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Prediction of Soil Erosion from Uplands under Climate Change Scenarios in Korea

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Major impacts of climate change expect that soil erosion rate may increase during the 21st century. This study was conducted to assess the potential impacts of climate change on soil erosion by water in Korea. The soil loss was estimated for regions with the potential risk of soil erosion on a national scale. For computation, Universal soil loss equation (USLE) with rainfall and runoff erosivity factors (R), cover management factors (C), support practice factors (P) and revised USLE with soil erodibility factors (K) and topographic factors (LS) were used. RUSLE, the revised version of USLE, was modified for Korean conditions and re-evaluated to estimate the national-scale of soil loss based on the digital soil maps for Korea. The changes of precipitation for 2010 to 2090s were predicted under A1B scenarios made by National Institute of Meteorological Research in Korea. Future soil loss was predicted based on a change of R factor. As results, the predicted precipitations were increased by 6.7% for 2010 to 2030, 9.5% for 2040 to 2060s and 190% for 2070 to 2090s, respectively. The total soil loss from uplands in 2005 was estimated approximately 28 [U+2179] 106 ton. Total soil losses were estimated as 31 [U+2179] 106 ton in 2010 to 2030s, 31 [U+2179] 106 ton in 2040 to 2060s and 33 [U+2179] 106 ton in 2070 to 2090s, respectively. As precipitation increased by 17% in the end of 21st century, the total soil loss was increased by 12.9%. Overall, these results emphasize the significance of precipitation. However, it should be noted that when precipitation becomes insignificant, the results may turn out to be complex due to the large interaction among plant biomass, runoff and erosion. This may cause increase or decrease the overall erosion.