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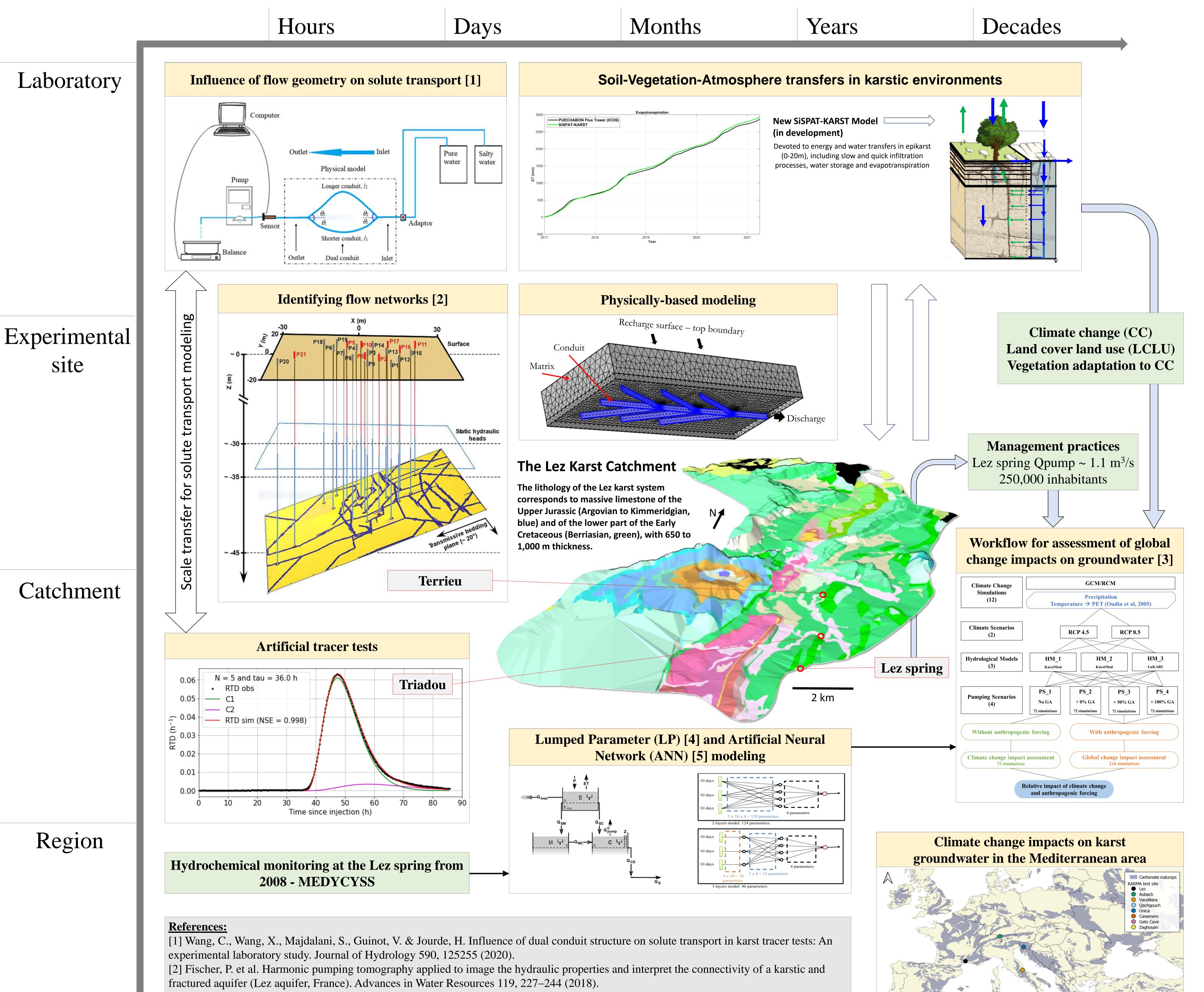
Coupling numerical approaches for a deeper assessment of karst groundwater vulnerability

Vianney Sivelle¹*, Hervé Jourde¹, Pierre Fischer¹, Yohann Cousquer¹, Mohammed Aliouache¹, Guillaume Artigue¹, Guillaume Cinkus¹, Jérome Demarty¹, Alain Dezetter¹, Jordi Etchanchu¹, Vincent Guinot¹, Anne Johannet¹, Véronique Léonardi¹, Samer Majdalani¹, Laïna Pérotin¹, Séverin Pistre¹, Yves Tramblay¹, Marc Vinches¹ and Chaoqi Wang¹.

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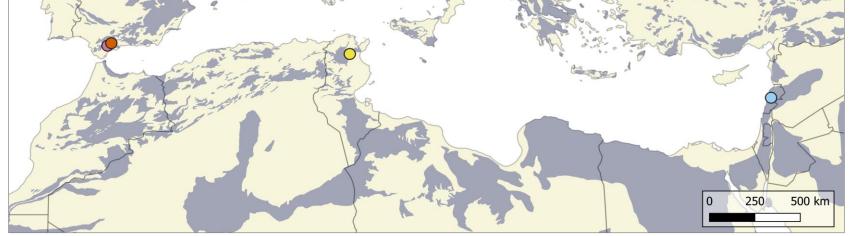
Objective

HydroSciences Montpellier (HSM) laboratory develops various tools for a deeper assessment of karst groundwater resources across a wide range of spatiotemporal scales. The objective is to assess karst groundwater vulnerability (regarding both quantitative and qualitative aspects) in a context of global change.



[3] Sivelle, V., Jourde, H., Bittner, D., Mazzilli, N. & Tramblay, Y. Assessment of the relative impacts of climate changes and anthropogenic forcing on spring discharge of a Mediterranean karst system. Journal of Hydrology 598, 126396 (2021).
[4] Cousquer, Y., & Jourde, H. Reducing Uncertainty of Karst Aquifer Modeling with Complementary Hydrological Observations for the Suitable Management of Groundwater Resources.

[5] Siou, L. K. A., Johannet, A., Borrell, V. & Pistre, S. Complexity selection of a neural network model for karst flood forecasting: The case of the Lez Basin (southern France). Journal of Hydrology 403, 367–380 (2011).



Solute transport

Hydrodynamics

Climate change impacts

Perspectives

The proposed approaches mainly consist in the development of innovative methods for the interpretation of artificial tracer tests. In addition, natural tracers as well as electrical conductivity or dissolved gas provide insight about flow processes within the karst aquifers, and constitutes relevant data for hydrological modelling. Tools for the analysis of non-reactive solute transport with potential application to reactive transport are also developed, with potential perspectives for the simulation of pollutogramme and development of Early-Warning System (EWS).