The Komesu and Giiza underground dams are first full scale underground dam facilities constructed for irrigation in Japan. This study area is located in the southern part of Okinawa Main Island, Japan, where Ryukyu limestone is extensively distributed. We studied the behaviour of groundwater flow in this region by using observation data of groundwater or springs through long term (from 1993 to 2010) monitoring.

The analysis of the effect of the underground dams in the groundwater behaviour, numerical simulation was used for that purpose, a well know computer code was utilized. Then, we analysed salt-water intrusion in the Komesu reservoir areas in detail by these the three dimensional numerical model.

Through the comparison with simulation and observed data, the cut off wall of dams effectively storage the groundwater in the reservoir areas. The observed groundwater level at the reservoir areas were almost reproduced by this model, but there were a few difference between the calculation and observation, response analysis could be carried out to improved the model by inputting various data of geological structure of Ryukyu limestone and introducing non-darcian flow. The results of examination make it possible to improve the management of groundwater reservoir in the limestone aquifer area behind the underground dam. The results demonstrate that underground dam may be a very useful instrument sustainability increase the available storage in the limestone aquifers.

This is contribution sustainable development of irrigation in Okinawa islands.