Estimation of SGW flux near the intertidal zone of Omae beach by the budget analysis using the marine observation data

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Submarine groundwater flux near the intertidal zone of Omae beach was estimated by the budget analysis using the marine observation data. Omae Beach is natural beach and located in the Shuku River mouth, Hyogo Prefecture Nishinomiya City Japan. The coastline is about 900m and the length of the inter-tidal zone is about 150m. Marine, river and groundwater observation were carried out in Oct. 10 and 11, 2007. CTD observation at 5 stations and ADCP observation on 2 lines (L1 and L2) were carried out in high tide, mean level and low tide during about 24 hours. The water level was measured at offshore of the intertidal zone during about 24 hours. The flow speeds of two rivers were measured in high and low tide. Water budget of the box which is surrounded by ADCP lines and Omae beach is represented by $dVx=Vq+Vp-Ve+Vg+VL1+VL2$. dVx is the variation of the box's volume (m3) during a period (dt). Vq is the river discharge. Vp is precipitation volume. Ve is evaporation volume. Vg is submarine ground water flux. $VL1$ and $VL2$ are the through water volume of the boundary section. We can estimate dVx by the observed water level, Vq by the river observation data, Ve by the bulk equation, $VL1$ and $VL2$ by ADCP data. It is no precipitation in the observation day. Then Vg, which is the sum of the fresh and recycling ground water, is calculated. The budgets were calculated in 8 periods related to observation time, namely tidal change. As another method, Vg, L1 and L2 were estimated by water, salt and total phosphorus budgets. Results and comparison will be shown in the presentation.

Keywords: Omae beach, Budget Analysis, Submarine ground water, Marine observation data, Intertidal zone