Role of man-made construction and works on karst sinkhole occurrence

Jérôme Perrin, Gildas Noury, Emmanuelle Rzycka

▶ **To cite this version:**

Jérôme Perrin, Gildas Noury, Emmanuelle Rzycka. Role of man-made construction and works on karst sinkhole occurrence. EGU General Assembly 2019, Apr 2019, Vienne, Austria. hal-02073702

HAL Id: hal-02073702
https://brgm.hal.science/hal-02073702

Submitted on 20 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.

Geophysical Research Abstracts
Vol. 21, EGU2019-19027, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

Role of man-made construction and works on karst sinkhole occurrence

Jérôme Perrin, Gildas Noury, and Emmanuelle Rzycka
BRGM, 3 av. Claude-Guillemin - BP 36009 - 45060 Orléans Cedex 2 - France

Subterranean karst constitutes a natural hazard for infrastructures and people. Human activities can accelerate natural processes, for example as they concentrate water infiltration into the ground. The French Geological Survey has analyzed the role of man-made constructions on karstic ground movements (limestone, chalk, gypsum).
This study includes a literature review, specific experts interviews (other surveys, engineering consulting company, land-use planning public authorities, etc.), and numerical modelling of water saturation under constructions.
This collected information confirms the role of water impoundment structures, leakages from underground pipes or ditches and dry wells, as aggravating or triggering factors of instabilities. In France, the impact of water table decline (due for example to intensive pumping) is currently not observed although 1) it existed in some areas during industrial periods (Paris area during 1980's) and 2) it is well documented abroad, for example in Florida and China. In France, the most prone context for ground movements is the covered karst: soil particles, with low cohesion, are downwashed by the ground water flow into the karstic voids and evacuated by karstic flow. The speed of such processes is highly variable and seems actually difficult to evaluate. Numerical modelling of water infiltration concentrated under two kinds of structure (basin and pipes leakage) provides some key information to evaluate the time needed before downwashing can start to operate (saturated ground). As a conclusion, the study proposes technical solutions to mitigate these specific and damaging ground movements.