

## The application of regional groundwater flow model to the underground dam in the ryukyu limestone aquifer

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The underground dam was construction in the Ryukyu limestone aquifer and groundwater is used to agricultural water. Water quality change of groundwater and that affect to sea water quality through submarine groundwater discharge to be expected due to agricultural use.

Groundwater model for understanding and predicting hydraulics and contaminant transport in aquifer make assumptions about the distribution and hydraulic properties of geologic features that may not always apply to karst aquifers. In this study, a finite difference groundwater model (MODFLOW-NWT) was applied to construct an equivalent single layer two-dimensional mathematical model of the Ryukyu limestone aquifer, which is located a southern part of Okinawa main islands. In order to handle problems at regional scale groundwater model in the aquifer, automated parameter estimation method (PEST) and coupling the conduit flow process was used in this model. Groundwater level measurements collected in 1994 were used to calibrate a steady state model of the study area. This study shows the ability of MODFLOW-NWT and PEST to simulate regional groundwater flow in highly karstified aquifer such as Ryukyu limestone aquifer, which is important for water resource and groundwater management in the area.

Keywords: Underground dam, groundwater flow, conduit flow, PEST, submarine water discharge