Geographic information system-coupling sediment delivery distributed modeling based on observed data

APPENDIX A: DESCRIPTION OF RUSLE FACTORS

The R-factor in RUSLE is an erosivity index. It is related to the annual precipitation in a linear relationship (USDA-ARS 1997). Some researchers evaluated the erosivity and developed statistical relationship between the R-factor and the total annual precipitation (Nearing et al. 2004; Blanco & Nadaoka 2006; Pal et al. 2012). As there are limited meteorological stations in mountainous basins, information on rainfall amount and pattern needs to be assumed based on neighboring stations (Lee & Lee 2010). The rainfall information available represents point data, and this has to be extrapolated in terms of spatial distribution, using the ArcGIS contouring function. In this study, the KICT (1992) method was used for computing the R factor (Lee & Lee 2006).

K is the soil erodibility factor. K factor is calculated according to the soil texture type of the area (Wischmeier et al. 1971), which is related to the grain size distribution and was derived from Erickson’s triangle diagram (Erickson 1997) for the study.

LS is the slope length-gradient factor. The slope length and slope steepness can be used in a single index, which expresses the ratio of soil loss as defined by Wischmeier & Smith (1978).

C is a crop and management factor, which is obtained by multiplying the crop type factor and tillage method factor (Lee & Lee 2006). P is a support practice factor.

**Table A1 | Definition of RUSLE factors**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
<th>Equation or method</th>
<th>Cited source</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Rainfall erosivity factor</td>
<td>$R = 38.5 + 0.35 P$, where, $P$ is the average annual precipitation</td>
<td>Lee &amp; Kang (2013); Lee &amp; Lee (2010)</td>
</tr>
<tr>
<td>K</td>
<td>Soil erodibility factor</td>
<td>Erickson’s triangle diagram</td>
<td>Wischmeier et al. (1971); Erickson (1997)</td>
</tr>
<tr>
<td>LS</td>
<td>Slope steepness and length factor</td>
<td>$LS = (X/22.1) \times (0.065 + 0.045 S + 0.0065 S^2)$ where, $X$ is the slope length (m) and $S$ is slope gradient (%). Value of cover management factor</td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td>Cover management factor</td>
<td>By land cover and topographic slope</td>
<td>Lee &amp; Lee (2006); Lee &amp; Kang (2013)</td>
</tr>
</tbody>
</table>
REFERENCES


