

**Supplementary Table S1** Overview of the distribution of soil aggregate size classes by using the dry sieving method in the organic (OF) and mineral (AE) horizons at the north- and the south-facing sites. Values are given as means with the standard deviations in brackets. In each column, different letters indicate significant differences ( $p < 0.05$  according to Duncan post-hoc test) as a function of slope exposure and soil horizon for each aggregate size class.

| Exposure | Soil horizon | Aggregate size classes (%) |                |               |               |               |                |               |              |
|----------|--------------|----------------------------|----------------|---------------|---------------|---------------|----------------|---------------|--------------|
|          |              | 10.00-4.75 mm              | 4.75-2.00 mm   | 2.00-1.00 mm  | 1.00-0.50 mm  | 0.50-0.250 mm | 0.250-0.125 mm | 0.125-0.05 mm | < 0.05 mm    |
| North    | OF           | 58.4 (8.09) a              | 9.6 (1.44) d   | 11.3 (2.78) b | 11.2 (2.95) a | 5.7 (1.77) b  | 2.4 (1.00) b   | 1.2 (0.74) b  | 0.2 (0.13) a |
|          | AE           | 39.5 (4.55) b              | 19.2 (1.15) a  | 13.8 (1.15) b | 11.1 (2.06) a | 8.2 (2.60) ab | 5.7 (0.94) b   | 2.1 (1.44) b  | 0.4 (0.69) a |
| South    | OF           | 43.7 (5.51) b              | 18.3 (5.14) ab | 13.0 (1.02) b | 12.7 (2.00) a | 5.6 (2.38) b  | 4.2 (2.60) b   | 2.1 (1.60) b  | 0.4 (0.30) a |
|          | AE           | 25.7 (8.84) c              | 10.8 (5.95) bc | 17.6 (1.95) a | 14.8 (2.93) a | 10.9 (2.17) a | 13.1 (4.98) a  | 6.5 (2.27) a  | 0.6 (0.23) a |

**Supplementary Table S2** Statistical output for each aggregate size class as a function of slope exposure (north- vs south-facing sites) and soil horizon (organic [OF] vs mineral [AE]).

| Aggregate size classes | Exposure     |    | Soil horizon |     | Interaction  |    |
|------------------------|--------------|----|--------------|-----|--------------|----|
|                        | F            | p  | F            | p   | F            | p  |
| 10.00-4.75 mm          | <b>12.58</b> | ** | <b>20.94</b> | *** | 0.01         | ns |
| 4.75-2.00 mm           | 0.01         | ns | 0.18         | ns  | <b>13.44</b> | ** |
| 2.00-1.00 mm           | <b>6.70</b>  | *  | <b>10.81</b> | **  | 0.86         | ns |
| 1.00-0.50 mm           | 3.14         | ns | 0.47         | ns  | 0.57         | ns |
| 0.50-0.250 mm          | 1.02         | ns | <b>9.08</b>  | **  | 1.18         | ns |
| 0.250-0.125 mm         | <b>7.47</b>  | *  | <b>13.36</b> | **  | 2.89         | ns |
| 0.125-0.05 mm          | <b>8.19</b>  | *  | <b>7.88</b>  | *   | 3.38         | ns |
| < 0.05 mm              | 1.05         | ns | 1.02         | ns  | 0.01         | ns |

ns (not significant); \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$