

# 23 October 2015 – Royal observatory of Belgium



## HG<sup>2</sup>

# Hydrology, Geophysics and Geodesy

A new way to manage water resources

## ABSTRACT BOOK



Belgian National Committee



International Hydrological Programme



# Program

## 09h00-09h30 Welcome, coffee

- 09h30** Van Camp, M.J.; Camelbeeck, T.  
*Short historic of Membach*
- 09h40** Van Camp, M.J.; Vanclooster, M.; Watlet, A.; de Viron, O.; Kaufmann, O.; Pajot-Métivier, G.; Casenave, F.; Crommen, O.; Dassargues, A. (keynote lecture)  
*Assessing groundwater mass balance: Keynote lecture: Hydrogeodesy in Membach and Rochefort*
- 10h20** Mikolaj, M; Güntner, A.; Reich, M.; Schröder, S.; Wziontek, H.  
*Portable superconducting gravimeter in a field enclosure: first experiences and results*
- 10h40** Watlet, A.; Van Camp, M.J.; Francis, O.; Poulain, A.  
*Hydrogeophysics to monitor the vadose zone of a karst system*
- 11h00** Poulain, A.; Rochez, G.; Hallet, V.  
*Hydrogeological dynamic variability in the Lomme Karst System (Belgium) as evidenced by tracer test and high resolution monitoring (KARAG project)*
- 11h20** Fripiat, C.; Veschkens, M.; Funcken, L.; Pacyna, D.  
*Barometric and gravimetric effects on water levels in an abandoned underground coal mine*
- 11h40** Kaufmann, O.; Watlet, A. (keynote lecture)  
*Geophysical monitoring to assess underground water distribution and fluxes*

## 12h20-13h00 Lunch

- 13h00** Hermans, T.; Beaujean J.; Nguyen, F. (keynote lecture)  
*Integration of geophysical data in hydrogeological models*
- 13h40** Simpson D.; Van Steenwinkel J.; Meyus Y.  
*Bottom-towed resistivity survey to support groundwater modelling of potential leakage during the enlargement of the Juliana canal*
- 14h00** Vanclooster, M.; Wiaux, F.; Tran, P.; Lambot, S.  
*The added value of high resolution hydrogeophysical monitoring for unravelling hydrological control of C emission along hillslopes*
- 14h20** Walraevens, K.; Vandenbohede, A.; Van Camp, M.  
*Salt water intrusion: mapping the interface depth*
- 14h40** Schwartz, N.  
*The effect of organic contaminants on the spectral induced polarization signature of soil*

## 15H00 Coffee break

## 15H30-16h30 Short visit of the observatory





## Hydrology and gravimetry

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For the 10 last years, terrestrial and satellite (GRACE) gravity measurements have reached such a precision that they can be of interest to better monitor underground water masses.

First, we show that terrestrial measurements provide high-precision information about the time evolution of mass changes in the few kilometres square around the gravimeter.

Then, examples of the possibilities and limitations of terrestrial measurements are given in Membach, close to Eupen, and in the Rochefort karst system. In Membach, we show that the evapotranspiration can be directly inferred from continuous gravity measurements: as water evaporates and transpires from terrestrial ecosystems, the mass distribution varies through the system, changing its gravity field at the level of, or smaller than 10-10 g per day. This corresponds to 2.0 mm of water over an area of 50 ha. The strength of this method is its ability to ensure a direct, traceable and continuous monitoring of actual ET for years at the mesoscale (~50 ha) with a precision of a few tenths of mm of water. In Rochefort, gravity measurements at the surface and in the cave allows separating the water contained in the unsaturated zone from the saturated one and therefore monitoring groundwater content changes that occur in the unsaturated zone only.