

Publication

Global rainfall erosivity assessment based on high-temporal resolution rainfall records

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The exposure of the Earth's surface to the energetic input of rainfall is one of the key factors controlling water erosion. While water erosion is identified as the most serious cause of soil degradation globally, global patterns of rainfall erosivity remain poorly quantified and estimates have large uncertainties. This hampers the implementation of effective soil degradation mitigation and restoration strategies. Quantifying rainfall erosivity is challenging as it requires high temporal resolution(<30) and high fidelity rainfall recordings. We present the results of an extensive global data collection effort whereby we estimated rainfall erosivity for 3,625 stations covering 63 countries. This first ever Global Rainfall Erosivity Database was used to develop a global erosivity map at 30 arc-seconds(1) based on a Gaussian Process Regression(GPR). Globally, the mean rainfall erosivity was estimated to be 2,190 MJ mm ha⁻¹ h⁻¹ yr⁻¹, with the highest values in South America and the Caribbean countries, Central east Africa and South east Asia. The lowest values are mainly found in Canada, the Russian Federation, Northern Europe, Northern Africa and the Middle East. The tropical climate zone has the highest mean rainfall erosivity followed by the temperate whereas the lowest mean was estimated in the cold climate zone.

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