

**Eleventh Session of the RA VI Working Group on Hydrology
Toulouse, France, 25-27 March 2009
Report of the Rapporteur on Water monitoring and Assessment
Prof. Valery Vuglinsky (Russia).**

1. Introduction - Background

At the XIVth Session of WMO Regional Association VI for Europe in Heidelberg, 5-15 September 2005 it was agreed that the Working Group on Hydrology should designate the Rapporteur on Water Monitoring and Assessment (technical aspects) during the following inter-sessional period with the Terms of Reference (TOR) as follows:

iii Water Monitoring and Assessment (technical aspects)

Considering the present and anticipated responsibilities of the NHSs in the area of monitoring and water assessment in compliance with the EU Water Framework Directive (WFD):

- (a) To evaluate current methods used for monitoring and assessment of surface and ground water;
- (b) To prepare a review of and proposals on:
 - Monitoring programmes in compliance with the WFD (end of 2006);
 - Methods and criteria for the classification of the state of rivers and groundwater bodies;
- (c) To evaluate the influence of monitoring frequency on the assessment of surface and groundwater quality parameters.

Recommendations on assigning a rapporteur on this subject were adopted at the Xth Session of the WGH RA-VI (Pruhonice, Prague, 4-7 May 2005). The proposed candidate was approved at the XIVth Session RA-VI (Germany, September 2005). As the Rapporteur did not participate in either of the sessions, he became aware of his having been assigned only at the WGH RA-VI special session on finalization of the part of RA-VI Strategic Plan related to hydrology (Prague, Czech Republic, 26-27 March 2007). Therefore, the present report has been drawn up for the period April 2007 – December 2008.

The Rapporteur field of activity refers to the Expected Result IV of the **RA-VI Strategic Plan: Integration of WMO observing systems**. Listed below are the main results of the work carried out over the period above.

Establishing standards for the Terrestrial Essential Climate Variables (ECV's)

The work has been done in line with the activities of the Terrestrial Observing Panel for Climate (TOPC) with the participation of the WMO CHy and WGH RA representatives. The TOPC is part of the Global Terrestrial Observing System and the Global Climate Observing System. One of its aims is development of terrestrial observation networks, including hydrological network. TOPC identifies global data sets for climate-related terrestrial applications.

One of the TOPS most important activities has been a preparation of the Biennial Report Supplement. This report reviews the terrestrial Essential Climate Variables (ECVs). Four of them, namely river discharge, water use, ground water and lake level, refer to the field of hydrology. A standard review of each ECV has been given involving terms and definitions, the observed parameters, measurement methods, both in-situ and satellite ones, existing standards and recommendations on improvement of monitoring of individual ECVs. Details are provided on why observations of these ECV are needed to understand the causes of climate change, analyse the potential impacts, evaluate the adaptation options and enable characterization of extreme events. It highlights some of the activities being undertaken, the need for the standardization of methods and harmonization of data and the major observational gaps and funding requirements needed to allow countries and international agencies to monitor, implement and report on issues related to climate change.

The Report on ECV T1: **River discharge** has been prepared by Ulrich Loozer (Germany), the Director of the Global Runoff Data Centre (GRDC). GRDC has identified a network of 380 key rivers worldwide where river discharge monitoring is essential: the Global Terrestrial Network for Rivers (GTN-R). The 80 hydrological services responsible for these rivers have been contacted and GRDC is beginning to receive updates of historical data for some rivers.

The Report on ECV T4: **Water level in lakes and reservoirs, water storage** has been prepared by Valery Vuglinsky with the participation of Tatyana Gronskaya (Russia), Jean-Francois Cretaux (France) and Reuben Sessa (FAO). In this document the description of existing measurement methods, protocols and standards (including in-situ and satellite measurements) are given. The contributing networks and data availability are analysed. The recommendations for improving of water level observation are suggested. It was stressed that the existing methods of lakes water level observations are metrologically well-founded and make it possible to obtain data accurate enough for further processing and analysis. The results of satellite water level measurements yet contain substantial errors which exceed admissible limits. However, this data enables one to assess general seasonal and long-term water level trends.

Further validation of this data by the specific examples of lakes and reservoirs with ground network as well as improvement of the technique of satellite water level measurements are necessary.

Development of International Data Centre on Hydrology of Lakes and Reservoirs

In accordance with the recommendation of the XIIth Session of CHy (Genewa, Switzerland, 20-29 October 2004) and the Agreement between WMO and Roshydromet signed in June 2008, the International Data Centre on Hydrology of Lakes and Reservoirs (HYDROLARE) was established at the State Hydrological Institute (Russian Federation) which is operated under the auspices of WMO.

The objective of the HYDROLARE is the establishment, development and regular update of international database on hydrological regime of lakes and reservoirs in order to:

- stimulate the development of the global monitoring system on lakes and reservoirs for rational use, preservation and management of their water resources;
- improve the knowledge on lateral fluxes transformation within lakes and reservoirs;
- supply data for scientific and educational purposes, modelling, and development of different global and regional projects/programmes.

During 2007-2008, the preliminary phase of HYDROLARE activity was realized. On 1 January 2009 the HYDROLARE began to operate in accordance with the WMO protocol. During 2008, the encoding system for data base was set and database software was chosen to meet WMO requirements. Metadata and historical observational data for Russia and other FSU countries was formed and loaded into the data base. First test operation of HYDROLARE was carried out.

At the end of 2008, the questionnaire for data collection from foreign countries was distributed via WMO. More than 45 countries agreed to cooperate with HYDROLARE.

The HYDROLARE web site is now under operation: www.hydrolare.ru.

The second meeting of the Steering Committee for the HYDROLARE will be held in St. Petersburg, Russian Federation, in May 2009.