Geophysical Research Abstracts
Vol. 19, EGU2017-4397, 2017
EGU General Assembly 2017

Estimation of Rainfall Erosivity via 1-Minute to Hourly Rainfall Data from Taipei, Taiwan

Ting-Yin Huang (1), Ssu-Yao Yang (2), and Chyan-Deng Jan (3)

(1) Department of Hydraulic and Ocean Engineering, National Cheng Kung University, Tainan 70101, Taiwan, R.O.C(ashley82330@gmail.com), (2) Department of Hydraulic and Ocean Engineering, National Cheng Kung University, Tainan 70101, Taiwan, R.O.C(henry740913@gmail.com), (3) Department of Hydraulic and Ocean Engineering, National Cheng Kung University, Tainan 70101, Taiwan, R.O.C(cdjan@mail.ncku.edu.tw)

Soil erosion is a natural process on hillslopes that threats people's life and properties, having a considerable environmental and economic implications for soil degradation, agricultural activity and water quality. The rainfall erosivity factor (R-factor) in the Universal Soil Loss Equation (USLE), composed of total kinetic energy (E) and the maximum 30-min rainfall intensity (I_{30}), is widely used as an indicator to measure the potential risks of soil loss caused by rainfall at a regional scale. This R factor can represent the detachment and entrainment involved in climate conditions on hillslopes, but lack of 30-min rainfall intensity data usually lead to apply this factor more difficult in many regions. In recent years, fixed-interval, hourly rainfall data is readily available and widely used due to the development of automatic weather stations. Here we assess the estimations of R, E, and I_{30} based on 1-, 5-, 10-, 15-, 30-, 60-minute rainfall data, and hourly rainfall data obtained from Taipei weather station during 2004 to 2010. Results show that there is a strong correlation among R-factors estimated from different interval rainfall data. Moreover, the shorter time-interval rainfall data (e.g., 1-min) yields larger value of R-factor. The conversion factors of rainfall erosivity (ratio of values estimated from the resolution lower than 30-min rainfall data to those estimated from 60-min and hourly rainfall data, respectively) range from 1.85 to 1.40 (resp. from 1.89 to 1.02) for 60-min (resp. hourly) rainfall data as the time resolution increasing from 30-min to 1-min. This paper provides useful information on estimating R-factor when hourly rainfall data is only available.