Geophysical Research Abstracts
Vol. 18, EGU2016-11052, 2016
EGU General Assembly 2016


# Nitrogen processing in the hyporheic zone and its response to stream-groundwater interactions

Stanley Grant, Morvarid Azizian, and Fulvio Boano
(sbgrant@uci.edu)

Modeling and experimental studies have shown that stream-groundwater interactions reduce hyporheic exchange, but the implications of this observation for hyporheic zone function are not yet clear. In this study we develop and test a simple process-based model for nitrate cycling in the hyporheic zone of a gaining or losing stream. Our model reproduces field measurements of nitrate uptake velocity and predicts that stream-groundwater interactions: (1) reduce hyporheic exchange; (2) reduce the residence time of water in the hyporheic zone; (3) slow denitrification; and (4) can cause stream sediments to switch from a net sink to source of nitrate. Stream-groundwater interactions attenuate denitrification across at least two scales of hyporheic exchange (fluvial dunes and riffle-pool bedforms). These results suggest that changes in regional groundwater hydrology (e.g., brought on by climate change) can indirectly affect stream nitrogen budgets by altering the form and function of the hyporheic zone.