

Spatio-Temporal Variation Pattern of Oil Concentration using Spatial Analysis on Mallipo Beach of Korea

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Abstract: In December 2007, Hebei Spirit oil spill incident occurred on the western sea of South Korea, which contaminated most of nearby beaches. This study aimed to analyze the spatio-temporal variation pattern of total petroleum hydrocarbon (TPH), oil concentration for Mallipo beach that is one of the areas with oil contamination damages. Accordingly, it calculated spatial statistics of TPH using weighted mean center (WMC) and TPH weighted standard distance (WSD), along with the mapping of TPH spatial distributions for 5 years since 2008. According to the result of WMC analysis, it moved west from the spatial mean center (MC) of the beach and moved once again towards the MC in winter. However, It showed a pattern of moving towards the MC from west of the beach in summer. In addition, WSD showed clustered pattern in winter seasons, followed by dispersed pattern in 2012. In summer, on the other hand, it showed dispersed pattern until 2010, followed by cluster pattern since 2011. Accordingly, it showed that the pattern of spatial variation of TPH and the change in spatial distribution pattern varied between winter and summer seasons. For the purpose of assessing and predicting the progression of beach oil contamination, it is necessary to not only apply a spatial statistics but also spatio-temporal variation pattern analysis of TPH by dividing period into winter and summer seasons.

Keyword: Spatio-Temporal Variation, Weighted Mean Center, Weighted Standard Distance, Total Petroleum Hydrocarbon (TPH)