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Effects of water and dissolved material exchanges between land and ocean on coastal ecosystem and fishery resources

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There are two pathways of water and dissolved materials from land to the ocean. The first one is river discharge and another is invisible submarine groundwater discharge (SGD). Many studies show the importance of SGD on coastal ecosystem and fishery resources. SGD is evaluated by using seepage meters and piezometers at local point scale, radon and strontium isotopes as tracers in bay scale to identify the origin of the fresh water, which is river water or groundwater. Another method is resistivity measurement which can tell us the salinity of the pore water in the sea bed near the coastal zone.

SGD observed by seepage meter and Rn concentration of the coastal seawater has a positive relationship over the world with different geology, geomorphology, and hydro-meteorological conditions. All SGD studies show that there are two components in SGD, one is fresh SGD and another is recirculated SGD. It is important for understanding coastal ecosystem and fishery resources to evaluate the ratios and processes of fresh SGD which is driven by hydrological condition in land, and recirculated SGD which is driven by oceanographic conditions in the sea.

In this study, SGD studies by using seepage meter and radon measurements over the world are reviewed to evaluate the physical and chemical factors which drive SGD and material transports by SGD, and the effects of SGD on the distribution of the fishery resources such as shell distributions in the coastal zone. River discharge is a main linkage between land and ocean through water and dissolved material transports, however it has huge temporal changes. On the other hands, the amount of SGD itself is not much but continuous contribution by SGD with constant temperature and nutrient discharges make stable physical, chemical, then biological conditions such as sea grass (Zostera bed).

Keywords: submarine groundwater discharge, coastal ecosystem, coastal fishery resources, nutrients, seepage, radon