Examining the Hydrogeochemical parameters of a multilayer karst system using high-resolution auto-monitoring. The case of Toulon springs (Dordogne, France)
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Toulon springs, one of the main springs in Dordogne, are located in Périgueux (Dordogne, France), at the northern edge of the Aquitaine Basin. Toulon springs are the main perennial outlet of the Turonian aquifer, with annual average discharge of 0.45 m3 s. These springs are fed by a multilayer karst aquifer from the upper Cretaceous and upper Jurassic. The objectives of the current study are to delineate the degree of participation of reservoirs (Santonian, Coniacian, Turonian, Jurassic). A new methodology based on high-resolution auto-monitoring of hydrogeochemical parameters of a karst system will be employed to the karst system.   It is possible with the aid of the automatic sensors allowing monitoring of several parameters such as temperature, EC, pH, redox potential, dissolved oxygen, turbidity. Another advantage is that there is a spectrophotometer which measures absorbance across the UV-Vis range (200-750 nm, at 2.5 nm intervals). These can lead to a precise measurement of DOC, TOC, and nitrate. These are immersed and installed at the outlet of the Toulon karst system. Interpretation from high-resolution auto-monitoring chronicles enable identification of quick flow condition during flood events (flushing effect from storage, water with low residence time, or nitrate responses of the karst system (mobilisation or dilution). At annual scale, time-series data are analyzed to show correlations between several parameters (flow dissolved oxygen turbidity + temperature EC + NO_3^- COT). This analysis by signal confirms the participation of waters from several reservoirs (Santonian, Coniacian, Turonian, Jurassic). Use of high-resolution auto-monitoring based of several parameters improve characterization of quick responses of karst aquifers to rainfall. This auto-monitoring enable to focus on the changes in hydrogeochemical processes. Results of this current study will help to improve knowledge of conceptual models of flow and transport in karst aquifers.