

B-11 Assessment of the Global Warming Effects on the Japanese Water Balance (Final Report)

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Purpose of this study is to predict the effects of greenhouse-induced climatic change on the water balance of a river catchment scale. The prediction of the water balance is, however, more uncertain than that of climate change.

One possible approach to estimate the change of precipitation at a river catchment scale over Japan due to global warming is to utilize a hydrologic model combined with a meso-scale atmospheric model. We have developed the coupled model, which uses the output of GCM as a boundary condition and can simulate the change of precipitation and temperature under the condition of doubling CO₂ over the Japan Island. We also tried another approach to estimate precipitation pattern change due to global warming by applying the weather pattern analysis method. We analyzed the historical relation between weather pattern and precipitation amount, which was then applied to the simulated weather pattern based on the output of GCM for estimating the precipitation pattern under warming condition.

On the other hand, changes of snowfall and snow melt amount has very important effects on water resources for cold region such as Hokkaido. Therefore, it is important to investigate the current and future snow melt runoff situations. We analyzed the amount of snowfall and snow melt runoff by using runoff model and remote sensing information, which was then used to simulate the change of hydrological cycle under the warming scenarios.