

Hydrology of the Anthropocene: From development to adaptation and harmony

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The world is now in the midst of the Anthropocene. The expansion of human activities is the main cause of the global change. This expansion has been supported by science and technology and hydrology was part of it. Harvard Water Program in the late 1950s was one of the symbols of such efforts in the 20th century on water resource systems. There was much enthusiasm created and many contributed to increase the efficiency of development. Nevertheless some technologies such as optimal design and data generation that attracted much attention seem not at last accepted by society. Why? Is it because society was premature to accept scientific judgment or the technology was premature to provide reliable judgment? I have to say that the truth was the mixture but very near to the latter. The technology was sufficiently sophisticated but not well designed to the total texture of the society and its decision making structure. In the reality the human instinct and past experiences were more comprehensive, manageable and reliable. Under such condition, the sophisticated science cannot be adopted by the society but rather treated as the increase of gray zone, if not a noise.

In the 21st century, such a relation between science and society is no longer acceptable as the matter is not an efficiency of development but human security and survival. Science and technology have to support human adaptation to the nature and harmony within the human themselves. Predictive hydrology, ecohydrology and hydrology for the law would play the key role. In order for ten billion people to live pleasantly and peacefully under the intensified climatic conditions and the accelerated speed and magnitude of changes of the nature and society, the human instinct and raw experiences are no longer a reliable guide.

Science has to take responsibility to provide precise diagnosis of the factual processes and precise prescription to lead the society jointly with the politicians to take actions for adaptation and harmony. Science is no longer allowed to just expand the gray zone. It should provide specific description of the reality that can be translated into actions and even laws. How? Computer simulation provides forecasts but at the same time expands uncertainty. Sink of uncertainty is only in observation and theoretical analyses. Hydrologists should fight against the reality that computer capacity is more rapidly increasing than observational and theoretical capacity which creates more uncertainty. The hydrologists have to more use their right brain and respond to the real needs of society.