Panta Rhei – Everything Flows
Change in Hydrology and Society
IAHS Scientific Decade 2013-2022
www.iahs.info/pantarhei

Details of the Proposal

Title of the Working Group (WG)

Physics of Hydrological Predictability

Abstract of the proposed research activity

The main objective of WG is to advance our understanding interconnection of predictability aspects of hydrological, weather and climate components of the Earth System.

WG science questions include:

1. What are the predictability limits of different water cycle processes and what metrics can be used to quantify it? These metrics will be used for
   - classifying hydrological systems in view of their predictability
   - evaluating the quality of the water cycle models by dividing inherent and model-related predictability limits, and
   - separating predictable and unpredictable water cycle patterns.
2. How to identify patterns of long-term predictability of the water cycle and to what extent are they affected by climate change processes?
3. How can we advance climate impact studies that focus on hydrological system resilience to climate changes and quantify uncertainties related to climate and hydrological components?
4. How to improve robustness of hydrological models used in climate impact studies?

Panta Rhei research Targets and Science Questions addressed by the Research Theme

WG's research activities are closely related to Science Question (SQ) 1 and SQ2. However potentially, results of the research activities are expected to be demand in addressing (fully or partly) all SQs

Societal impact of the Working Group activity

The Working Group research activities are framed within the context of effective regional water management. A deeper understanding of hydrological

changes, which is necessary for design of efficient management and adaptation strategies under conditions of water scarcity, with an objective to prevent and mitigate floods and droughts in the ongoing climate changes without compromising the sustainability of ecosystems. Identification of predictable patterns in the water cycle would contribute to these strategies. Better understanding of predictability will provide an opportunity to improve the accuracy of hydrologic predictions and projections based on predictable weather and projected climate patterns. Thereafter, having these projections at hand, the requirements of the water resources management and adaptation to future climatic changes will be easier to meet.

List of Participants

The proposed WG includes 10 principal investigators from 4 countries (Russia, Germany, USA, France). The main areas of expertise include: hydrological, land-surface, ecohydrological. and climate modeling, climate/land-use impact assessment, extreme weather and climate events, water management

Name of Participant	Affiliation (full address and email)	Role in Working Group (Chair or Member)	Main expertise
1. Dr. Alexander Gelfan	Water Problems Institute of Russian Academy of Science, 3 Gubkina Str., 119333 Moscow Russia hydrowpi@aqua.laser.ru hydrowpi@mail.ru	Chair	Hydrological prediction and forecasting, climate impact assessment; land use change impact assessment
2. Dr. Pavel Groisman	NOAA National Climatic Data Center, Asheville, NC, 28801, USA, Pasha.Groisman@noaa.gov	Member	Climate and environmental changes
3. Dr. Eugene Gusev	Water Problems Institute of Russian Academy of Science, 3 Gubkina Str., 119333 Moscow Russia sowaso@yandex.ru	Member	Land-surface/atmosphere interaction, land-surface processes modelling, soil physics
4. Dr. Valentina Krysanova	Potsdam Institute for Climate Impact Research (PIK) P.O. Box 60 12 03 D-14412 Potsdam Germany Valentina.Krysanova@pik-	Member	Ecohydrological modelling; climate impact assessment; land use change impact assessment; adaptation to climate change in water

	potsdam.de		management
5. Dr. Inna Krylenko	Water Problems Institute of Russian Academy of Science, 3 Gubkina Str., 119333 Moscow Russia krylenko_i@mail.ru	Member	Hydrological modeling, climate impact assessment
6. Dr. Yuri Motovilov	Water Problems Institute of Russian Academy of Science, 3 Gubkina Str., 119333 Moscow Russia motol@pochta.ru	Member	Hydrological modelling, water resources management
7. Dr. Olga Nasonova	Water Problems Institute of Russian Academy of Science, 3 Gubkina Str., 119333 Moscow Russia nasonova@aqua.laser.ru	Member	Land-surface/atmosphere interaction, land-surface processes modelling
8. Dr. Alexander Shiklomanov	Institute for the Study of Earth, Oceans, and Space Morse Hall University of New Hampshire 8 College Road Durham, NH, USA alex.shiklomanov@unh.edu	Member	Cold-region hydroclimatology, hydrological and water management modeling
9. Dr. Vladimir Semenov	GEOMAR Helmholtz Centre for Ocean Research Kiel Düsternbrooker Weg 20 24105 Kiel, Germany vsemenov@geomar.de	Member	Mechanisms of climate variability, climate modeling, detection of externally forced climate changes
10. Dr. Olga Zolina	Laboratoire de Glaciologie et Géophysique de l'Environnement Université Joseph Fourier – Grenoble 1 / CNRS, France ozolina@lgge.obs.ujf-grenoble.fr	Member	Climate change in global- and continental-scale water cycle, extreme weather and climate events