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*Supplement of*

## **Quantitative sediment source attribution with compound-specific isotope analysis in a C3 plant-dominated catchment (central Switzerland)**

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1 **Tables S1 – S2**

2 Table S1: Input values for all calculations. Sources for the downstream sites A and B were averages of the sources at the site and the  
 3 upstream sources. Source type F = forest, P= pasture and A= arable land. Source type AP describes the averaged value of arable land  
 4 and pasture. Event abbreviations BF = base flow, HF = high flow. The sum of FA concentration ( $\Sigma$ ) and % C (Org) are the conversion  
 5 factors when weighting sediment contribution %.

| Site      | Source       | C14:0 FA       |                          | C26:0 FA       |                          | C28:0 FA       |                          | $\Sigma$ c C26/C28FA | $\Sigma$ c C14/C26FA | %C (org) |
|-----------|--------------|----------------|--------------------------|----------------|--------------------------|----------------|--------------------------|----------------------|----------------------|----------|
|           |              | $\delta^{13}C$ | $\mu\text{g/g dry soil}$ | $\delta^{13}C$ | $\mu\text{g/g dry soil}$ | $\delta^{13}C$ | $\mu\text{g/g dry soil}$ |                      |                      |          |
| A         | F            | -33.6 ± 0.6    | 3.8                      | -34.6 ± 1.0    | 4.9                      | -34.5 ± 0.3    | 7.0                      | 11.9                 | 8.7                  | 3.4      |
| A         | P            | -33.8 ± 1.1    | 2.0                      | -36.3 ± 0.3    | 5.7                      | -37.2 ± 1.2    | 4.3                      | 10.0                 | 7.7                  | 3.5      |
| AB        | F            | -33.4 ± 0.5    | 2.6                      | -34.3 ± 0.9    | 6.0                      | -34.2 ± 0.6    | 10.1                     | 16.1                 | 8.6                  | 3.1      |
| AB        | P            | -33.3 ± 1.0    | 2.3                      | -36.6 ± 0.9    | 10.8                     | -37.9 ± 1.5    | 6.2                      | 17.0                 | 13.1                 | 3.8      |
| AB        | A            | -31.6 ± 1.1    | 1.3                      | -36.1 ± 0.2    | 6.0                      | -37.0 ± 0.6    | 3.7                      | 9.7                  | 7.3                  | 2.4      |
| AB        | AP           | -32.4 ± 1.3    | 1.8                      | -36.3 ± 0.8    | 8.4                      | -37.5 ± 1.3    | 5.0                      | 13.4                 | 10.2                 | 3.1      |
| ABC       | F            | -33.5 ± 0.6    | 4.5                      | -34.2 ± 0.9    | 7.3                      | -34.2 ± 0.7    | 15.3                     | 22.5                 | 11.8                 | 3.0      |
| ABC       | P            | -33.2 ± 1.1    | 2.0                      | -36.6 ± 0.8    | 9.7                      | -37.5 ± 1.3    | 5.7                      | 15.4                 | 11.8                 | 3.5      |
| ABC       | A            | -31.8 ± 0.8    | 1.1                      | -36.3 ± 0.8    | 5.7                      | -37.2 ± 0.9    | 3.5                      | 9.2                  | 6.8                  | 2.1      |
| ABC       | AP           | -32.5 ± 1.2    | 1.6                      | -36.4 ± 0.8    | 7.7                      | -37.4 ± 1.1    | 4.6                      | 12.3                 | 9.3                  | 2.8      |
| <b>SS</b> | <b>Event</b> |                |                          |                |                          |                |                          |                      |                      |          |
| A         | BF           | -38.4 ± 0.5    | 15.2                     | -34.8 ± 0.5    | 14.8                     | -35.4 ± 0.5    | 14.1                     | 28.9                 | 30.0                 | 6.2      |
| A         | HF 2010      | -33.9 ± 0.5    | 3.1                      | -34.5 ± 0.5    | 2.0                      | -35.1 ± 0.5    | 1.9                      | 3.9                  | 5.1                  | 1.5      |
| A         | HF 2009      | -35.3 ± 0.5    | 5.1                      | -34.9 ± 0.5    | 3.6                      | -35.7 ± 0.5    | 4.3                      | 7.9                  | 8.7                  | 2.5      |
| B         | BF           | -37.6 ± 0.5    | 14.2                     | -35.6 ± 0.5    | 9.3                      | -36.2 ± 0.5    | 9.6                      | 18.9                 | 23.5                 | 7.8      |
| B         | HF 2010      | -33.3 ± 0.5    | 3.4                      | -34.0 ± 0.5    | 1.6                      | -34.7 ± 0.5    | 1.9                      | 3.5                  | 5.0                  | 2.3      |
| B         | HF 2009      | -33.1 ± 0.5    | 3.3                      | -34.5 ± 0.5    | 2.0                      | -35.0 ± 0.5    | 2.4                      | 4.4                  | 5.3                  | 2.4      |
| C         | BF           | -35.1 ± 0.5    | 7.8                      | -35.0 ± 0.5    | 7.1                      | -36.1 ± 0.5    | 7.5                      | 14.6                 | 14.9                 | 6.9      |
| C         | HF 2010      | -34.2 ± 0.5    | 2.4                      | -34.4 ± 0.5    | 2.7                      | -35.0 ± 0.5    | 3.0                      | 5.7                  | 5.1                  | 1.6      |
| C         | HF 2009      | -34.8 ± 0.5    | 3.3                      | -34.7 ± 0.5    | 3.1                      | -35.4 ± 0.5    | 3.1                      | 6.2                  | 6.4                  | n.a.     |

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9 Table S2: Results (p-values) of statistical T-tests for significant differences between source areas (sources are merged over the study  
10 site). Bold values are considered as significantly different ( $p < 0.05$ ).

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|                     | C14:0 FA     | C16:0 FA | C18:0 FA     | C20:0 FA | C22:0 FA     | C24:0 FA     | C26:0 FA     | C28:0 FA     |
|---------------------|--------------|----------|--------------|----------|--------------|--------------|--------------|--------------|
| Forest/Pasture      | 0.459        | 0.318    | <b>0.020</b> | 0.273    | <b>0.014</b> | <b>0.022</b> | <b>0.001</b> | <b>0.018</b> |
| Forest/Arable land  | <b>0.032</b> | 0.460    | <b>0.010</b> | 0.385    | <b>0.027</b> | 0.156        | <b>0.017</b> | <b>0.008</b> |
| Arable land/Pasture | <b>0.043</b> | 0.055    | 0.473        | 0.223    | 0.879        | 0.994        | 0.490        | 0.665        |

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