

Development of Future Precipitation Data Support Model using RCP Scenarios in Korea Peninsula

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Abstract. Concept of Smart Water grid comprising high-tech ICT and efficient management of available amount of water resources. In order to apply this system, it is important to forecast future precipitation. Korea Meteorological Administration provides climate change scenarios. This study developed a program which providing a precipitation in the unit grid of 1km*1km using the RCP scenario. Visual Studio 2013 was used for developing the model based on C language. Climate change scenarios were stored in Oracle DB to be used through the server of Incheon National University. The result of extraction was stored as a text file and visualization by time series graph to increase user convenience.

Keywords: RCP Scenario, Visual Studio, Precipitation Analysis

1 Introduction

The process of producing the detailed prediction of climate change in the Korean Peninsula is as follows. The Meteorological Administration and National Institute of Meteorological Research (2011) prepared the 5th evaluation report for IPCC, and to produce the detailed prediction of climate change in the Korean Peninsula, they calculated in 2012 the multi-stage prediction data of climate change in the Korean Peninsula by combining the global climate prediction model, regional climate prediction model and statistical spatial elaboration model.

The program providing climate change scenarios reflects the recent administrative district map from the RCP 8.5 scenario provided by Meteorological Administration, supplements the areas with missing data, and provides the daily precipitation amount based on the user's selection for future predication period and location.

2 Program development

Based on the present, the program providing future precipitation data shows the daily amount precipitation during the future period. Developed program used the prediction

of precipitation probability provided by Meteorological Administration to provide the daily precipitation amount for a period less than the future three months. For long-term exceeding three months, the precipitation amount was provided by RCP scenario for each 1km-unit grid and administrative district.

The climate change scenarios and average year's precipitation data of the past stored in the DB are designed to be extracted based on the location and period set by the user. The data of climate change scenarios in the unit of 1km-grid are linked so that setup in the unit of large region, medium region and standard basin is available by the latitude/longitude coordinate and date. Setup was also made to allow users get data by selecting the observation point based on the unique number of rainfall observatories.

Figure 1 shows the User Interface of the program developed by this research to provide future precipitation data. The program was developed to allow users extract precipitation data by the RCP 8.5 scenario between 2015 and 2050, as well as download the data of 65 major observatories around the country which have climate observation data for the past 30 years or more. The program supplements such omission, and allows users extract precipitation amount more accurately.

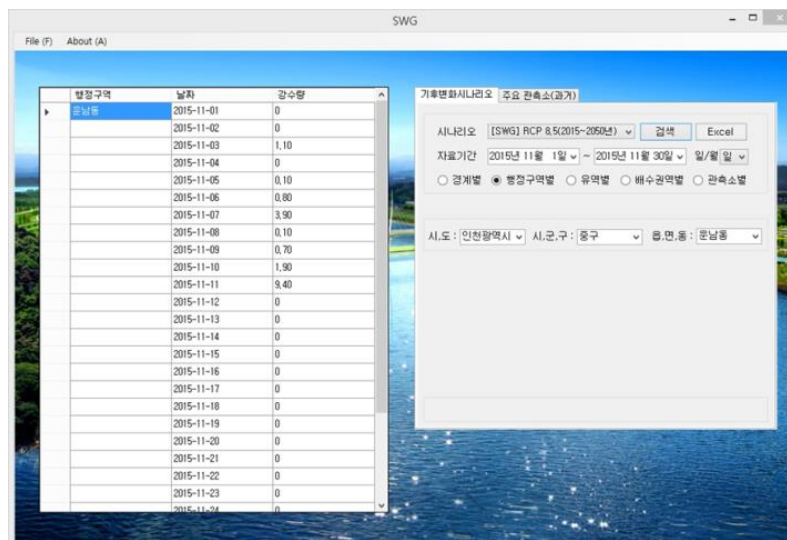


Fig.1. Screen of program providing future precipitation data

3 Conclusion

This study developed a program providing future precipitation data to be used for evaluating the water resources shortage. The average year's precipitation amount of the past provided by observatories, the probability of precipitation prediction provided by Meteorological Administration, and RCP 8.5 scenario were used for extract

estimated precipitation. The program developed by this study to extract climate change scenarios allows users extract daily precipitation data based on their selection for period and location. The program is especially effective in getting the average precipitation amount in specific areas selected by the user. To extract data within a one-year period, it takes less than 10 seconds, showing capacity of speedy search and display.

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