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Relationships between natural fluorescence and organic matter content based on sampling and *in-situ* monitoring of groundwater. Application to the karst systems of the Lez and Fontaine de Nîmes springs

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Natural fluorescence; Organic carbon flow; Continuous monitoring

In karstic aquifers, changes in organic content are now commonly used to track the arrival of water from rapid infiltration (Blondel et al., 2010). Along with physico-chemical and hydrodynamic monitoring, the continuous monitoring of Total and Dissolved Organic Carbon (TOC/DOC) can thus be used to enhance our understanding of karst flows processes and karst vulnerability to pollution.

In addition to laboratory TOC analyzer, different optical approaches have been proposed to measure organic contents in waters, based on fluorescence or absorbance properties of the organic compounds (Coble, 1996). First studies dealing with fluorescence spectroscopy on karstic aquifers highlighted two distinct compounds of fluorescent organic matter, denoted humic-like and protein-like (Mudarra et al., 2011; Quiers et al., 2013). This approach however requires analyses on water samples, and is consequently limited to punctual monitoring. Other studies focused on continuous measurements of natural fluorescence by using field fluorometers, initially designed for continuous measurement of artificial dye tracers. Recent results highlight that field fluorometers can be used to measure humic-like substances, while protein-like compounds need further developments (Durepaire, 2014). Based on such *in situ* monitoring, correlation between TOC/DOC and natural fluorescence data is not straightforward and show seasonal variations (Savoy, 2007; Tissier et al., 2013). Our study aims at better understanding the relationships between fluorescence, absorbance and organic content in karst groundwater from two karst systems with contrasted environmental contexts, the Lez spring and the Fontaine de Nîmes spring.These two sites are equipped for physico-chemical and hydrodynamic monitoring, and also with field fluorometers and a submersible UV/VIS spectrometer. Field sampling campaigns are

also carried out in order to compare *in situ* measurements with laboratory analyses and also to sample different types of water that contribute to karstic flows to characterize the origin of the GW organic compounds.

All these data will be gathered to explore and discuss the relationship between TOC/DOC and fluorescence using samples analyses and *in situ* monitoring during the hydrological cycle.