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Subannual spatiotemporal patterns of potential erosion hotspots on full island scale (Mauritius, Indian Ocean): Foci for agrodiversity and ecosystem buffer regions

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Economic and agricultural growth on Mauritius has resulted in severe environmental pressure during the last decades. Forest fragmentation (>98%), agricultural intervention, prolonged bare soil periods and changing soil properties in combination with a short rainy cyclone season has led to an increase in surface erosion processes and loss of soil fertility. The sensitivity to soil erosion depends on spatial differences in surface conditions. To reveal hot spots of erosion, the Revised Universal Soil Loss Equation (RUSLE) model was applied for the whole of Mauritius (scale 1:50 000) through ArcGIS algorithms. Although RUSLE is not designed to calculate monthly potential erosion we demonstrate it may indicate realistic spatiotemporal patterns. Subannual soil loss values in 2005 and averaged for a 30 yrs period between 1978-2008, were reclassified into six potential soil erosion categories, from very low to extremely high. In 2005 peaks in potential erosion values in February and March (>1.5t ha-1 month-1) coincide with the cyclone season and very low potential soil loss values from October through December (<0.05t ha-1 month-1) relate to the dry season, which confirms the influence of the R-factor. The calculated values and patterns of potential soil erosion hot spots compare realistically with available soil loss data for various land cover units. Hotspots that would otherwise masked by the annual mean of the annual based RUSLE equation. The outcome provide essential subannual spatiotemporal information to identify areas with increased vulnerability to soil erosion that should prioritized for taking effective measures against future soil loss. In a monocrop setting subannual RUSLE analyses can provide regional and temporal foci to base agrodiversity strategies upon. Further it helps to identify vulnerable spots in buffer zones of threatened ecosystems.