



Co-funded by the
Erasmus+ Programme
of the European Union



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**TRACING THE NITROGEN SOURCE IN
GROUNDWATER**



JAROSLAV ČERNI
WATER INSTITUTE

International Symposium "Water Resources Management: New Perspectives and Innovative Practices,"
Novi Sad, 23-24 September 2021

Groundwater



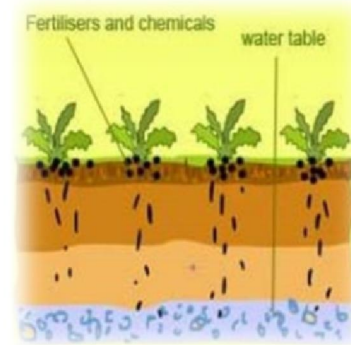
- More than 97% of the total quantities of fresh water on Earth is groundwater;
- Slow groundwater flow, pollutant persistence;
- Prevailing conditions determines pollutants fate;



Groundwater



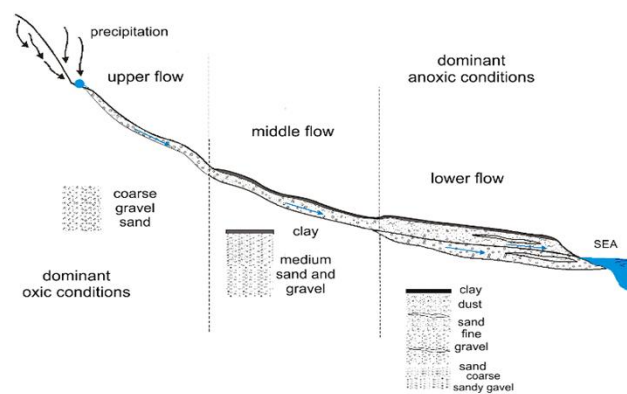
- Groundwater composition;
- The importance of groundwater for Serbia;
- Aquifer's self-purifying potential – agrochemicals;



Groundwater



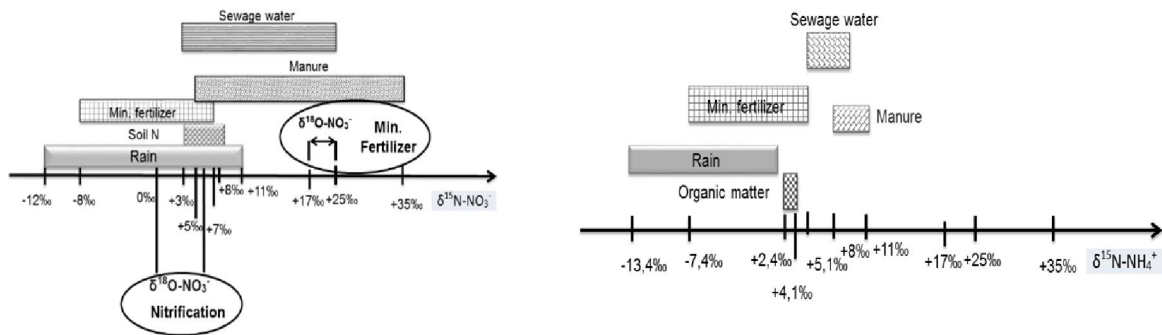
- Nitrogen transformation conditions;
- Oxygen content, geology;
- Boron, NO_3^- , NH_4^+ , Cl, Na, TOC: NO_3^- ,
- H_2S ...;
- Stable isotope analysis:
 - $\delta^{15}\text{N}-\text{NO}_3^-$ range is -8.3 to + 65.5 ‰
 - $\delta^{15}\text{N}-\text{NH}_4^+$ range is -8.5 to + 23.8 ‰



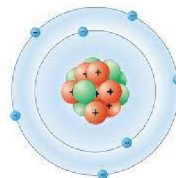
Groundwater



Characteristic ranges of isotopic signatures of stable N isotopes depending on source



Groundwater



To maintain the basic, autochthonous groundwater quality and to determine the vulnerability of groundwater to certain pollution the simultaneous complex analysis of agrotechnical, physico-chemical and hydrogeochemical data must be conducted.

Nitrogen sources in groundwater under agricultural areas should be studied by simultaneous analysis of concentrations levels of O_2 , NH_4^+ , NO_3^- ; TOC; changes in concentration levels of anthropogenic tracers B, Cl, Na; by examination of state condition parameters (pH, redox potential) and isotopic signatures of stable isotopes of nitrogen and oxygen.



**Thank you for your
attention!**

