

Calculation of SS concentration coefficients of river water for each land use by a simple watershed model.

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In recent years, sediment-related disasters are increasing due to intensification and localization of rainfall caused by climate change. Although it is difficult to predict the place and extent of sediment-related disasters, we firstly grasp the average concentrations of sediment discharge in recent years and predict increase and decrease in the sediment concentrations when the way of rain changes. Sediment runoff is depend on land use and land cover, conservative measures, topography, climate condition mainly rainfall etc.. Among them, the land use and land cover is expected to be great in normal climate conditions. Here, in order to contribute to the prediction of sediment-related disasters in the future, coefficients that indicate the SS load intensity to rivers of each land use for the river watersheds across the country are calculated using a simple watershed land use model.

Watersheds whose lower ends are observation points of water quality, and whose land use ratios were determined by GIS technique using published database of DEM (GSI, 10B, raster data) and LULC mesh data (JAXA, ALOS AVNIR-2, 10m mesh data). The SS concentration coefficients of paddy, upland, forest, and urban were calculated by applying the below multiple regression equation using the land use ratios and published SS data(Ministry of Environment).

$$C = a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4$$

C: SS concentration (mg L⁻¹) a_i : SS concentration coefficient for land use i , x_i : ratio of land use i , Land use i : 1;paddy 2;upland fields 3;forest 4;urban

The SS concentration coefficient is 15.4 (lower limit 95% value 12.0 to upper limit 95% value 18.8), 11.5 (7.4 to 15.6), 3.9 (2.6 to 5.1), 11.2 (9.2 to 13.2) for paddy fields, upland fields, forests and urban areas respectively (n=5103).

In order to investigate further in detail, it is necessary to analyze fertilization, soil properties, livestock industry in the watershed, climatic conditions (especially rainfall amount), topographical and geographical features and so on.

Keywords: watershed land-use model, SS, concentration coefficient