Spatial Distribution of Rainfall Erosivity for the main agricultural production zones of Austria

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Rainfall erosivity is calculated based on the amount and intensity of rainfall within a given event and is considered an important aspect of water based erosion. In this study, the summer (May to October) rainfall erosivity for the area of Austria was assessed, based on the functions provided by the Revised Universal Soil Loss Equation (RUSLE). With previous studies using limited erosivity values to depict the country's soil loss erosion, the territory of Austria required an updated erosivity (R-Factor) map to identify the country's vulnerable agricultural production zones.

In order to create the most reliable R-factor representation, stations had to fulfil a certain criteria to be eligible for the study, with a minimum of eighteen years of continuous data (between 1995 and 2015), and containing both ombrogragh (five minute interval) and ombrometer (daily manually recorded) readings. This resulted in 159 of 243 stations being observed for this study. The two types of readings were matched to find daily errors within the five minute interval data, and any identified errors were excluded before calculating the event R factor for each station. The results were compared to outputs from the Rainfall Intensity Summarisation Tool (RIST) to ensure proper scripting. In order to calculate the R-factor for the missing and faulty data, the R-factor parameters from the error-reduced rainfall data were identified using a non-linear regression model. The R-factor values were recombined and the sum of the summer R-factor was identified for each station, while the R-factor for the main agricultural production zones was calculated by pairing stations by their coordinates.

Results revealed a summer range of 255 to 3636 MJ mm ha^{-1} h^{-1} for individual stations, with a national summer average of 1085 MJ mm ha^{-1} h^{-1}. To account for the large spatial heterogeneity within Austria, we also identified monthly R-factor distributions for the eight main agricultural production zones.

This approach enabled us to get better insight into the spatial distribution of R-factor values for the agricultural production zones. Future research will look into national scale based soil erosion with RUSLE at the spatial scale of agricultural parcels, and thus providing base information for future management policies in correspondence with the Austrian Environmental Programme for Agriculture (ÖPUL).