Name of research institute or organization:

Institut des Sciences de l'Environnement, Université de Genève

Title of project:

Assessing Climate Change Impacts on the Quality and Quantity of Water (ACQWA)

Project leader and team:

Prof. Martin Beniston, project coordinator
PD Dr. Markus Stoffel, project director

Project description:

The overall goal of ACQWA is to maintain and extend European pre-eminence in the provision of policy-relevant information on climate and climate change impacts on the quality and quantity of water and its interactions with society. ACQWA will achieve this through: (i) the use of advanced modelling techniques to quantify the influence of climatic change on the major determinants of river discharge at various time and space scales; (ii) the analysis of the impact of climatic change and changes in water quality and quantity on society and economy while taking feedback mechanisms into account.

The focus will be on continuous transient scenarios from the 1960s up to 2050. In comparison to many existing studies, limiting the modelling horizon to the mid-21st century allows for the development of more realistic assessments of progressive impacts on social, economic and political systems, which we expect to evolve, typically, in an adaptive mode on time scales shorter than the centennial, eventually shifting to new equilibria when forced abruptly.

The project draws on the involvement and expertise of a large number of institutes (currently 30 partners – and 37 independent research groups from 7 European countries, and in addition 3 non-European partners in Argentina, Chile and Kyrgyzstan. The list of contractors is given at the end of this Executive Summary.

ACQWA aims at providing detailed predictions of climate change, and its impacts on the quality and quantity of water, using a suite of modeling tools. The development of systematic approaches to the quantification of changes in water availability is expected to provide a significant and original contribution to worldwide research into climate change impact prediction. Regional climate model outputs shall provide the essential information on shifting precipitation and temperature patterns, and snow, ice, and biosphere models will feed into a hydrological model in order to assess the changes in basin hydrology, seasonality, amount, and incidence of extreme events. This output is intended as input for developing, evaluating and applying a range of impact models. The multi-model system itself will be used for transient regional climate change scenarios. Both datasets should be of particular interest for regional stakeholders.

The largest progress during the past year concerned the completion of the climate scenarios simulations, including those characterized by high spatial resolution and obtained through dynamical downscaling, the consolidation of the downscaling procedures, and the advancement of the research on modeling the complex response of snow, glaciers (incl. the Aletsch glacier) and consequently river basins to climate change, both at the small and the large scale. The methodologies developed on snow, ice and runoff are currently being used to address environmental and socio-economic responses to changes in hydrological regimes in terms of hazards, hydropower, tourism, agriculture, aquatic ecosystems, and health implications of changing water quality. These results will feed into a quantitative model of water use incorporating supply and demand. The resulting integrated model will permit the construction of scenarios and allow evaluation of various policy options for adaptation and mitigation, which will be of particular interest to policy makers and various stakeholders.

Key words:

Snow, ice, glaciers, runoff, impacts, climate change, Rhone catchment, Aletsch glacier

Internet data bases:

http://www.acqwa.ch

Collaborating partners/networks:

37 partner institutions from Europe, Central Asia and South America

Address:

Institut des Sciences de l'Environnement
Université de Genève
7 route de Drize
CH-1227 Carouge

Contacts:

Markus Stoffel
Tel.: +41 22 379 07 97
Fax: +41 22 379 06 39
e-mail: markus.stoffel@unige.ch
URL: http://www.acqwa.ch