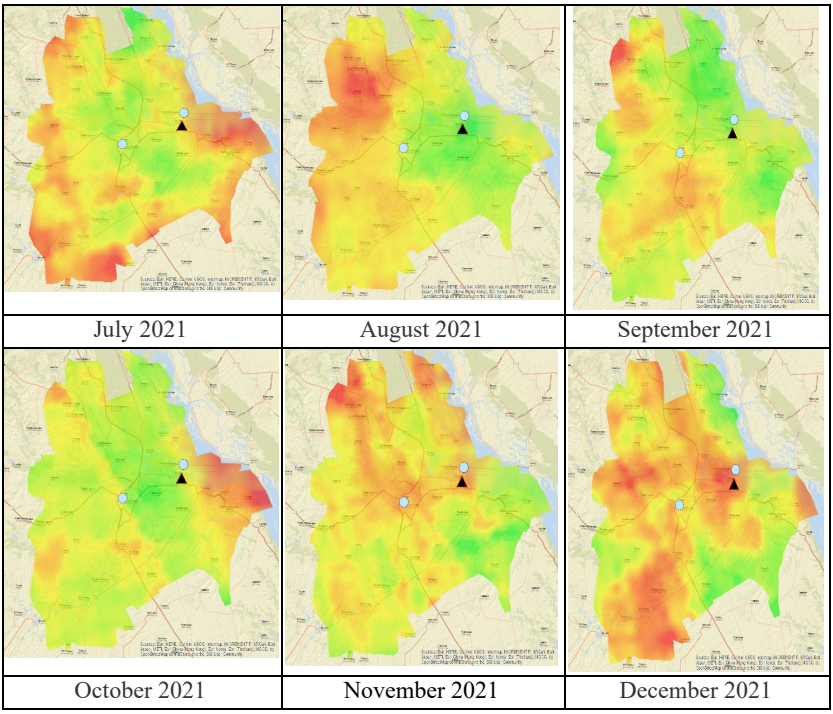


Fig. 1 - Distribution of aerosol index values over the study area from January to December 2021.

As we can conclude from the satellite images taken on the territory of the Thermal Power Plant the most polluted air background is during the winter months. It is closely connected with the working period of the Thermal Power Plant, that's because it generates warmth for houses mainly in the colder winter months. In the result of this, more pollutants enter the ambient atmosphere and can create these clouds of polluted gaseous aerosol. In the other months, the pollution can be created not only by the Thermal Power Plant, but also by the other industrial or technical facilities that can be included into the observation zone, but even from the other regions because of the constantly moving wind masses.

The «red» level of pollution can highly damage the ecological stance of the territory and it cannot be stabile for permanent existence. Other indicators are pleased for living, but also have some negative impact on the environment.

Using the remote satellite monitoring approach, we can easily find, locate, observe the places with different kind of pollution. For example: NO^2, CO^2, SO^2, AQI and even the thermal pollution.

References

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