

From submarine to lacustrine groundwater discharge

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Abstract Submarine groundwater discharge (SGD) and its role in marine nutrient cycling are well known since the last decade. The freshwater equivalent, lacustrine groundwater discharge (LGD), is often still disregarded, although first reports of LGD are more than 50 years old. We identify nine different reasons why groundwater has long been disregarded in both freshwater and marine environments such as invisibility of groundwater discharge, the size of the interface and its difficult accessibility. Although there are some fundamental differences in the hydrology of SGD and LGD, caused primarily by seawater recirculation that occurs only in cases of SGD, there are also a lot of similarities such as a focusing of discharge to near-shore areas. Nutrient concentrations in groundwater near the groundwater–surface water interface might be anthropogenically enriched. Due to spatial heterogeneity of aquifer characteristics and biogeochemical processes, the quantification of groundwater-borne nutrient loads is challenging. Both nitrogen and phosphorus might be mobile in near-shore aquifers and in a lot of case studies large groundwater-borne nutrient loads have been reported.

Key words surface water; groundwater; lake; nutrient budget; water budget; submarine groundwater discharge; lacustrine groundwater discharge