

# About the future water resource management considering the climate change

- Evaluation of the analysis technology aiming the appropriate use and maintenance of the underground water-

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## 1. Introduction

To create sustainable and powerful national land and local area, it is imperative to secure the stable and good quality water supply based on the health and sane water recycle. In particular recently, as it is estimated to see increasing drought risk due to climate change, increasing water demand due to global population increase and further tough competition on the water business, under the circumstance future tight water demand and supply is concerned, we have to proceed on working toward upgrading the water resource management

Specifically, we are required to achieve integrated water resource management to use various water resources including underground water and rain water on effectively utilizing respective characteristics going away from the conventional water resource management based on the surface stream water.

## 2. Process and task concerning the underground water management

Underground water has been broadly utilized for the daily life water and various purposed as good quality, convenient and cheap water resource.

However, as too much water intake caused by the industrialization has resulted in underground water obstruction such as ground sinking, we have seen a process to convert the resource to the surface stream water on restricting the water intake of the underground water by the Industrial Water Act.

Further, to the character of the underground water as a private property attached to the land, with the recent point of view that the underground water is a significant factor to compose the water recycle, it is required that the public nature of the underground water prevails as the socially-accepted idea.

Accordingly, activated use of the underground water is, still securing the underground water appropriately, a conversion of the paradigm, and it is required to achieve reliable quantitative research result that contributes to such a breakthrough, make concepts and further to make a new rule.

On the other hand, as for the analysis of the underground water, analysis theory and numeric value analysis technology to resolve it are already established. However, there is a problem of lower accuracy in the analysis since the given condition of such an analysis such as the data of the underground water level, water intake volume, earth quality condition were not grasped sufficiently.

## 3. Outline of this research

This research has adopted the watershed of the Chiyogawa river, the first class water system as the case

study watershed so as to construct both the flow analysis model and water balance analysis model and predict the future on the effect that the climate change gives to the surface stream water and underground water, in which we still proceed on the analysis.

In the flow analysis, we have supposed a model with a point of view to grasp and make visible the underground water flow in the watershed as precisely as possible. This is because we are to submit the result for the purpose of making a common concept among concerned parties and for the judgment whether or not to expect the underground water as an alternative water resource at the time of the drought, thus to make it the analysis technology to support the general water resource management in respective area. We have made this model a water recycle model using the “integrated water recycle simulator” that is able to analyze the surface stream water and underground water perfectly all together.

For the water balance analysis, we have supposed a model in a viewpoint of the convenience. This is for the purpose of making it a macroscopic analysis technology that contributes to grasp the long-term wide spread area change of the water balance that can be submitted to the discussion of what is the nation wide water resource management including the underground water. We have made this model a tank model composed of the dam watershed, residual watershed and underground water basin.

## 4. Future perspective

We are currently collecting data of the underground water level in the country together with the above analysis. From now on, we would like to make an analysis of the trend of recent underground water level and future prediction of the effect on the surface stream water and underground water caused by the climate change in a nationwide view so as to study what should be the future water resource management considering also active utilization of the underground water.

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