

Innovative and Multidisciplinary Data for Hydrological Sciences

Technical/Scientific session – Perugia, 22/11/2018

Flavia Tauro

International Association of Hydrological Sciences

Outline

- MOXXI
 - Introduction
 - The beginning
 - The group
 - Research questions
 - The objectives
 - Sample initiative
 - Future perspectives

MOXXI: introduction

- Measurements and Observations in the XXI Century working group of IAHS
- Established in 2013 (I am Chair since 2015)
- Objectives:
 - What are the key gaps in our understanding of hydrologic change?
 - How can we advance our monitoring and data analysis capabilities to predict and manage hydrologic change?

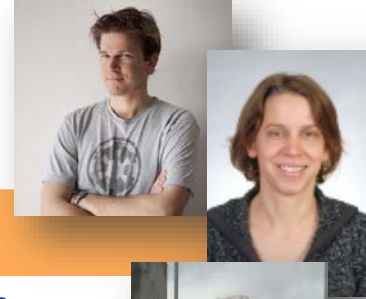
MOXXI: the beginning

IAHS, IAPSO, IASPEI Joint Assembly (Gothenburg)

MOXXI Measurements & Observations in the 21st Century



XXV IUGG General Assembly (Melbourne)



XXVI IUGG General Assembly (Prague)

International Strategic Workshop on Future IAHS Science Initiative (Nanjing)

2010

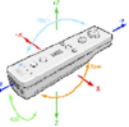
2012

2011

2013

Scientists must leave their ivory computers

03 October 2013 by [Hydrologic ABC](#)



What science needs is pragmatic researchers who adopt a practical approach and a resourceful attitude like that shown by TV hero MacGyver. This often means more measurement and observation and less time spent modelling on the computer. So says Ralf Hut, awarded his PhD at TU Delft on Tuesday 1 October. During his PhD research, Hut perfectly exemplified this MacGyver attitude. He was partly responsible for the development of several new measurement instruments for his own specialism, hydrology. They include a rain gauge that measures the size of raindrops by listening to the sound the drops make on impact and an evaporation meter based on the Wilmette.

2008



Experimental Hydrology Wiki

Why do we need an Experimental Hydrology Wiki?

It will help us to learn about, recommend, question and discuss new / established methods.

- It will help us to avoid reinventing the wheel
- It will help us not to make the same mistakes
- It will help us to share new ideas and concepts
- It will help us to find the methodology and tools

Water Resources Research

Hydrologic Measurement Methods

Water Resources Research, vol. 46, no. 4, 2010

We believe that this special section of Water Resources Research on Hydrologic Measurement Methods marks a turning point in appreciation of the essential and unfinished business of learning how to get the right data upon which our understanding of hydrology rests.

Select All Save to profile Export citation

Regular Article Jump to...

Improved extraction of hydrologic information from geophysical data through coupled hydrogeophysical inversion

A. C. Hinnell, T. P. A. Ferré, J. A. Vrugt, J. A. Huisman, S. Moysey, J. Rings and M. B. Kowalsky

Version of Record online: 9 APR 2010 | DOI: 10.1029/2008WR007060

Abstract | Article | PDF(600K) | References

MOXXI: the group

- More than 130 MOXXI friends from more than 15 countries
- Mostly from universities but also from research centers and private companies
- First Topical Conference November 2016 at ESA campus (Frascati, Italy)
- Second Topical Conference December 2017 at WMO (Geneva, Switzerland)
- Third Topical Conference March 2019 at NYU (NY, USA)

MOXXI: research questions

- Panta Rhei Science Questions 1 and 5:
 - *What are the key gaps in our understanding of hydrologic change?*
 - *How can we advance our **monitoring** and data analysis capabilities to predict and manage hydrologic change?*

Original Articles

“Panta Rhei—Everything Flows”: Change in hydrology and society—The IAHS Scientific Decade 2013–2022

“Panta Rhei—Tout s’écoule”: Changement hydrologique et sociétal—La Décennie Scientifique 2013–2022 de l’AISH

A. Montanari, G. Young, H.H.G. Savenije, D. Hughes, T. Wagener, L.L. Ren, ...show all

Pages 1256-1275 | Received 18 Mar 2013, Accepted 21 May 2013, Accepted author version posted online: 30 May 2013, Published online: 05 Jul 2013

Original Articles

A decade of Predictions in Ungauged Basins (PUB)—a review

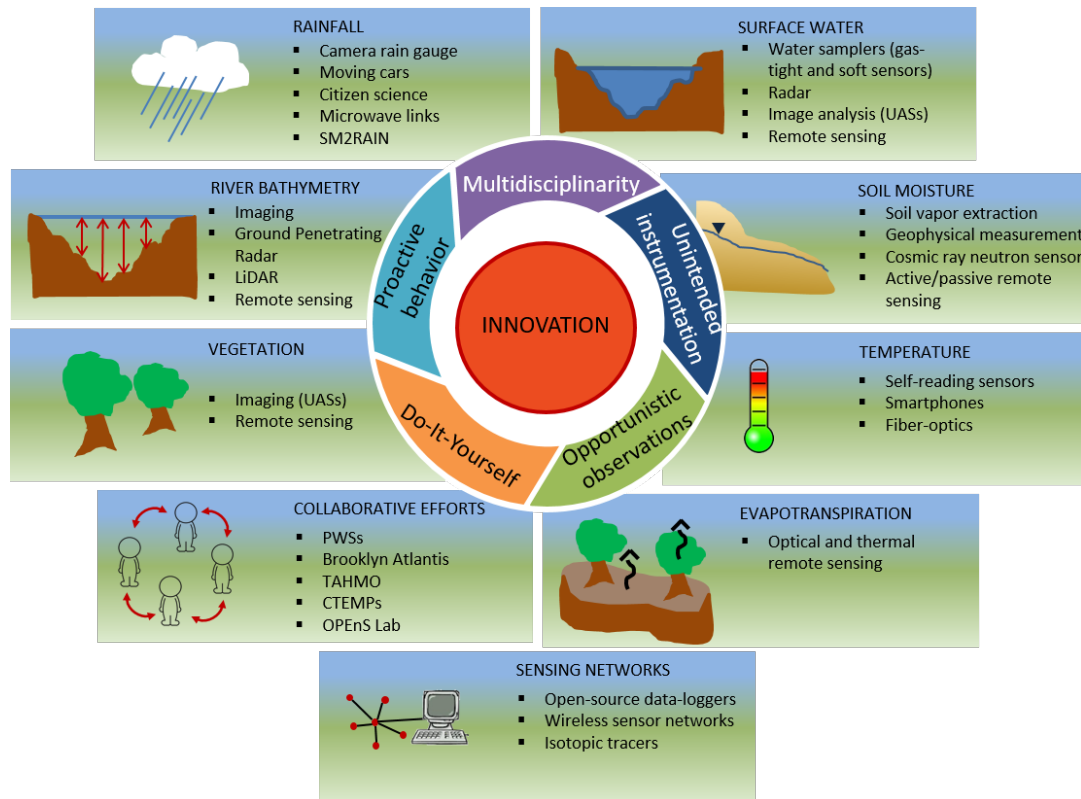
Revue d’une décennie sur les prévisions en bassins non jaugés (PUB)—une revue

M. Hrachowitz, H.H.G. Savenije, G. Blöschl, J.J. McDonnell, M. Sivapalan, J.W. Pomeroy, ...show all

Pages 1198-1255 | Received 14 Mar 2013, Accepted 02 May 2013, Accepted author version posted online: 16 May 2013, Published online: 14 Jun 2013

MOXXI: the objectives

- Growing community with broad research interests



MOXXI: the objectives

HYDROLOGICAL SCIENCES JOURNAL, 2018
VOL. 63, NO. 2, 169–196
<https://doi.org/10.1080/02626667.2017.1420191>



Measurements and Observations in the XXI century (MOXXI): innovation and multi-disciplinarity to sense the hydrological cycle

Flavia Tauro^a, John Selker^b, Nick van de Giesen^c, Tommaso Abrate^d, Remko Uijlenhoet^e, Maurizio Porfiri^f, Salvatore Manfreda^g, Kelly Taylor^h, Tommaso Moramarcoⁱ, Jerome Benveniste^j, Giuseppe Ciruolo^k, Lyndon Estes^l, Alessio Domeneghetti^m, Matthew T. Perksⁿ, Chiara Corbari^o, Ehsan Rabiei^p, Giovanni Ravazzani^q, Heye Bogena^r, Antoine Harfouche^s, Luca Brocca^t, Antonino Maltese^k, Andy Wickert^t, Angelica Tarpanelliⁱ, Stephen Good^b, Jose Manuel Lopez Alcala^s, Andrea Petroselliⁱ, Christophe Cudennec^u, Theresa Blume^v, Rolf Hut^c and Salvatore Grimaldi^{a,f}

^aDepartment for Innovation in Biological, Agro-food and Forest Systems, University of Tuscia, Viterbo, Italy; ^bDepartment of Biological and Ecological Engineering, Oregon State University, Corvallis, Oregon, USA; ^cDepartment of Civil Engineering and Geosciences, Delft University of Technology, Delft, The Netherlands; ^dBasic Systems in Hydrology Division, World Meteorological Organization, Geneva, Switzerland; ^eDepartment of Environmental Sciences, Wageningen University, Wageningen, The Netherlands; ^fDepartment of Mechanical and Aerospace Engineering, New York University Tandon School of Engineering, Brooklyn, New York, USA; ^gDipartimento delle Culture Europee e del Mediterraneo, University of Basilicata, Potenza, Italy; ^hEarth Research Institute, University of California Santa Barbara, Santa Barbara, California, USA; ⁱResearch Institute for Geo-Hydrological Protection, National Research Council, Perugia, Italy; ^jDepartment of Earth Observation Future Missions, Science and Applications, European Space Agency ESRIN, Frascati, Italy; ^kDipartimento di Ingegneria Civile, Ambientale, Aerospaziale, dei Materiali, Università degli Studi di Palermo, Palermo, Italy; ^lGraduate School of Geography, Clark University, Worcester, Massachusetts, USA; ^mDepartment of Civil, Chemical, Environmental, and Materials Engineering, University of Bologna, Bologna, Italy; ⁿSchool of Geography, Politics and Sociology, Newcastle University, Newcastle upon Tyne, UK; ^oDepartment of Civil and Environmental Engineering, Polytechnic of Milan, Milan, Italy; ^pBPI Hannover, Verworn, Hannover, Germany; ^qInstitute of Bio- and Geosciences, Forschungszentrum Jülich IBG-3, Jülich, Germany; ^rDepartment of Earth Sciences, University of Minnesota, Minneapolis, Minnesota, USA; ^sDepartment of Electrical Engineering & Computer Science, Oregon State University, Corvallis, Oregon, USA; ^tDepartment of Economics, Engineering, Society and Business Organization, University of Tuscia, Viterbo, Italy; ^uUMR SAS, Agrocampus Ouest, Rennes, France; ^vGFZ German Research Centre for Geosciences, Section Hydrology, Potsdam, Germany

MOXXI: sample initiatives

- Participation in a COST Action on the harmonization of drones for scientific observations
- Proposal and paper writing
- Facilitating coordination between National Services and scientists/startups:
 - First call of the HydroHub, the Global Hydrometry Support Facility of WMO

MOXXI: future perspectives

- Participate in IAHS Forum on Unsolved Questions in Hydrology
 - MOXXI is taking a leading role in the forum
 - Every friend has been asked to participate

MOXXI: join us in NYC!

Source: ESA

MEASUREMENTS AND OBSERVATIONS IN THE 21° CENTURY

MOXXI 2019 Topical Conference

Citizen and Hydrology (CandHy) Kickoff Meeting

11-13 March 2019
New York University, New York , NY, USA



Contact info

- <https://iahs.info>
 - Commissions>Working-Groups>MOXXI
- Please contact me if you have questions:
 - flavia.tauro@unitus.it