

System Development of Geosphere Environmental Informatics and Its Application

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Abstract. In this study, we examined cadmium (Cd) concentration in river-bed sediments using GIS system of geosphere environmental informatics, which has been being developed for the integration of geosphere environmental information such as geology, soil texture, vegetation, topography, location of mineral deposit, alteration zone, anomaly of heavy metals, satellite image, the groundwater information, concentration of heavy metals in rocks, soils and river-bed sediments. In the GIS system, some original geoprocessing models were developed. Map integration model can integrate various type of information and take new insight from them. Search refinement model can extract the objective feature from various information by selecting attribute and location repeatedly. We carried out the hydrologic analysis in order to evaluate the concentration distribution of Cd. In the analysis, the stream network and the watersheds of sampling points were created from a digital elevation model in the Tohoku district, Japan. We integrated Cd concentration and the watersheds, and created the concentration distribution map at each watershed. In addition, the influence of topography and soil texture on the Cd concentration was considered. Finally, we concluded that the incorporation of geosphere environmental information into the concentration distribution is effective to the evaluation of the transfer behavior of Cd.

Keywords: GIS, Geosphere environmental information, Hydrologic analysis, Soil pollution, Heavy metal.