**Monday, May 20th 2019**

**Workshop nº 8**

**By Dr. Rudy Rossetto (Institute of Life Sciences, Scuola Superiore Sant'Anna), Dr. Giovanna De Filippis (Institute of Life Sciences, Scuola Superiore Sant'Anna)**

## Theme: Application of ICT software tools for groundwater management

# Title: Modelling MAR facilities design and operations using the free and open source FREEWAT plugin

**Themes**

Ground water resource managementManaged Aquifer Recharge (MAR)
MODFLOW
Numerical modelling using GIS (Geographic Information System)
Free and open source software

**Objectives**

During the last decades, depletion of groundwater resources and worsening of groundwater quality, mainly caused by overexploitation and climate change, are matters of concern at the global scale. As such, sustainable management and planning of grondwater resources is of paramount importance in the agenda of local and national governments. To this aim, avaluating the benefits induced by MAR facilities on groundwater flow and quality through modelling during the design and operational phase is being a recurring theme.
This short course aims at proposing innovative ideas on groundwater resource management by focusing on the application of ICT software tools for designing of MAR facilities. It will also address topics about modelling infiltration during the operational phase. The participants will acquire basic digital skills on the application of the FREEWAT platform for simulating the effects of setting in place a MAR facility in a real-world case study.

**Description**

The EU HORIZON 2020 FREEWAT project (FREE and open source software tools for WATer resource management; http://www.freewat.eu/) aimed at providing innovative software tools to get a full characterization of hydrologic systems and the involved processes, by facilitating the application of water-related Directives. This is accomplished through the application of the FREEWAT plugin, which is the main outcome of such efforts.
FREEWAT is a free and open source QGIS-based platform which integrates a number of modelling codes (e.g., MODFLOW and MODFLOW-related ones) for

the simulation of the hydrological cycle and hydrochemical processes. It couples the capabilities supplied by such codes with the potentialities of GIS spatial analysis tools to support models implementation.
The short course will consist in theoretical and applied lectures, including capabilities a basic exercise on modelling the implementation of a MAR facility in a real-world case study.
Participants to this short course will work on their own laptop and they will be provided with all the necessary material prior the beginning of the course.
Participants will be required to install the needed software prior to the short course. Internet connection is needed.
Participation to this short course is free of charge.
A maximum of 20 seats are available.
Registration is mandatory by writing an e-mail to info@ismar10.net C/C Giovanna De Filippis (g.defilippis@santannapisa.it) and providing the following information:

- Name and Surname
- Affiliation (name of institution, city, country)
- E-mail contact

PROGRAM. The workshop program includes:

1. h. 14:30 – 15:30

Rudy Rossetto – Application of numerical modelling for groundwater management and Mar facilities design and operations

2. h. 15:30 – 16:00

Rudy Rossetto – The free and open source FREEWAT platform

3. h. 16:00 – 17:30

Giovanna De Filippis – Modelling the effects of a MAR facility on groundwater availability in the Cornia plain (central Italy)

4. h. 17:30 – 18:00

Course instructors and all attendees – Discussion and questions

**Proposers CV:**
***Rudy Rossetto***, researcher at the Institute of Life Sciences at Scuola Superiore Sant'Anna, is expert on water resource management and planning/ hydrology (surface- and groundwater) / ICT for water management.
Rudy deals with surface and subsurface hydrology linking the digital to the physical world of water. Main research fields are: development of GIS integrated hydrological and groundwater numerical models; managed aquifer recharge; water management and planning focusing on concurrent uses solution. He coordinated the EU H2020 FREEWAT project, and WP8 leader in EU FP7 MARSOL. Scientific coordinator of technical coordinator of the EU LIFE REWAT project and the Italian-Israeli bilateral project PHARM-SWAP MED. He is member of the International Association of Hydrogeologists (a member of the

Managed Aquifer Recharge Commission) and of the EGU and IAHS. Co-editor in chief of Acque Sotterranee-Italian Journal of Groundwater since 2012.

***Giovanna De Filippis***, post-doctoral researcher at the Institute of Life Sciences at Scuola Superiore Sant'Anna, expert on the application of ICT software tools (modelling codes, GIS and programming languages) for water resource management.

Since 2012, Giovanna has been dealing with numerical modeling applied to groundwater flow and related processes. Since 2016, she has been collaborating to relevant EU-funded projects (e.g., FP7 MARSOL, H2020 FREEWAT, LIFE REWAT). Teaching experience at national and international level. Co-author of about ten indexed and peer-reviewed scientific papers and about forty national and international conference papers. Member of the IAH (International Association of Hydrogeologists) and co-chair of the ECHN-Italy (Early Career Hydrogeologists Network – Italian chapter) group since 2017. National Representative for YHS (Young Hydrologic Society). Associate Editor of Acque Sotterranee-Italian Journal of Groundwater.