



innovationmeetings
meet the construction experts

21 june 14h > 18h
geothermal energy

ULB – BATir

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innoviris.brussels
empowering research

Innovation Meeting – 23/06/2015 – p. 1



BATir

Competencies



BATir BUILDING, ARCHITECTURE & TOWN PLANNING

ULB

HOME PEOPLE RESEARCH PUBLICATIONS TEACHING EVENTS JOBS CONTACT

Architectural Engineering (AIA)

Town Planning (UAT)

Civil Engineering (LGC)

Geomechanics (LGM)

Computational Mechanics (SMC)

About us Search in BATir

Latest News

- 01/02/2012: SMC seminars (Feb-Jun 2012)
- 16/02/2012 : N. De Temmerman (VUB) invited in BATir Seminar
- 23/12/2011 : Nicolas Moëls invited in BATir Seminar

Links

- Ecole Polytechnique de Bruxelles
- Filière Construction & Architecture
- Université Libre de Bruxelles

For BATir Members

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BATir

Competencies



- Scientific expertise on closed-loop borehole heat exchanger systems
 - Fundamental knowledge of physical processes
 - Theoretical background
 - Efficiency of grout materials
 - Optimisation of thermo-hydro-mechanical properties
 - Prediction of long-term behaviour of borehole heat exchanger systems
 - Numerical model of heat transfer in the ground

BATir

Equipment



- Laboratory of Geotechnics
 - Experimental devices for geomechanical characterization of soils
 - Measurement of thermal conductivity on soil samples (thermal needle probe)
- 4 experimental closed-loop borehole heat exchangers installed on ULB campus (depth +/- 80 m) and monitored with optic fibers

Projects

Presentation



■ Project BruGeo

- FEDER Brussels Region + EU (2016 – 2020)



■ Project Geotherwal

- Walloon region – Erable project (2012 – 2016)

Project BruGeo

Goals



■ Enhancement of geothermal potential of Brussels

- Mapping of geothermal potential of both open and closed-loop systems in Brussels
 - Database on geological, hydrogeological and geothermal properties of Brussels's underground
 - New in-situ and lab tests (boreholes, piezometers, pumping tests, TRT, logging)
- Clarification of public regulations (environmental permits, etc.)
- Communication for different target groups (citizens, installers, design offices, administration)
 - Website, conferences

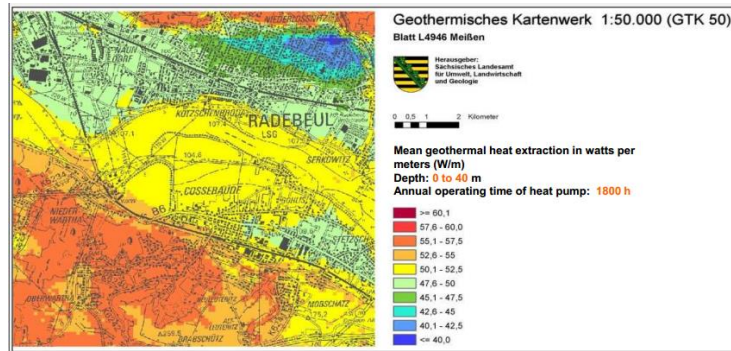
Project BruGeo

Goals



- Enhancement of geothermal potential of Brussels
 - Mapping of geothermal potential

Ex: Hanovre (Germany)



Extractable heat for a 40 m deep closed-loop BHE

Project BruGeo

Presentation



Partners



Closed-loop systems



Open-loop systems



Underground in Brussels; geothermal energy; mapping



Public regulations; environmental aspects; mapping; contact with citizens



Contact with industry professionals (installers, design office)

Project GeoTherWal



Goals

- Improvement of the design and the installation of borehole heat exchangers (closed-loop system)
 - Study of heat exchange between pipe, grout and grounds
 - Small scale laboratory tests
 - Numerical modelling
 - Real-scale tests on 3 in-situ experimental sites

Project GeoTherWal



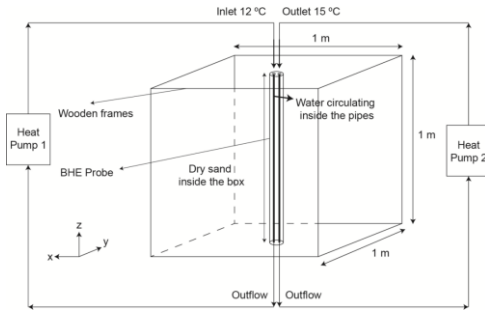
Presentation

- Partners
 - ULg (Profs. R. Charlier & F. Nguyen, G. Radioti, G. Dumont)
 - ULB (Prof. B. François, S. Erol)
 - GeoLys (V. Lejeune, V. Vandeheede, G. Poulain)
 - OREX (V. Fiquet)

Project GeoTherWal

Presentation

- Small scale laboratory tests
 - The sandbox experiment

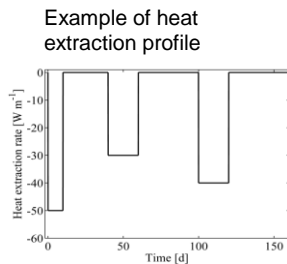


The temperature of the heat carrier fluid is controlled by two independent heat pumps:
 $\Delta T = 3^\circ\text{C}$; $T_{\text{mean}} = 13.5^\circ\text{C}$, $T_0 = 20^\circ\text{C}$

Project GeoTherWal

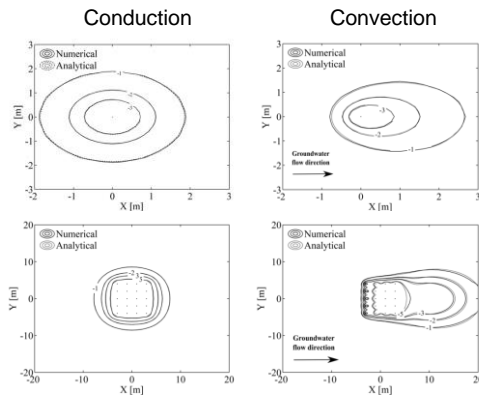
Presentation

- Numerical modelling
 - Analytical solution for discontinuous heat extraction



Single borehole

Multi borehole



Project GeoTherWal

Presentation

■ Real-scale tests on 3 in-situ experimental sites, equipped with optic fibers

- Liège (Sart-Tilman) : 4 boreholes of ~100 m
- Bassenge : 15 boreholes of 40 m
- **Brussels (Solbosh) : 4 boreholes of ~90 m**

