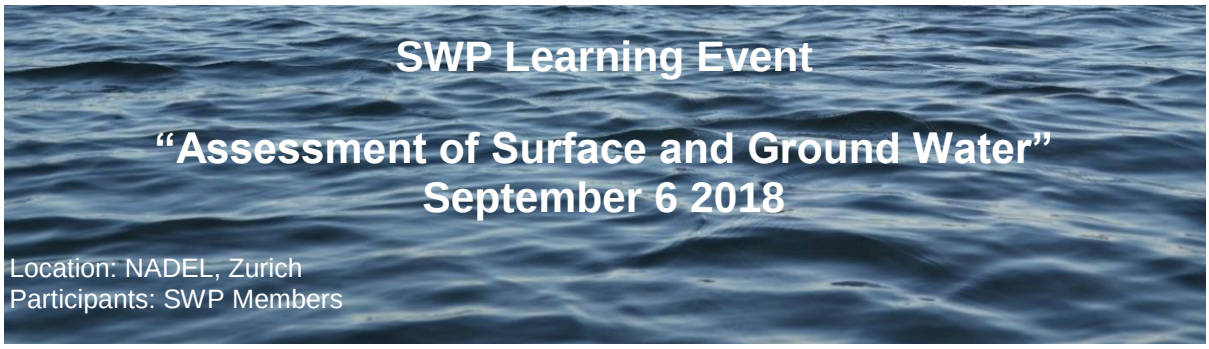

SWP Learning Event

"Assessment of Surface and Ground Water"
September 6 2018

Location: NADEL, Zurich
Participants: SWP Members

Timing	Topic	Who
09h00-09h30	Welcoming coffee	SWP
09h30-09h40	Welcoming speech	NADEL
09h40-10h00	**Introduction**: context, overall objectives, program, participants' introduction	SWP Chair & secretariat
10h00-10h40	**Setting the scene** * basic & stat-of-the-art tools and approaches to assessment of surface and ground water; Input (20mn)+ Q&A (20mn)	Speaker: Michael Sinreich (FOEN)
10h40-12h20	**Breakout session "Water Quantification and mapping"** - Quantifying surface water through remote sensing tools - Methods to estimate groundwater recharge, case study Chad - Zoom on the Groundwater African atlas *with last 30mn: rotation to another session	Hosts: Salvador Peña (Photrack) Marie-Louise Vogt (CHYN) Sean Furey (RWSN)
12h20-13h30	Networking (brownbag) lunch	SWP
13h30-15h00	**Breakout sessions: assessing water quality** - Water analysis portable lab: practical demonstration of major parameters (fecal contamination, turbidity, residual chlorine) - Challenges of geogenic contamination, an introduction to the EAWAG GAP platform	Hosts: Claudio Valsangiacomo (supsi) Joel Podgorski (EAWAG)
15h00-15h30	Coffee break	
15h30-17h00	**Plenary: from assessment towards implementation** Inputs: (20-30mn) - Holistic water resources assessment, case study Switzerland - Focus on assessment for humanitarian purpose 1hour- Discussion	Speakers: Adrian Auckenthaler Canton Basel Ellen Milnes (Humanitarian Aid)
17h00-17h15	Concluding remark & evaluation	SWP
17h15-18h00	Networking apéro	SWP

Breakout Session Description

Break-out sessions on the topic of "Water quantification and mapping"

Break-out session: Measuring discharge in channels and rivers using a smart-phone App.

In many places of the world there is few data or no data at all regarding water discharge. This greatly restrains any effort towards effective water resources management, especially in places where the water resources are scarce, highly variable and where strong growth in water demand overlap with administration underfunding. There is a need of cheaper and easy-to-use methods for gathering data regarding how much water is flowing in natural rivers and in man-made irrigation furrows. We have developed a mobile device application for determining open-channel discharge in e.g. rivers, artificial channels and irrigation furrows. Discharge measurement via smartphones provides a non-intrusive, accurate and cost-effective monitoring method. This break-out will show how to set-up a site and how to use the Discharge App and its associated data management platform.

Break-out session: Methods to estimate recharge, case study Chad

In arid and semi-arid regions, recharge is a fundamental parameter that should be estimated before developing any sustainable management plan for the exploitation of water resources. The main source of recharge is rainfall; other sources of recharge are from river flows (perennial, seasonal, ephemeral), neighbouring aquifers, or from anthropogenic activities such as irrigation (canals, fields) and urban settlements. Direct and diffuse recharge from precipitation is the more readily determined source. Water balance methods and the use of remote sensing to represent the temporal and spatial variabilities of precipitation are nowadays common approaches, having been successfully implemented in many parts of the world (Brunner et al., 2004). But in arid and semi-arid lands, direct recharge becomes less important than indirect and localized recharge in terms of total aquifer replenishment (Gee and Hillel, 1988, Stephens, 1994, Wood and Sandford, 1995), which increases the complexity of the methodological approach. Also, in such regions, recharge generally occurs with a high temporal and spatial variability, characterized by infrequent large recharge events. The most common methods to estimate recharge are direct measurements of groundwater level variations, which require decades worth of monitoring data that are often unavailable in developing countries, or indirect, physical approaches, such as water balance, Darcy flux measurements and tracers (e.g., Cl, stable isotopes, ^{3}H and ^{36}Cl). The project's objective dictates whether multiple "at-point" or area-based estimation methods are the most appropriate, but as a general rule a combination of methods (remote sensing, GIS, conceptual models, Darcian and tracer's methods), coupled to the necessary component of field measurements, seem the best way to realistically investigate recharge processes (Simmers, 1997). This breakout session will discuss about several methods for estimating recharge. Many examples from our research in Chad will be given and we will discuss on the benefit of combining remote sensing products and the sampling of groundwater for a chemical and stable isotopic characterization (Vogt et al., forthcoming), enabling the identification of zones that still receive significant modern recharge.

Breakout sessions on the topic of "Assessing water quality"

Breakout session: Water analysis portable lab

The « Laboratory Session » will focus on water quality, setting priorities in the choice of parameters to be analysed in the field and involving participants in a "hands-on" exercise. Participants will benefit of a 20 min lecture on water quality for based the "WHO Guidelines for drinking water quality" and a full hour for measuring hands-on few important parameters using the portable laboratory designed by the Swiss Humanitarian Aid Unit, such as faecal contamination (standard bacteriological analysis), turbidity, free residual chlorine, small physics-chemical parameters (Cl, No3, No2, NH4, Fe, Hardness, conductivity, pH and others).

Challenges of geogenic contamination, an introduction to the EAWAG GAP platform

The following functionality and features of the GAP online platform (www.gapmaps.org) will be demonstrated: (a) viewing and printing global and regional arsenic and fluoride hazard maps and datasets of related variables, (b) uploading, analyzing and sharing data in a secure environment and (c) modeling one's own data, which can then be used to create a prediction map that be downloaded as a raster file. Users are encouraged to bring their own laptops and data to work with, such as GIS files or Excel tables with columns of latitude, longitude and some quantity (e.g. measured pollutant concentrations). Note that GAP can also be used for contaminants other than arsenic or fluoride.

Speakers Learning Event

Adrian Auckenthaler studied environmental sciences at ETH Zürich. At his position at the Kantonal Laboratory he was responsible for drinking water safety in the Canton of Basel-Country. During that time, he also wrote his PhD on microbial water quality in karst systems. Since 2006 he is at the Office of Environmental Protection and Energy of Basel-Country where he had several positions concerning groundwater and contaminated sites. Actual he is the head of the department of water and geology and is member of the management.

Claudio Valsangiacomo (born 1962) is a biologist holding a PhD from the Swiss Federal Institute of Technology, Zurich. He is Professor at the Swiss University of Applied Sciences of Southern Switzerland (SUPSI), leading the Centre for Development and Cooperation. He did research in life sciences and underwent further specialization in clinical and food/water microbiology in public health laboratories in Switzerland. He has been involved as health and water expert in development and humanitarian projects since 2001, with international consultancies/assignments on behalf of the Swiss Agency for Development and Cooperation (SDC), and various international organizations (WHO, UNICEF, USDA). He represents SDC in the Global Task Force for Cholera Control (lead WHO&UNICEF).

After having earned degrees in earth sciences from UC Santa Cruz and geophysics from the University of British Columbia as well as working for many years in the IT industry in Boulder, Colorado, **Joel Podgorski** moved to Switzerland in 2010 to pursue a PhD in hydrogeophysics in ETH's environmental engineering department, during which he conducted extended field campaigns in Botswana's Okavango Delta. Since 2014 he has been a researcher at the Swiss Federal Institute of Aquatic Science and Technology (Eawag) in Dübendorf. There he carries out studies in prediction modeling of geogenic groundwater contamination and is the project coordinator of the Groundwater Assessment Platform (GAP).

Marie-Louise Vogt is a geologist from the University of Lausanne. In 2007, she entered the sector of humanitarian aid. She first worked for NGOs in South Sudan and Mozambique, then for the Swiss Humanitarian Aid in Zimbabwe, and for the UN in Guinea and Chad. The project in Chad brought her back to Switzerland for a PhD (hydrogeology) at the University of Neuchâtel. She is now at her last year of thesis. The aim of her research is to improve the understanding of the groundwater system of the Nubian Sandstone Aquifer System in Northern Chad. Specific objectives that are motivating the study are: 1) to identify if, where and how much modern recharge is still occurring, despite the general aridity of the region, 2) to test hypothesis to where this recharge is flowing, whether supplying the Nubian Sandstone Aquifer System or whether leaving the system, and 3) to understand the origin of the Ounianga Lakes, an astonishing group of lakes in the middle of the Sahara Desert. The break-out session "Methods to estimate groundwater recharge, case study Chad" will provide many examples from her current research.

Michael Sinreich is a hydrogeologist at the Swiss Federal Office for the Environment. He is in charge of the national groundwater monitoring and responsible for the assessment of hydrogeological basics on a national scale. He actually serves as president of the Swiss Hydrogeological Society and leads a working group on integrated water resources management.

Salvador Peña-Haro holds a PhD from the Technical University of Valencia on Hydraulic and Environmental Engineering. He worked at the ETH Zürich in the Institute of Environmental Engineering (IfU) as a Post-doctoral researcher. He has worked for more than 15 years on different topics related to water management and measurement in several countries. Currently he works at photrack ag, where he has been developing an image based discharge measurement method.

Sean Furey is a Water & Sanitation Specialist at Skat Consulting and Director of the Rural Water Supply Network (RWSN). Originally from the UK, he has been living in Switzerland since 2011 and specialises in bridging the gap between research and practice in groundwater use – particularly in Sub-Saharan Africa.

Ellen Milnes is a hydrogeologist and holds a PhD from the University of Neuchâtel, where she was working as senior lecturer until 2016, mainly in the field of applied hydrogeology in semi-arid/arid regions and in humanitarian contexts. She has been coordinating the joint ICRC-UNINE WATSAN training (water and sanitation in emergencies) since 2005 and has been working part-time as SDC seconded senior hydrogeologist for UNHCR headquarters since 2014.

Subscription for the event by email to soraya.kohler@swisswaterpartnership.ch