

Modeling of Water Balance Components in a Small Island via a Numerical Model Application

Abstract

A numerical model (SEAWAT-2000) was selected to estimate the water balance components in the low-lying area of Manukan Island. The water balance components of the current situation have shown that decreasing freshwater storage is due to irregularities in the patterns of recharge rate and over pumping. Scenarios land 2 were selected for factors that affect the water balance components in the current situation. The water balance components in Scenarios 1 and 2 have illustrated sustainable management and utilization of groundwater resources in the study area. A valuable tool to restore groundwater storage has been demonstrated in Scenario 2, which represents the impact of future El Nino events. The best artificial recharge method must be selected with consideration given to other important factors. Extra meteorological and water usage data will aid sustainable management and utilization of groundwater resources, as well as further reduction of the pumping rate. The results of this study provide a management foundation for restoration of the groundwater resources of Manukan Island. The management foundation can also be used with other small islands that have similar hydrogeological conditions for the purpose of groundwater resource protection.