



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

Title of the Research Theme

Mountain Hydrology

Abstract of the research theme

Mountains are water towers for sustaining Earth's fresh water systems through snow, ice and lake storages, permafrost and groundwater recharge. Hydrological processes in mountainous regions are complex and heterogeneous and our understanding of them is restricted due to limited data. In regions with extensive glacier and snow cover, the hydrological regime is highly susceptible to climate change and the effects go beyond the mountain systems. This theme aims to explore

- How can we best combine in-situ and remote sensing information for improving quality and quantity of observation data in mountainous regions?
- What are the gaps and shortcomings in currently available hydrological models designed to cover large regions? Such models should adequately represent required details of the physical processes and also be computationally efficient.
- How can we improve the understanding of climate change in mountainous regions?
- How does climate change impact the sensitivity of mountainous eco-systems and hydrological responses?
- What are the key sources of predictive uncertainty in the assessment of climate change impacts and what is the best way to interpret the impacts under uncertainty?
- How will changes in hydrological regimes influence the impacts of water-related disasters and how will they affect the multiple uses to which water is put?

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

This research theme aims to address all three targets of Panta Rhei and addresses its major science questions.

Societal impact of the Research Theme

Mountainous regions host diverse human activities, eco-systems, biodiversity and cultural heritage, which are inextricably linked to climate and hydrological regimes. Economic developments in mountainous regions are largely water-based, e.g. agriculture and hydropower. Climate change has increased the vulnerability of mountain societies and eco-systems to the impacts of natural disasters including floods, droughts, landslides and mudflows. Socio-economic developments may also be adversely impacted. By improving the understanding of the links between climate change, hydrology and eco-systems, hydrologists can contribute to shaping sustainable development strategies and adaptation measures for mountain societies and for downstream societies influenced by mountain waters.

Several Working Groups may be formed to address the various research sub-themes and science questions. These can be formed after acceptance of the Mountain Hydrology Research Theme.