List of UPH as of 16:13 on 13 April 2018

Floods and droughts			
Can we improve the estimation of extreme flood peak discharges ?			
How to reconstruct paleohydrological phenomena during the Holocene and why did they happen?			
Is vulnerability reduction masking a climate change signal in temporal flood risk trends?			
Do we understand scour and erosion processes occurring during extreme floods?			
Can we improve the estimation of extreme flood peak discharges ?			
How can we evaluate the performance of Flood Early Warning Systems, in terms of losses avoided as a result of a warning?			
How do we improve drought (or flood) risk assessments?			
How to use nature-based solutions to reduce flood risk and drought risks and increase the resilience of water resources?			
How do droughts and floods shape hydrological risk awareness?			
How are changes in vulnerability influencing trends in flood risk?			
How to assess water scarcity by considering both water quantity and quality			
Do flood rich-poor periods exist? If so why?			
Where and when do flood wave superpositions occur and what are the atmospheric, catchment and river network controls on this process?			
Water scarcity assessment			
Floods and droughts: how can we improve forecasting skill or predictability at different lead time lengths?			
Impacts: why do improvements in forecast skills not always translate into forecast value for society?			
What are typical spatial scales over which multi-catchment/trans-basin flooding takes place, how does this vary regionally and why?			
Are very extreme floods increasing and if so why?			
Do drought rich periods exist and if so can we predict droughts in advance?			
How do geomorphic processes amplify floods?			
Studies or rainfall runoff elasticity usually focus on severity of rainfall changes - What is the role of duration of that change? How does the effect of sustained changed conditions accumulate with time and why?			
What is the role of changing vegetation patterns on droughts and floods?			
Do extreme floods and droughts around the world teleconnect with each other and with extra-terrestrial factors?			
Does large scale deforestation cause droughts and floods downwind?			
How does streamflow respond to rainfall much faster than rainfall itself reaches the stream?			
What is the role of virtual water transfer on droughts?			
Snow and ice			
Why, in snow dominated basins, are low flows more sensitive to total volume of snowmelt runoff than to the temperature effects on the timing of that runoff?			
How can we ensure that improved snowmelt models translate into			

improved capabilities to simulate streamflow from snowy watersheds?			
How can we ensure that improved snowmelt models translate into improved capabilities to simulate streamflow from snowy watersheds?			
How can small-scale variability of snow distribution be better represented in larger scale models, and what level of detail is needed for snowmelt runoff modelling?			
Under what conditions is snow melt a more efficient generator of streamflow and groundwater recharge than rainfall?			
What is the effect of preferential deposition and lateral redistribution of snow on runoff generation in alpine headwatersheds?			
How to determine the snow water equivalent in mountain regions?			
Why do catchments with similar glacial cover respond differently in terms of streamflow?			
How important is sublimation for the water balance in snow dominated catchments			
How does seasonal/decadal warming and refreezing affect runoff from glacierized catchments?			
Why do we observe different changes in snow cover in different catchments around the world in response to global warming			
How do spatial-temporal patterns in snow and ice influence groundwater recharge?			
Water quality			
What are the appropriate approaches for evaluating the role of water quality within the water-energy-food-nexus? Or more simply: How to evaluate the role of water quality within the water-energy-food-nexus?			
What are the key parameters for describing human-water interactions in water quality models?			
Can we devise a combined eco-hydrology index of river health to balance human and ecological needs?			
What is the role of water quality in the water-energy-food nexus?			
How to describe human-water interactions in water quality models?			
How do we identify the dominant process controlling water quality over different spatial scales?			
What controls long-term spatio-temporal evolution of catchment water quality?			
How can a hydrograph be separated in to baseflow and quickflow			
How do we stop people using the concept of baseflow and quickflow?			
What factors contribute to the persistence of sources contributing to the degradation of water-quality			
What factors contribute to the delay of response to land use change			
Why are reaction coefficients different in different streams? Can we use that to find an universal coefficient?			
How to study the interaction between water quality and air quality?			
Evaporation and precipitation			
How do we improve the estimated rainfall input?			

Relation between solar cycle and periodicity in occurrence of annual rainfall			
Particularly in drier climates where ET can be ~90% of rainfall, how can we get better estimates of evaporation?			
Soil evaporation and soil evaporation/transpiration partition – how is the changing through the seasons (canopy evaporation)			
How plants and grass works and interact with soil and atmosphere to produce evaporation?			
How can we close the water balance components obtained from different measurement sources?			
How much precipitation originates from irrigation?			
How do we improve the estimated evapotranspiration?			
Do observed changes in extreme precipitation fit CC relationship 7% per degree			
Can we improve extreme rainfall estimates?			
Does increased CO_2 concentration lead to less evapotranspiration			
Are there trends in the global amount of precipitation			
How does urbanisation affect rainfall generation?			
How to estimate condensation (dew)?			
Scale and scaling			
Will we ever find the best approach to extrapolate point scale data to the catchment scale?			
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Combining understanding gained at different spatial scales, eg. generalizing lessons learned from case studies to larger scales.			
How dominant hydrological processes emerge and disappear across the scales.			
Can we trade space for time in hydrology?			
How can we measure the distance between two catchments?			
Can we theoretically link between spatial and temporal scales?			
Hydrological properties and processes are heterogeneous at all scales – what are the large-scale consequences?			
How do we formally up and down-scale?			
How does added information in space add to the understanding of hydrological fluxes?			
Can hydrological laws be defined at catchment scale?			
Rainfall-runoff resonance in terms of flood generation			
Can we find any thermodynamical/physical explanation at multiple scales of how hydrological systems work			
How do we downscale climate projections to hydrological scales			
Which are the scale invariant processes in hydrology			
Are scaling laws universal or do they differ per region and in time?			
Do effective parameters keep the physics?			

Modelling (general)			
Improve model performance through including other data sources (e.g. soil moisture)? Issue here is how much information do these data sets provide (from the view point of the model), and what is the impact of uncertainty in the new datasets? If more noise than information, then adding the data doesn't help.			
How do we better capture and use the uncertainty in the outputs of hydrological models?			
How do we better capture and use the uncertainty in the inputs of hydrological models?			
How can we better constrain our models with observational data?			
What is the role of equifinality in understanding and modelling hydrologic systems?			
Can hydrological processes of highly urbanized watershed be realistically simulated/predicted?			
What future for process based modelling beyond persistent dilettantism ?			
How to solve the energy budget, the carbon budget and the sediment budget together to constrain hydrologic models results ?			
Which new mathematics to choose for the hydrology of this century?			
Does machine learning have a real role in hydrological modelling ?			
How can we really cope hydrological modeling with remote sensing measures ?			
When will hydrological models (HMs) be robust enough to anticipate accurately future water conditions?			
Is it possible to remove the independence condition in the multivariate frequency analysis (e.g., when using Copulas)?			
What is the value of soil moisture observations for hydrologic predictions?			
How can we identify the independent factors determining a nonlinearly evolving hydrologic response?			
How can one identify the optimal sample dimension to use in multivariate analysis with copula functions?			
Assessing the impact of non-stationary (epistemic) precipitation errors on hydrological model predictions			
Why is the added value of using models not constant across regions?			
How can we smartly incorporate vegetation dynamics in hydrological models			
Which processes are currently not well represented in models and how to improve that			
How to disaggregate model structural uncertainty from input uncertainty			
Can we build a unified hydrological model that does everything			
What is an appropriate level of complexity for hydrological models			
How to identify the hydrological indices that condition hydrological dominant mechanism in ungauged catchments			
Landscape processes and streamflow			
Do we understand scour and erosion processes occurring during extreme floods ?			

Does the "catchment counter-regulation effect" exist (runoff greater than precipitation)?			
How do we obtain water balances for patch-scale areas of low relief?			
What controls the rate of development of watershed behavior (i.e., hydrological succession)			
Desalinated water start to be more and more important fresh water source. What will be impact on water cycle in future?			
How to use tracers in an integrative way to better understand the source, path and age information of (reactive) compounds in catchments?			
How do preferential flow pathways on hillslopes connect and how can we include preferential flow in hydrological models?			
What are the factors controlling the subsurface hydrological connectivity between hillslopes and streams?			
What determines the partitioning of rainfall and snowmelt into vertical and lateral flow paths and how can we use this knowledge to improve the representation of subsurface stormflow in hydrological models?			
Understanding the dynamics of temporary rivers			
Why does a precipitation shift from snow towards rain lead to a decrease in streamflow?			
Why we can not predict river runoff?			
Why are the distribution of distances from a point in the catchment to the nearest river reach exponentially distributed?			
Why / How does hydro-geomorphology follow thermodynamic laws - Coevolution, structure-function, emergence, anisotropy, scaling...			
How can we explain the ubiquitous existence of patterns in hydrology providing constraints on heterogeneity and preferential flow of water through media			
Natural heterogeneity, thermodynamics and (yet again) closing the water balance			
What controls the long term water balance, apart from aridity?			
Why are there flood plains			
Why do some catchments need complicated models and others don't to simulate runoff			
What processes can resonate and lead to compound events			
What are the characteristics of catchments that make them so difficult to model			
How many streamflow gauges are required for global hydrological analysis			
What is the relationship between soil transmissivity and landscape form			
What processes control the expansion and contraction of stream networks as landscapes wet up and dry out			
What are the interactions between catchment properties and modes of streamflow variability			
Can we predict the dominant runoff processes on the basis of climate, soil, vegetation and topography (Dunne diagram)			
River flow recessions controlled by the contraction of the stream network			

Measurements and data			
How to extract information from available data on human and water systems in order to inform the building process of socio-hydrological models?			
Is it possible to accurately measure flow discharge using gauge-cams (or UAV-mounted cameras)?			
A large number of inaccurate observations vs a few accurate measurements: what is our best choice?			
How can we measure subsurface stormflow in space and time?			
Can citizens provide quantitative (or only qualitative) measurements of hydrologic processes?			
How to develop an "openstreetmap-like" water data platform integrating principles and methods of citizen-driven volunteering activities and collaborative mapping?			
How to integrate citizen science and data for the understanding and mitigation of the effects of natural disasters by risk awareness, communication and outreach activities?			
Is it possible to accurately measure flow discharge using gauge-cams (or UAV-mounted cameras)?			
A large number of inaccurate observations vs a few accurate measurements: what is our best choice?			
Working with different data sources (and there varying spatial and temporal resolution), for example impact & vulnerability information, citizen science data, satellite data.			
How can we accurately measure water fluxes in the subsurface (soil and groundwater) at a range of scales?			
How can we detect and measure spatial hydrological patterns ?			
How to cost- efficiently observe multiple tracers at a high temporal frequency at various locations?			
How do we remotely sense river discharge and soil moisture			
What can we learn from remotely sensed regional patterns of soil moisture, vegetation etc			
How can we effectively measure regional subsurface conductivity fields			
How can RS data be used for flood forecasting in ungauged basins			
How can we best use indigenous knowledge to create actionable knowledge for decision making			
With the increased and type of data available do we need to rethink what we are evaluating for water management			
Can we measure flood depth and velocity fields in real time for flood events			
How can we convincingly put a value to hydrological observation systems to reverse the current trend of decline			
How can we observe plant available water at a regional scale			
What are the key technical and non-technical factors holding us back in producing reliable low cost wireless sensor networks			
How to open up all hydrological data around the world			
Can the reliability of hydrological data be increased using the block-chain technology			
How to measure true areal rainfall			
Can the decline of raingauges be compensated by satellite data			

Groundwater and soils			
Groundwater quality: Groundwater quality: More research is needed on the extent, fate and impacts of emerging contaminants of concern (EOCs) in groundwater, including personal care products, human and animal pharmaceutical chemicals, pesticide metabolites, nanoparticles			
Groundwater quality: How can surface water and groundwater quality be managed and protected in urban areas to best effect? There is a need for a better understanding of key contaminant pathways and mitigation options - and downstream impact on water quality in urban areas, and associated wider economic impact and health impacts. What urban design approaches for water supply and waste management can help contribute to quality of place and urban water quality?			
Karst aquifers: If slow intergranular seepage flow is the norm, in what circumstances does groundwater flow rapidly, sometimes at tens to thousands of metres per day?			
Karst aquifers: Are there ways to precisely define groundwater pathways in karstic and fissured aquifers, as tracing tests mainly show just the relationship between inflow and outflow (springs) points?			
Managed Aquifer Recharge (MAR) : Why does clogging and unclogging occur in infiltration basins and recharge wells? While for clogging this is already answered at a superficial level, with a list of physical, chemical and biological processes, we have as yet no reliable universal model - and possibly none at even local scale - that is effective in predicting the rate of clogging or means of reversal.			
Managed Aquifer Recharge (MAR) : Why are microbial pathogens removed in the subsurface? There are competing theories that pathogen predator microorganisms or net attachment to aquifer matrix are responsible for removal. With DNA detection and source tracking methods and techniques to measure surface properties of pathogens and the porous matrix, the methodology now exists to give better definition to the fate of human pathogens in the unsaturated and saturated zones.			
Climate change and global groundwater resources: How much groundwater exists on the Globe? Estimates were made back in the 1970s but an update is needed, especially as water resources come under increasing pressure from changing climate and land use intensification.			
Climate change and global groundwater resources: The IAH Commission for Groundwater and Global Change is currently looking at the response of aquifers to the pumping of "old but renewable" groundwater resources (change in "fossil base flow regime", enhanced recharge potential) , as well as the impacts of increased rainfall intensities on aquifer recharge under changing climate - positive or negative?			
Groundwater-surface water interactions: Although much studied over recent decades there is still a lot more left to understand about groundwater-surface interactions, including the role of the hyporheic zone (e.g. in contaminant fate and transport) , and the dependencies of different ecosystems with respect to their hydrological conditions, and how the status of these ecosystems can be assessed.			
The unsaturated zone: Flow and soil-rock-water interaction in the unsaturated zone. There remain many uncertainties regarding flow			

processes and water-soil-rock interactions in the unsaturated zone, which have significant impacts on groundwater recharge and on the transport and attenuation of groundwater contaminants.			
What are the hydrological processes associated with ground water droughts and ground water floods			
how much ground water feeds in to the oceans			
How to quantify inter-catchment groundwater flow			
How important is groundwater biodiversity to aquatic and terrestrial surface biodiversity			
Can groundwater depletion feed back in to the atmosphere and lead to precipitation changes			
Does Richard's equation work at the catchment scale			
What are the effects of natural and anthropocenic soil disturbances on heat and mass fluxes at the land-atmosphere interface			
Why is soil-water content so variable in space and time			
What are the climate controls on groundwater recharge			
What is the definition of soil water content in climate models			
How can we improve the estimates of groundwater recharge at the global scale			
What are the gas migration processes in the vadose zone under climate stress			
How to identify the groundwater dependent ecosystem by new technology			
Hydrological change			
Why are some catchments more sensitive to land-use/cover change than others?			
Why is it very difficult to assess the impact of land use/land cover change on the hydrology of river basins within the humid tropical rainbelt?			
Understanding the hydrological impacts of landuse change.			
Improve understanding of tipping points; i.e. when do we risk irreversibly changing the hydrological response of a system through the use of WRS, and is this change acceptable?			
Why are some catchments more sensitive to land-use/cover change than others?			
Is the hydrological cycle regionally accelerating under global warming?			
Influence of climate variability on large rivers runoff			
Dealing with non-stationarities, e.g differences in timescales between analysis tools & methods, modeling of non-stationary processes			
Quantifying the human influence on hydrology and hydrological extremes at the catchment scale			
What is the real impact of man on the water volumes transferred to the sea by rivers?			
Why are springs in mountains drying up?			
How can we detect and attribute change in flood characteristics?			
Sudden and abrupt changes of water management conditions?			
Why do we see long term cycles in temperature, rainfall and river flows?			
How do we incorporate climate change and climate variability along			

with landuse change in cumulative impact assessments			
What is the cause of the Hurst phenomenon			
How do you implement an artificial water cycle in urban systems (water reuse etc.)			
How strong is the impact of hydrological change on the migration of people worldwide and what is the effect of migration on hydrologic change			
Are hydrological models able to extrapolate to changed conditions			
What lessons can we learn from the collapse of ancient hydrologic civilizations for contemporary water management			
Is there adequate knowledge in hydrologic models to address health problems			
How can hydrologic sciences be used to predict and prevent wars over water			
What is the hydrologic effect of melting permafrost			
Assorted			
Elementary physics of hydrological cycle.			
Impact of solar activity on hydrological cycle of the Himalayan and Indian Peninsula Rivers.			
Does hydrology needs non-equilibrium thermodynamics or even a new type of thermodynamics ?			
How we can do hydrology science more open and replicable ?			
How can we link our hydrological science with stakeholders?			
What creates stochasticity in hydrology			
Extra themes:			
Humans and hydrology			
Why is it that half the world's population have to deal with no regular water supply – why is it so difficult to solve the water problem			
Why is it people live in high risk flood and drought areas			
Hydrology as a science			
Objectivity in hydrology			
How do we scientifically deal with hydrology as an inexact science			
What better foundation can we define for the hydrological science			
Why is it we can safely ignore so much of the catchment complexity			
How can we shift the culture among hydrological science to encourage collaboration across disciplines			
Should hydrologists care about water – is it a science or an application			
Have hydrologists capitalized on the advances in other areas of science			
Is hydrology suffering from insufficient reproducibility and repeatability and if yes then how can we fix it			
Uncertainty			
How to make decisions under deep uncertainty			

What is the purpose of distinguishing between aleatory and epistemic uncertainty and what are the mathematical consequences			
How to communicate uncertainty to the general public			
How to account for the unknown unknowns			
How much and what information from catchment attributes do we need to reproduce the dynamic catchment behaviour			
Separate floods and droughts			
Communicating hydrology			
How do we communicate the value of hydrological information and knowledge in a post truth world			
How can we shift the culture among hydrological science to encourage collaboration with industry and decision makers across disciplines			
Why does nobody listen to us			
Why do we not listen to decision makers			
How can we convince stakeholders to do optimal allocations of water			
How do we know what is optimal for stakeholders			
Mathematics and computer science in hydrology			
Has hydrology fully capitalized on the advances in computer science			
Predictions in Ungauged basins			
What is catchment similarity – is it static or dynamic and does it produce similar behavious			
Engineering in hydrology			
Is it possible to design water sustainable projects that will not eventually fail			
How can we improve knowledge transfer into engineering hydrology from other hydrology or vice versa			
Should hydrologists insist that design and operation are seen as a whole and not two different parts			
Remote sensing hydrology			
How much can we gain from soil moisture data assimilation for flood forecasting			
Can we use RS measurements for hydrograph separation			