

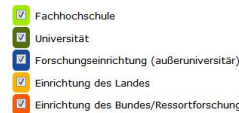
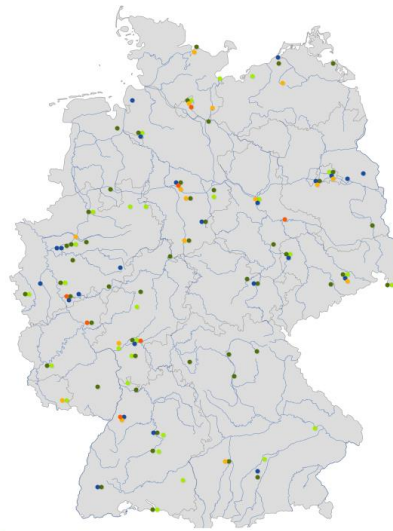
Water Science Alliance e.V.

A platform for interdisciplinary water research

watersciencealliance.org

Water research in Germany has

- excellent expertise
- federal /sectoral structure
 - > 450 working groups
 - > 150 institutions
- many disciplines
- many associations



Complexity of water problems requires

- inter/trans-disciplinary approaches,
- closer cooperation between institutions among all fields of water research
- competitive structures



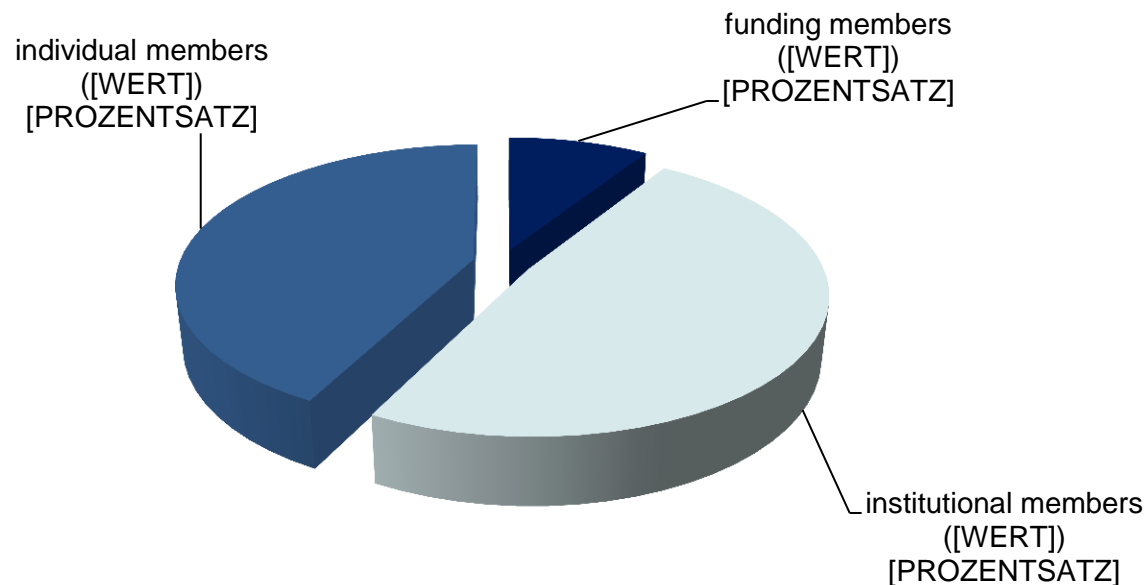
Need for a scientific hub

- to strengthen and bundle the existing water research competences
- to create and use the resulting synergies (for new research initiatives)
- to make the German water research community more visible on the national and international level

founded as a registered **association** of the German water research community by the Senate Commission on Water Research on February 26, 2013 in Berlin

existing on

- **individual members**
- **institutional members**
 - esp. university institutes, research centers, departments, ...
- **funding members**
 - research institutions (Helmholtz, Leibniz, ...)



Platform for strategic cooperations

Establish interdisciplinary networks to provide efficient structures for integrated water research

Representing overall water research expertise to policy makers and research funding organizations

Webpage with blog (www.watersciencealliance.org) (mostly in German)

Online portal “Water Research in Germany” (in German)

Water Research Horizon Conference (in English)

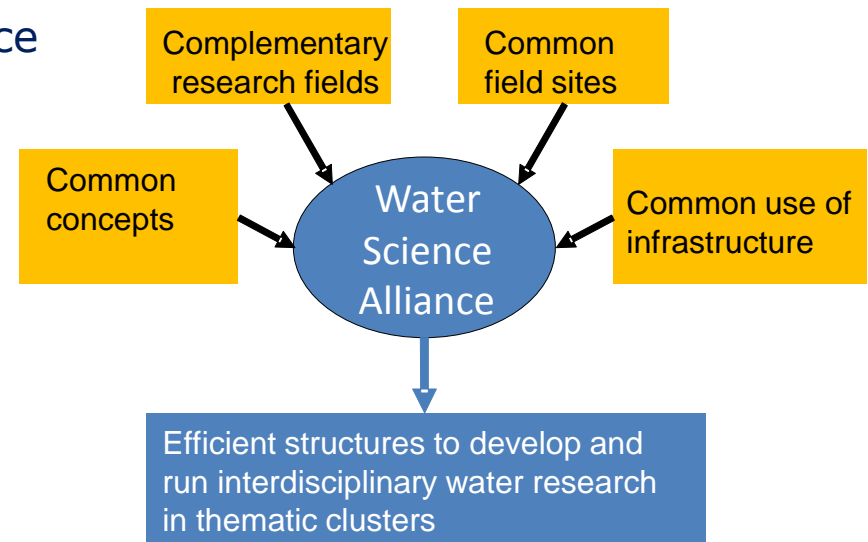
- open forum for promoting innovative ideas and strategic initiatives
- pushing forward cooperation in fields lacking interaction
- identification of interfaces between competences of institutions/disciplines

Workshops (German or English)

Thematic clusters as an integrated instrument ...

... to be established for

- (1) synergetic integration of competences from institutions and scientific concepts to develop or run interdisciplinary water research
- (2) strategic initiatives
- (3) the transfer of research findings into implementation and policy advice
- (4) networking of running projects



Thematic clusters may be developed by the members!

Understanding **matter fluxes** at catchment scale: safeguarding our health and the environment

A community effort towards **model development and data integration** in water research

New approaches to **observation, exploration and data assimilation** in water research

Managing water beyond **IWRM**: target setting, instrument choice and governance

New challenges emerging from **global and climate change**: food and water, mega-urbanization, risk and vulnerability

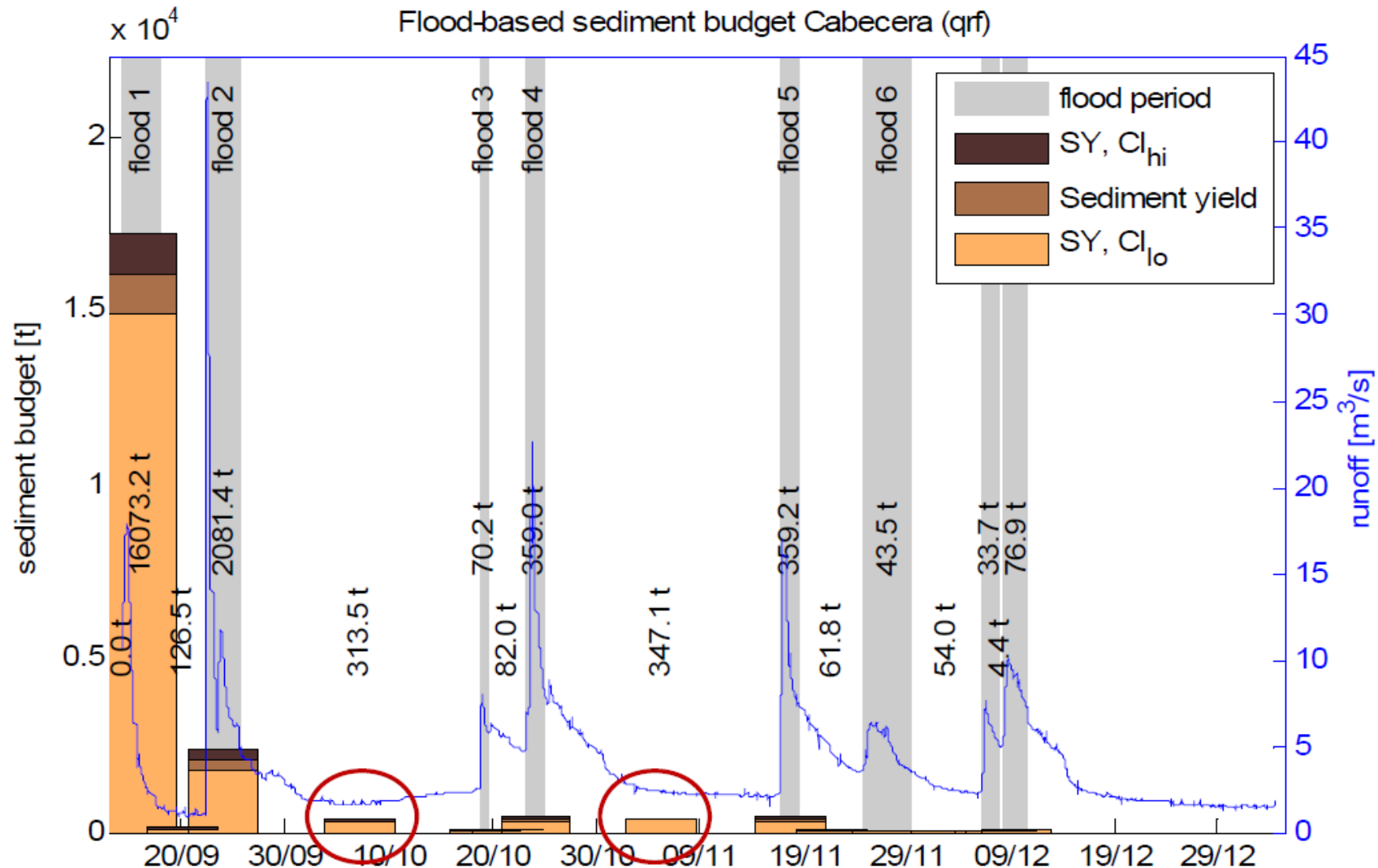
Water scarcity: 2 Examples (from WSA members)

Example 1: Water and Sediment Modelling in semi-arid Areas (Uni Potsdam)



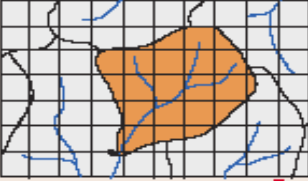
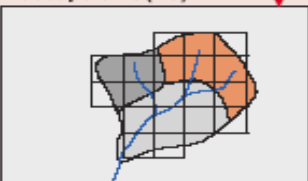
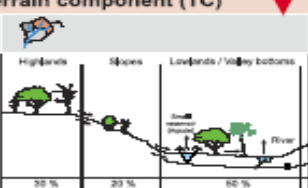
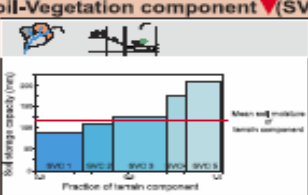
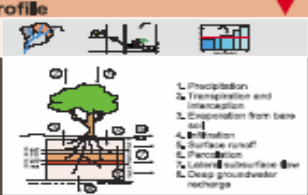
Example 1: Water and Sediment Modelling in semi-arid Areas (Uni Potsdam)

water → sediment response: non-linear and equivocal

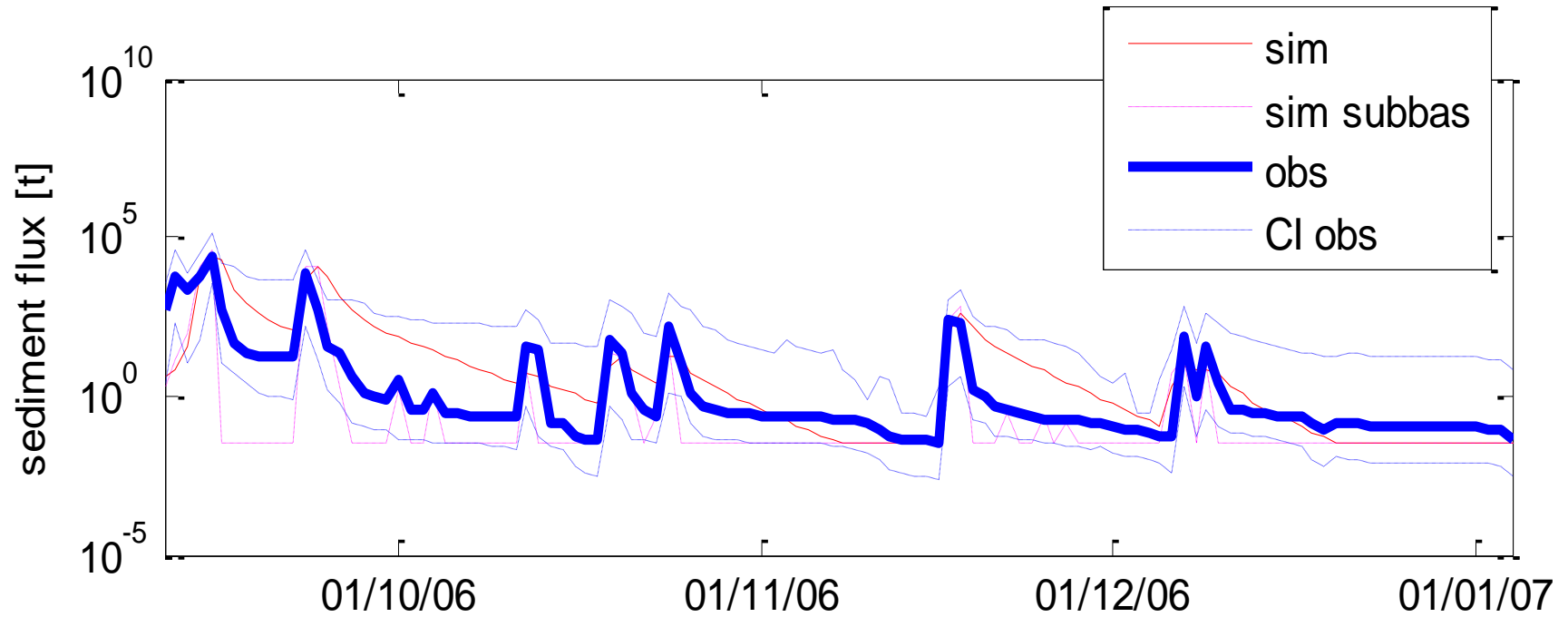


Example 1: Water and Sediment Modelling in semi-arid Areas (Uni Potsdam)

Hydro-Sedimentological Model WASA-SED

Level	Type and criteria of delimitation	Function
1 Sub-basin / Municipality / Grid cell	 <ul style="list-style-type: none"> - Polygons with geographically referenced location - Data source of basins: Terrain analysis of 30"-USGS-DEM and digitized topographic maps - Municipalities: administrative boundaries (municipios) 	<ul style="list-style-type: none"> > Runoff routing, including retention in reservoirs and withdrawal by water use > If grid cells smaller than sub-basin / municipalities are used: Runoff responses of all grid cells pertaining to a sub-basin are added up to give the basin response. Further sub-division (levels 2-5) starts from the grid cell level.
2 Landscape unit (LU)	 <ul style="list-style-type: none"> - Polygons with geographically referenced location - Similarity of <ul style="list-style-type: none"> - major landform - general lithology - soil associations - toposequences 	<ul style="list-style-type: none"> > Modeling unit with similar characteristics referring to lateral processes and similarity of sub-scale variability in vertical processes > Composed of 1 - 3 terrain components > Runoff responses of all landscape units are added up to give total response of sub-basin / municipality / grid cell
3 Terrain component (TC)	 <ul style="list-style-type: none"> - Fraction of area of landscape unit (no geographic reference) - Similarity of <ul style="list-style-type: none"> - slope gradients - position within toposequence - soil associations 	<ul style="list-style-type: none"> > Lateral transfer of surface and subsurface runoff between terrain components of different topographic position by upland-lowland relationships > Reinfiltration and exfiltration (return flow) in component with lower topographic position
4 Soil-Vegetation component (SVC)	 <ul style="list-style-type: none"> - Fraction of area of terrain component - Characterized by specific combination of <ul style="list-style-type: none"> - Soil (sub-)type - Vegetation / land cover class 	<ul style="list-style-type: none"> > Variability of soil moisture within terrain component > Lateral redistribution of surface and subsurface runoff among soil-vegetation components > Variability of soil moisture storage capacity within soil-vegetation component (partial area approach for saturation-excess surface runoff)
5 Profile	 <ul style="list-style-type: none"> - Representative profile of soil-vegetation component - Several soil horizons of variable depth - Lower limit by depth of root zone or bedrock 	<ul style="list-style-type: none"> > Calculation of water balance in the profile for each soil-vegetation component > Determination of vertical and lateral water fluxes for individual horizons

Example 1: Water and Sediment Modelling in semi-arid Areas (Uni Potsdam)



Sediment fluxes of the Villacarli sub-catchment Sept – Dec 2006

Example 2: Integrated Project ‘Water Scarcity‘ (UFZ)

Goals

- ⊙ **new hydrological monitoring - and model approaches** that guarantee reliable prognosis, despite existing local data scarcity.
- ⊙ **adapted and efficient wastewater treatment and reuse concepts** that enable flexible adjustments to future challenges.
- ⊙ **socio-economic and legal framework allows sustainable and peaceful international management** of scarce resources.

Integrated project ‘Water scarcity‘

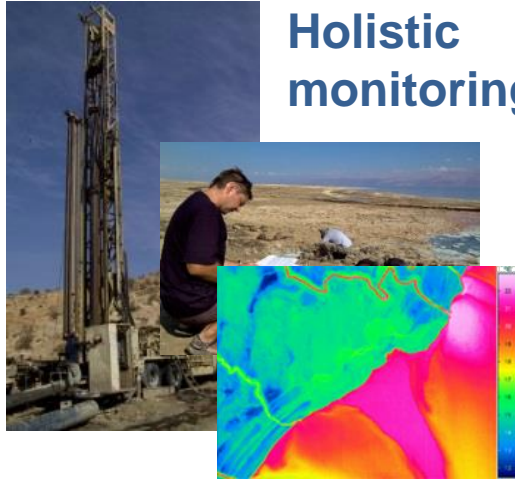
- ⊙ **collaboration of 10 UFZ departments ranging** from hydrology/ hydrogeology to biotechnology to environmental politics & international law
- ⊙ more than **50 UFZ scientists** involved

UFZ contacts

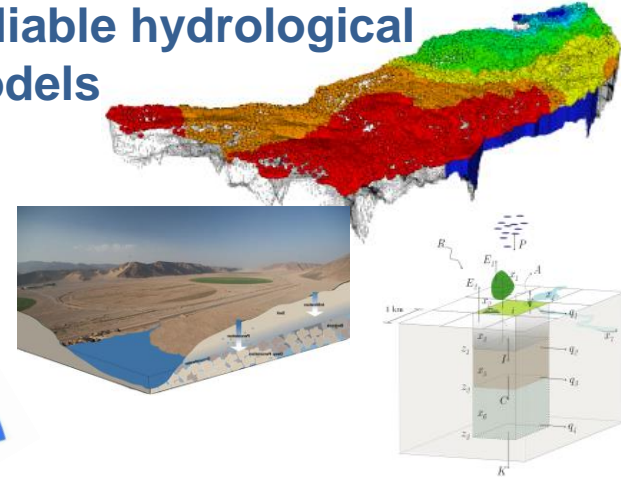
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IP Water Scarcity – Work Packages (WPs)

Holistic monitoring



Reliable hydrological models



Hydrol. prediction

Sanitation & GW protection

Management framework

International water law and transboundary aquifer management

Technologies for efficient & flexible wastewater treatment and reuse clusters



Socio-economic assessment of water scarcity



Water for Life
Jordan's Water Strategy
2008-2022

HELMHOLTZ
CENTRE FOR
ENVIRONMENTAL
RESEARCH – UFZ

UFZ contacts

Prof. Dr. Ralf Merz, ralf.merz@ufz.de // Dr. Jan Friesen, jan.friesen@ufz.de

**The Water Science Alliance offers to function as a facilitator,
to make contacts and forward inquiries!**

Further projects/links

<http://www.deserve-vi.net>

<http://www.iwrm-smart2.org>

<http://www.nice-jordan.org>

<http://watersciencealliance.org>

Contacts

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Many thanks for your attention!