Application of Physics-based Erosion Model for Agricultural lands

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(a) Purpose of study or research hypothesis

Climate change is the most significant environmental issue, especially in Korea, where heavy rains occur frequently. This change in pattern further increases the risk of soil erosion. Soil erosion causes several problems, such as reduced agricultural land and poor water quality. In this study, we analyze soil erosion in agricultural land in the Doam basin.

(b) Key issue(s) or problem(s) addressed

This study analyzed the patterns of erosion and deposition using a physics-based erosion model. We confirmed spatial distribution and the amount of erosion.

(c) Methodology or approach used

The selected study site is the Doam basin, located in Daegwallyeong, Gangwon, in Korea. This study site has a dam for hydroelectric power generation. However, its operation was suspended in 2001 because of water quality issues due to severe soil erosion from the upstream areas. Even in the basin, a lot of soil loss occurs during rainfall due to having many agricultural lands.

For soil erosion models, many models have been developed, ranging from empirical models to physics-based models. In this study, we used SSEM (Surface Soil Erosion Model) of a physics-based model to analyze soil erosion. Since this model can reflect Spatio-temporal variability, it is possible to determine where, when, and the amount of erosion occurs.

(d) Results or conclusions derived from the project

As a result, erosion occurred in most of the agricultural lands. Significantly, it was analyzed that many erosion occurred in the agricultural lands nearby city. These results show that they are consistent with the patterns of erosion identified in the actual site. Therefore, plans and policies to reduce soil erosion are needed in this basin. These results can be used as primary data for soil erosion control and soil conservation management.

(e) Implications of the project relevant to congress themes

This work seeks to take an engineering approach to soil erosion using a physics-based model. Muddy water generated by soil loss can destroy aquatic ecosystems, and a decrease in agricultural land reduces agricultural productivity. Therefore, making an appropriate plan to solve these problems is necessary, and this study can be helpful with these issues.

Keywords : soil erosion, physics-based erosion model, agricultural land