



Panta Rhei – Everything Flows  
Change in Hydrology and Society  
IAHS Scientific Decade 2013-2022  
[www.iahs.info/pantarhei](http://www.iahs.info/pantarhei)

### **Proposal for a Working Group**

#### **Title of the Working Group**

Changing Biogeochemistry of Aquatic Systems in the Anthropocene

#### **Abstract of the proposed research activity (150 words)**

The proposed working group will bring together scientists from several countries and disciplines who share a common interest in addressing the challenges of understanding and managing the changing biogeochemistry of aquatic systems under the pressure of diverse human impacts. The research goal is to gain holistic understanding of coupled hydrologic and biogeochemical processes in aquatic systems and to provide effective prediction and management solutions in an integrated fashion. This working group will function as a platform to stimulate close collaborations, share ideas and visions, and conduct inter-comparison of data and models across various locations and scales from different disciplinary and societal perspectives.

The working group will host international workshops, convene special sessions at international conferences, and organize special journal issues within the context of coupled hydrological and biogeochemical processes under natural and human-induced changes. These activities will contribute to Pantarhei by addressing science questions 1, 4, 5 and 6.

#### **Pantarhei Research Themes, Targets and Science Questions addressed by the Working Group**

This working group will mainly focus on Target 2: Estimation and prediction of the Pantarhei Science plan as outlined in <http://distart119.ing.unibo.it/pantarhei/>. This working group will address the following Science Questions outlined in the plan:

SQ1: What are the key gaps in our understanding of hydrologic change?

SQ4: How can we use improved knowledge of coupled hydrological–social systems to improve model predictions, including estimation of predictive uncertainty and assessment of predictability?

SQ5: How can we advance our monitoring and data analysis capabilities to predict and manage hydrologic change?

SQ6: How can we support societies to adapt to changing conditions by considering the uncertainties and feedbacks between natural and human-induced hydrologic changes?

**Societal impact of the Working Group activity (150 words)**

Aquatic biogeochemistry is of critical importance to freshwater sustainability, food and energy security and aquatic biodiversity. The aquatic systems of interest include receiving waters that serve human societies, such as river networks, lakes, reservoirs, estuaries and coastal seas. Humans increasingly alter the aquatic biogeochemical cycles directly by replacement of native vegetation with agricultural crops, applying fertilizers to increase crop yields and by the discharge of untreated sewage, and indirectly by altering the water cycle (e.g., through dams and water withdrawals) and impacting downstream water quality. Climate change is also expected to significantly affect aquatic biogeochemical cycling. Research aims at improved understanding of the dynamics of the coupling between hydrologic and biogeochemical processes under natural and human-induced changes and the use of this understanding towards improved models that can serve as tools for sustainable management of water quality and biodiversity in aquatic systems which is becoming urgent in the emergent Anthropocene.