

Comparative study of nutrient in coastal areas of groundwater and river contribution types, in Bisan Seto Inland Sea

Shin-ichi Onodera[1]; Mitsuyo Saito[2]; Yuta Shimizu[3]; Koichi Kitaoka[4]; Seiko Yoshikawa[5]

[1] Integrated Sci., Hiroshima Univ; [2] CMES, Ehime Univ.; [3] Grad., Integrated Sci., Hiroshima Univ.; [4] Appl Sci, Okayama Univ of Sci; [5] Natl. Agric. Res. Center for Western Resion

Coastal groundwater is one of the important water resources for the coastal city and industries. But groundwater discharge is generally a little as compared with river discharge. Therefore, groundwater level depression and land subsidence had occurred due to over-pumping. To use sustainably groundwater and river water, it is necessary to manage the withdrawal from both water resources within the discharge volume. However, it is difficult to evaluate the groundwater discharge in various catchments of regional area. The objective of this study is to estimate groundwater discharge in various catchments of regional area, based on the topographic parameters. We conducted the river runoff measurement and nutrient load monitoring at 15 coastal catchments with the watershed area of around 1km² in a small island in the various season. In addition, we extracted topographic parameters from the topographic map. We found that water convergence degree of catchment (Wc) controlled the river runoff. In addition, we suggest that this relationship is able to distinguish the discharge path in a catchment to river runoff and groundwater flow type. The catchment with high Wc has the property, such as deep valley, wide width, or large area. Such catchment was the river runoff type. On the other hand, the catchment with low Wc such as shallow valley, narrow width, or small area was the groundwater discharge type. Such type of catchments is suitable to groundwater use. Furthermore, we examined relationships between coastal topographic slope and darcy's equation parameters in various catchments. The permeable and flowable layer thickness decreased and hydraulic gradient increased with increasing topographic slope. Consequently, groundwater discharge increased more at the topographic slope of about 0.01. These results suggest that delta areas with such slope are suitable to groundwater use.