

# The random walk of pollutants through river catchments

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River catchments play critical roles in regional economies and in the global economy. In addition, rivers carry large volumes of nutrients, pollutants, and several other forms of tracers into the ocean. An intricate system of pathways and channels, both on the surface and in the subsurface of catchments, allows rivers to carry large volumes of tracers. However, scientists do not yet fully understand how pollutants and other tracers travel through the intricate web of channels in the catchment areas of rivers.

In a new study, Cvetkovic et al. show that the travel path of tracers through channels can be modeled as a random walk, which is mathematically similar to the path an animal would trace when foraging. Previous studies have applied the random walk approach to understand the behavior of fluids flowing through [aquifers](#) and soils but not to model the transport mechanism of tracers that travel passively with water flowing through catchments.

The authors also show that the random walk behavior of tracers in river catchments depends on how the velocity of particles in the catchment has varied over time; the variability in velocity in turn depends on how the physical space of the channel itself has evolved over a long time. Their study provides a new approach to understanding transport of tracers, such as pollutants and nutrients, within a river catchment.

**More information:** “Water and solute transport along hydrological pathways” *Water Resources Research*, [doi:10.1029/2011WR011367](https://doi.org/10.1029/2011WR011367),

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