



Panta Rhei – Everything Flows Change in Hydrology and Society IAHS Scientific Decade 2013- 2022

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Details of the Proposal by Prof. A.Tskhai (Russia)

Title of the Research Theme: Reservoir Creation Impact

Abstract of the research theme

Reservoir creation is an effective tool for solving of economical and technical problems in the society. However, the insufficient development of a methodological framework for impact analyzing and forecasting hampered finding of optimal technical solutions. A major problem in this: properties of creating nature-technical complexes and ecosystems fundamentally differ from the previous state of river objects. In this regard more universal approaches should be used than the traditional statistical analysis of previous data. For example, it is necessary to move from phenomenological water quality models to simulation of nutrients biogeochemical cycles transformation and the calibration should be carried out on the data for reservoir-analogue. These investigations are integrated and interdisciplinary initially. At the same time outcomes will be more similar to the technology for use in practice.

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

1. Insufficient development of a comprehensive methodological framework for understanding, estimation and prediction of reservoir creation impact is the key gap.
2. On the one hand a reservoir leads to the satisfaction of the needs of society in the water. On the other hand the environmental impact is not always friendly to man.
3. Now the main boundary is in human ecology. But sustainability problems for hydrological, environmental and social systems are on the agenda. For the future: main investigation direction is the dynamic search for balances of these systems.
4. We will be able to more accurately define the boundaries of model predictions as well as forecast the character of changes dynamics.
5. Monitoring results and data analysis will become the theoretical basis of forecasting and management of hydrological changes in practice.
6. Our activities will provide sound information to knowledge generation and adoption of qualified management decisions.

Societal impact of the Research Theme is in

- ⌘ *methodological field*: the scientific methodology of nature-technical complex will be developed by accounting of interrelation changes of environmental, economic and technological factors;
- ⌘ *methodical field*: modern methods of analyzing and modeling will be used for assessment, forecasting and management of reservoir creation and use in river basin on the basis of administrative and economic norms and standard monitoring data;
- ⌘ *mathematical modeling*: complex of effective simulation and optimization models which allow in particular to assess environmental effects of fulfillment of administrative decisions will be originating and using in practice;

⌘ *technologies*: original information geo-technologies which been available for reservoir creation and use in river basin will be proposed.

Panta Rhei Working Groups referring to the Research Theme

For this moment I am not proposing a Working Group to address my proposed Research Theme.