



Characterization of sources of water in karstic aquifers in the watershed of Paris by measurement of the isotopic composition of various forms of nitrogen

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In order to supply Paris on drinking water, many springs located around the city are exploited by 'EAU DE PARIS' company. This study is focused on five groups of springs located south of Paris. They are placed in two neighboring watersheds: Villemer, Villeron are situated in the Lunain watershed (important agricultural activity) and Bourron, La Joie and Chaintréauville are in the Loing watershed (big part of its surface covered by forests). They are located in karst formations resulting of the Senonian chalk weathering. The hydrochemical and geochemical characteristics of the springs are very different although they are close geographically. In Villemer spring, a high turbidity sometimes with specific bacterial contamination and phytosanitary products are observed. Nitrate concentrations are between 30 and 50 mg/l. In the Villeron site (group of springs), the inter-annual and seasonal variability of nitrate is less important than Villemer, but the concentrations are much more important (50 - 55 mg/l). Phytosanitary substances are present. In the Bourron site, nitrate concentrations are the lowest and produces the largest daily discharge (phytosanitary products are not present) at the opposite of La Joie and Chaintréauville springs where the nitrate concentrations exceed the drinking water standard limited value (50 mg/L). Daily water production is good. Many previous hydrogeologic studies, especially artificial tracing,

have shown that waters of the Lunain River are connected with all the three springs. To better understand the origin of nitrates isotopic measurements were made ($\delta^{15}\text{N-NO}_3^-$ and $\delta^{18}\text{O-NO}_3^-$) during high and low flow periods. First results show that: - Villeron Site: the springs are supplied by groundwater in low and high water flows and they are affected by an additional contribution of agricultural water in the high flow period. - Villemer spring: may be resulting from a supply of surface water to groundwater in the low flow period and from an additional supply of agricultural water and domestic waste water in the high flow period. - In Bourron springs, no differences were observed between the two periods.