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In the framework of the franco-canadian ANR-NSERC project G-BASELINE, 12 groundwater samples from the albian aquifer of the Paris Basin have been analyzed for major and traces elements, and also for oxygen and hydrogen isotopes of the water molecule, sulfur and oxygen isotopes of dissolved sulfates, carbon, strontium, lithium and boron isotopes, and finally uranium disequilibria.

Waters plot on the meteoritic line in the $\delta^{18}O$-δD diagram, and display $\delta^{13}O$ clustering at -10.5±1 ‰. $\delta^{18}O$ and $\delta^{34}S$ of dissolved sulfates are very low, as low as -22‰ for sulfur isotopes. This probably results from the oxydation of pyrites that may be present in the aquifer. This in turn indicates that gypsitic minerals (also occurring in the albian aquifer) do not contribute significantly to the sulfur isotopic signature. Lithium isotopic signatures scatter between 1.7 and 16.9‰. Strontium and boron isotopic signatures vary between 0.7074 and 0.7087, and between -0.5‰ and +25.6‰, respectively. This probably reflects the contribution of the glauconite to the isotopic signature of albian waters, as the lowest Sr isotopic ratios are associated with low $\delta^{11}B$. Indeed, water/rock interaction processes with phyllosilicates are known to result in low $\delta^{11}B$ in the waters, and the lowest Sr isotopic ratios match the albian seawater Sr isotopic composition. The highest $\delta^{11}B$ are measured in goundwaters that locate in the Paris region, more precisely North-East of the city. Their boron isotopic signatures (from +8.2 to +25.6‰) are best explained by a geochemical influence of the brines from the underlying dogger and/or upper triassic aquifers. Such an hypothesis agrees with recent geophysical studies, which conclude to the occurrence of drainage processes between the albian and underlying aquifers in this area [1]. Finally, $^{234}U/^{238}U$ activity ratios may be extremely high, as high as 21 north of Paris, indicating important water/rock interaction processes.

[1] Dentzer, Ph D. Thesis, Pierre et Marie Curie University, Paris, 2016.