

# Annual News Letter 2013

## Amsterdam Critical Zone Hydrology Group

6 January 2014

### Dear colleagues and partner institutes,

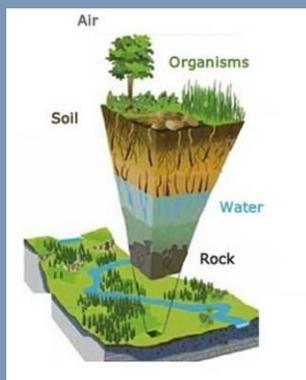
The members of the Amsterdam Critical Zone Hydrology Group wish you **a happy and successful New Year!**

The first full year of operation of the ACZHG has been dynamic. This letter aims to inform you about successes and developments in the group

vis á vis our ambition to improve understanding of the Earth's 'Critical Zone' - the porous near-surface layer that extends from the top of the vegetation canopy down to the deepest groundwater - where rock, soil, water, air and living organisms interact and regulate the flows of energy, water,

carbon and nutrients, thereby sustaining the natural resources that Mankind depends upon.

In the New Year we hope to continue existing collaborations and to explore new and exciting research or teaching collaborations!



#### Highlights:

- 3 new large projects 2
- ACZHG in *Nature* 2
- Film-maker joins group 3

### Four PhD's awarded in 2013

**Hylke Beck** (16 Oct.)  
*Linkages between streamflow, climate and catchment characteristics: a global analysis.*

**Perry de Louw** (6 Dec.)  
*Saline seepage in deltaic areas - Preferential groundwater discharge through boils and*

*interactions between thin rainwater lenses and upward saline seepage.*

**Matthijs Bonte** (16 Dec.)  
*Impacts of shallow geothermal energy on groundwater quality.*

**Fabricio Zanchi** (18 Dec.)  
*Vulnerability to drought*

*and soil carbon exchange of valley forest in Central Amazonia (Brazil).*

These theses can be downloaded from the ACZHG new [website](#).

### Hydrology master programme rated best in NL

In the fall of 2012 an international panel evaluated the Group's 2-year Hydrology Master Programme. Uniquely within the Dutch earth sciences higher education system, the Group's programme received the

qualification 'good' with respect to all three standards: (1) intended learning outcomes, (2) teaching-learning environment, and (3) achieved learning outcomes. Read key statements or download

the committee's full report on our [website](#).

In addition, **Maarten Waterloo** was elected best teacher of the Faculty of Earth and Life Sciences (his second nomination!).



## New projects



ACZHG participates in the newly funded [P4GES](#) project. **Sampurno Bruijnzeel** and **Ilja van Meerveld** co-lead the hydrological investigations in secondary forests in Madagascar.

ACZHG associate **Jaap Schellekens** is to coordinate the 8.9 million Euro earth2Observe project. This European 7th framework program brings together a consortium of large-scale hydrological

modelling groups, atmospheric scientists, remote sensing specialists and local water managers to provide a multi-model holistic re-analysis of our global water resources.

Chinese Scholarship Council PhD student **Liang Yu** started her research on the fate of contaminants in urban settings, supervised by **Hans-Peter Broers**, and in close collaboration with Deltares and Waternet.

ACZHG received funding from NWO's Urbanizing Deltas of the World (UDW) programme to address sustainable water supply issues in Bangladesh with a focus on Managed Aquifer Recharge (MAR) systems. **Koos Groen, Boris van Breukelen** en **Pieter Stuijzand** co-lead this project, which also involves Utrecht University, TU Delft and the University of Dhaka.

## Publication highlights

In 2013 ACZHG produced over 40 peer-reviewed journal papers (published or accepted) while more than 20 additional ones are under review with reputed journals.

**Koos Groen** and **Henk Kooi's** *Nature* paper *Offshore fresh groundwater reserves as a global phenomenon*, published with former VU colleague **Vincent Post**, was featured on dozens of news-sites worldwide, in national newspapers (Volkskrant/NRC), and on national public radio.

Two papers by our PhD students were featured as research spotlights of the week in *AGU's Eos*:

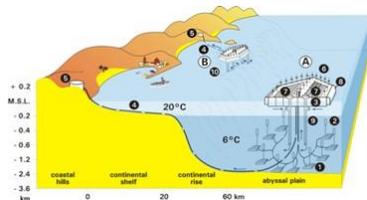
- **Hylke Beck's** WRR paper: *Global patterns in baseflow index and recession as derived from 3166 small catchments*

- **Chandra Ghimire's** JGR paper *Reforestation severely degraded grassland in the Lesser Himalaya of Central Nepal: effects on soil hydraulic conductivity and overland flow production*.

The fact that this happened in the same week is unique!

**Chandra Ghimire** further received the ITC Research Award 2012 for best research paper for his paper *The effect of sustained forest use on hillslope hydraulic conductivity in the Middle Mountains of Central Nepal*, published in *Ecohydrology*.

**Hylke Beck** also acted as co-author in a *Nature Climate Change* paper by Diego Miralles et al. on the El Niño–La Niña cycle and recent trends in continental evaporation.



*“The volume of offshore low salinity groundwater is a hundred times greater than the amount we’ve extracted from the Earth’s sub-surface in the past century since 1900.”*

## New website widely used

The effort to produce a new [website](#) for ACZHG is paying off. It provides an effective platform showcasing and structuring the research of the group and the linkages with the

group’s successful international Hydrology MSc programme and other activities. Numerous compliments have been received regarding the quality of the site and it is

extensively consulted: over 3000 unique visitors in 2013, mostly from NL, USA, Germany, UK, China, Italy, Canada, Australia and Brazil.

## Film maker John Dennis Liu associated with ACZHG

In January 2013 the well-known Chinese-American film-maker **John Dennis Liu** joined the ACZHG as a Visiting Fellow. John's [movies](#) and [educational](#) activities focus on the sustainability of ecosystem restoration. Collaboration

with John will strengthen ACZHG's studies of the soil and water impacts of reforestation and greening degraded lands, as part of the newly established [ACRES\\_R3](#) (Amsterdam Centre for REsearch on the Restoration, Reforest-

ation and Regreening) initiative coordinated by **Sampurno Bruijnzeel**. Another joint activity is to provide scientific input to John's new television series on Earth Make-Over which may include some of our own projects.



## Outlook for 2014

The New Year is likely to bring about major change for the ACZHG. An exciting prospect is the proposed merger of the science faculties of the VU University and the University of Amsterdam within the new Amsterdam Faculty of Science (AFS). Discussions with our soil scientific and geomorphological counterparts at the UvA have started to identify common research interests and to explore the possibilities for a joint master's programme on soil and water. Joint educational activities are expected to start in September 2015.

Another exciting research development sparked by the Group's recent *Nature* article concerns the interest shown by various governments and Multi-national Companies in exploring the possibilities for using *offshore groundwater reserves*.

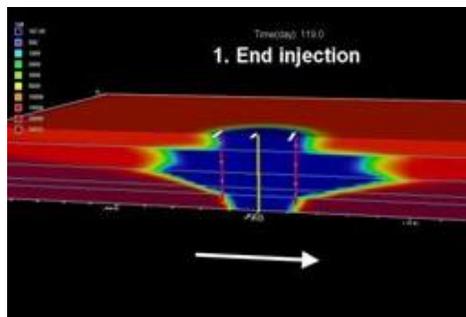
On the *regreening* front, the envisaged scientific input required by the newly established [Ecosystem Return Foundation](#) that aims to re-green 200 million ha in the next 20 years is another important development which will extend our reforestation research into drier areas.

### *New technologies*

The newly acquired state-of-the-art Dualem geophysical equipment operated by **Michel Groen** will be used for 3-D mapping of subsurface geology, freshwater-saltwater interfaces, weak spots in dikes, and hillslope soil water movement. Innovative mathematical models and stable isotope techniques are used increasingly to monitor the degradation of organic and metal pollutants in the environment and to assess 'old' and 'new' water contributions to storm runoff from contrasting land-uses.

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*"Two new and exciting research themes include the use of offshore groundwater reserves and the large-scale regreening of degraded lands"*



Visit our website! Go to: <http://www.hydrology-amsterdam.nl>