

EGU2020-10587

<https://doi.org/10.5194/egusphere-egu2020-10587>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Nutrient Losses to the Siverskyi Donets and Dniestr River Basins (Ukraine)

Olha Ukhan, Yuliia Luzovitska, Nataliia Osadcha, and Volodymyr Osadchyi

Ukrainian Hydrometeorological institute, Hydrochemistry, Kyiv, Ukraine (ukhan_o@ukr.net)

For the quantitative assessment of the circulation of fluxes, the differentiation between point, quasi-stationary sources and diffuse, non-stationary sources play a significant role. The firsts include municipal and industrial wastewater discharges. The flow of substances from diffuse sources depends substantially on the landscape characteristics of the basin, water runoff, etc. In contrast to point sources, which always have an anthropogenic origin, the diffuse flow is associated with both natural processes and the influence of human activity.

The aim of this work was to estimate the diffuse flow within the Ukrainian part of the Severskyi Donets and Dniester basins. The focus was on evaluating the nutrients emission, among which nitrogen and phosphorus compounds were considered.

To quantify nutrient emissions from point and diffuse sources the special conceptual approach was proposed. It was a simple method for the first assessment which didn't require detailed initial information and was based on the catchment characteristics, export coefficients and statistical data.

The Dniester basin is located in Eastern Europe and flows through Ukraine and Moldova into the Black Sea. According to the natural conditions it's divided into 3 separate parts: Upper Carpathian, Middle Podil and Lower Dniester.

The main nitrogen pollution in the Dniester basin is caused by diffuse sources of agricultural origin. Their share in Podil Upland (about 80%) and Low part (about 90%) significantly exceeds the corresponding values in the Upper Dniester of 60%. This is due to the fact of occupying by forests about 30% of the slopes of this mountain part.

About 30% of the total phosphorus emission is formed within the Upper Carpathian part. Municipal discharged and agricultural territories approximately equally determined this load. On the contrary within the plain territory the role of agriculture was dominant and increased from the middle to the lower part of the Dniester river - from 55 to 75%.

The Siversky Donets basin is located on the southwestern slope of the Central Russian Upland within forest-steppe and steppe zones. One of the features of this basin is the extremely high level of cultivation resulting significantly water pollution. More than 78% of the territory is covered by agricultural lands, what is much large compare to many European countries, where it does not

exceed 35%. This is due to the dominance within the Siverskyi Donets basin of the most fertile chernozem soils. Disruption of the soil cover due to plowing led to significant nutrient losses due to deflation and water runoff.

More than 80% nitrogen emission are strongly affected by arable lands. The rest of the factors have a negligible impact. Compare to nitrogen the dominant part of phosphorus load comes to rivers as solid particles due to erosion processes - 56% and 36% - due to agriculture.