

Recent advances on the characterization of karst-river interactions during floods

Jean-Baptiste Charlier, Roger Moussa, Stephanie Pinson, Didier Narbaïs, Jean-François Desprats

▶ **To cite this version:**

Jean-Baptiste Charlier, Roger Moussa, Stephanie Pinson, Didier Narbaïs, Jean-François Desprats. Recent advances on the characterization of karst-river interactions during floods. 27th International Karstological School - "Classical Karst", Jun 2019, Postojna, Slovenia. hal-02061364

HAL Id: hal-02061364
https://brgm.hal.science/hal-02061364

Submitted on 8 Mar 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Recent advances on the characterization of karst-river interactions during floods

Jean-Baptiste Charlier[1,*],Roger Moussa[2], Stéphanie Pinson[3], Didier Narbaïs[4], Jean-François Desprats[1]

[1] BRGM, Univ. Montpellier, Montpellier, France

[2] LISAH, Univ. Montpellier, INRA, IRD,Montpellier SupAgro, Montpellier, France,

[3] BRGM, F-45060 Orléans, France

[4] SCHAPI, 42, avenue Gaspard Coriolis, 31057 Toulouse Cedex 01

[*] corresponding author: e-mail: j.charlier@brgm.fr; Tel: +33 (0)4 67 15 79 77

Key-words: surface/groundwater interactions; geomorphological index; model; runoff

Flood hazard and groundwater resource management in karst catchments require a better understanding of hydrogeological processes and notably groundwater/surface water interactions. This is a great challenge due to the heterogeneity of karst aquifers and due to the diversity of karst types (small perched units, wide sedimentary basins, barren/covered karst, etc.). The aim of this communication is to present recent developments on the characterization of karst-river interactions through two main approaches: a spatial approach aiming at localizing karst areas promoting surface flows, and a temporal approach aiming at modelling lateral flows from karst units in rivers.

The first spatial approach is based on the GIS index IDPR (Index of Development and Persistency of River networks, developed by BRGM©), quantifying the hydrological connectivity to the hydrographic network. From the standard version of the IDPR over France (25 m resolution), we propose to compare IDPR calculations differentiating intermittent and perennial reaches of rivers in order to detect infiltrations zones that contributive temporary to rivers, as many karst units.

The second approach is a modelling framework based on the inverse problem for the diffusive wave model, to simulate lateral flow during floods on a reach between two stations. Knowing the upstream and downstream hydrographs, we can model the lateral one, given information on the hydrological processes involved in the intermediate catchment. Applying such approach on river reaches crossed by karst units is a new way to quantify river losses and gains, characterizing localized recharge and aquifer drainage to rivers, respectively.

We propose to illustrate these two approaches through several case studies in France, where a better characterization of karst-river interactions and flood risk management are critical issues.