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Supplement of

Modelling the hydrological interactions between a fissured granite aquifer and a valley mire in the Massif Central, France

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Table S1. Mean annual water balance of the mineral and peat soils domains derived from model results for the period 2001–2013.

| Water balance domain | mm yr ⁻¹ | | | m ³ yr ⁻¹ | | |
|-------------------------------------|---------------------|---------------|----------|---------------------------------|---------------|----------|
| | Peat soils | Mineral soils | Combined | Peat soils | Mineral soils | Combined |
| Precipitation | 1267 | 1267 | 1267 | 466872 | 1583059 | 2049931 |
| Actual evapotranspiration | 696 | 560 | 591 | 256615 | 699643 | 956258 |
| - incl. from interception | 20 | 237 | 187 | 7203 | 295935 | 303138 |
| - incl. from ponded water | 443 | 18 | 115 | 163208 | 22849 | 186057 |
| - incl. from UZ | 99 | 287 | 244 | 36353 | 358145 | 394498 |
| - incl. from SZ | 135 | 18 | 45 | 49851 | 22714 | 72565 |
| OL boundary inflow | 1586 | 80 | 2 | 584416 | 99971 | 2923 |
| OL boundary outflow | 280 | 466 | 2 | 103026 | 581980 | 3542 |
| OL to river | 2534 | 30 | 600 | 933881 | 37398 | 971278 |
| Infiltration from OL to UZ | 160 | 948 | 769 | 59004 | 1184801 | 1243806 |
| Infiltration from OL to SZ | 8 | 4 | 5 | 3007 | 4547 | 7554 |
| Seepage from SZ to OL | 983 | 337 | 484 | 362371 | 421264 | 783635 |
| Percolation from UZ to SZ | 61 | 662 | 525 | 22661 | 827106 | 849766 |
| SZ boundary inflow | 1310 | 92 | 20 | 482919 | 114691 | 31700 |
| - to upper layer (peat) | 19 | NA | NA | 6950 | NA | NA |
| - to lower layer (mineral) | 1292 | NA | NA | 475969 | NA | NA |
| SZ boundary outflow | 246 | 408 | 21 | 90825 | 509492 | 34407 |
| - from upper layer (peat) | 1 | NA | NA | 203 | NA | NA |
| - from lower layer (mineral) | 246 | NA | NA | 90622 | NA | NA |
| Upper to lower SZ layer | 36 | NA | NA | 13153 | NA | NA |
| Lower to upper SZ layer | 1070 | NA | NA | 394375 | NA | NA |
| SZ to river exchange | 15 | 4 | 6 | 5591 | 4476 | 10067 |
| - upper SZ layer (peat) to river | 4 | NA | NA | 1479 | NA | NA |
| - lower SZ layer (mineral) to river | 11 | NA | NA | 4112 | NA | NA |
| River to SZ exchange | 0 | 0 | 0 | 5 | 23 | 27 |
| - river to upper SZ layer (peat) | 0 | NA | NA | 2 | NA | NA |
| - river to lower SZ layer (mineral) | 0 | NA | NA | 3 | NA | NA |
| Change in total storage | 0 | -5 | -4 | 23 | -6163 | -6140 |
| - incl. change in OL storage | 0 | 0 | 0 | 21 | -103 | -82 |
| - incl. change in UZ storage | 0 | 0 | 0 | -1 | -247 | -248 |
| - incl. change in SZ storage | 0 | -5 | -4 | 3 | -5814 | -5810 |
| - incl. in upper layer (peat) | 0 | NA | NA | 2 | NA | NA |
| - incl. in lower layer (mineral) | 0 | NA | NA | 1 | NA | NA |
| Total error | -391 | 23 | -71 | -144252 | 29082 | -115170 |
| - incl. overland error | -392 | 18 | -75 | -144310 | 23113 | -121196 |
| - incl. UZ error | 0 | 0 | 0 | 10 | 203 | 211 |
| - incl. SZ error | 0 | 5 | 4 | 49 | 5766 | 5815 |
| - incl. in upper layer (peat) | 0 | NA | NA | 64 | NA | NA |
| - incl. in lower layer (mineral) | 0 | NA | NA | -15 | NA | NA |

UZ: unsaturated zone; SZ: saturated zone; OL: overland

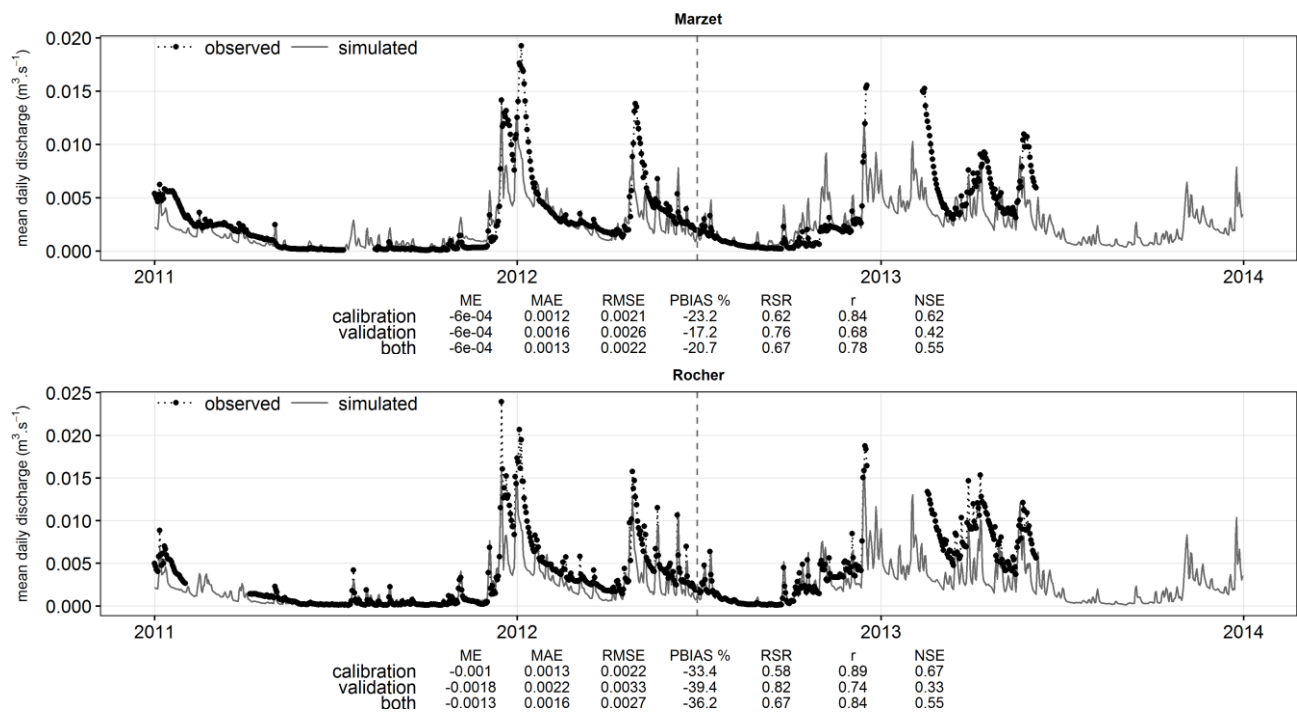
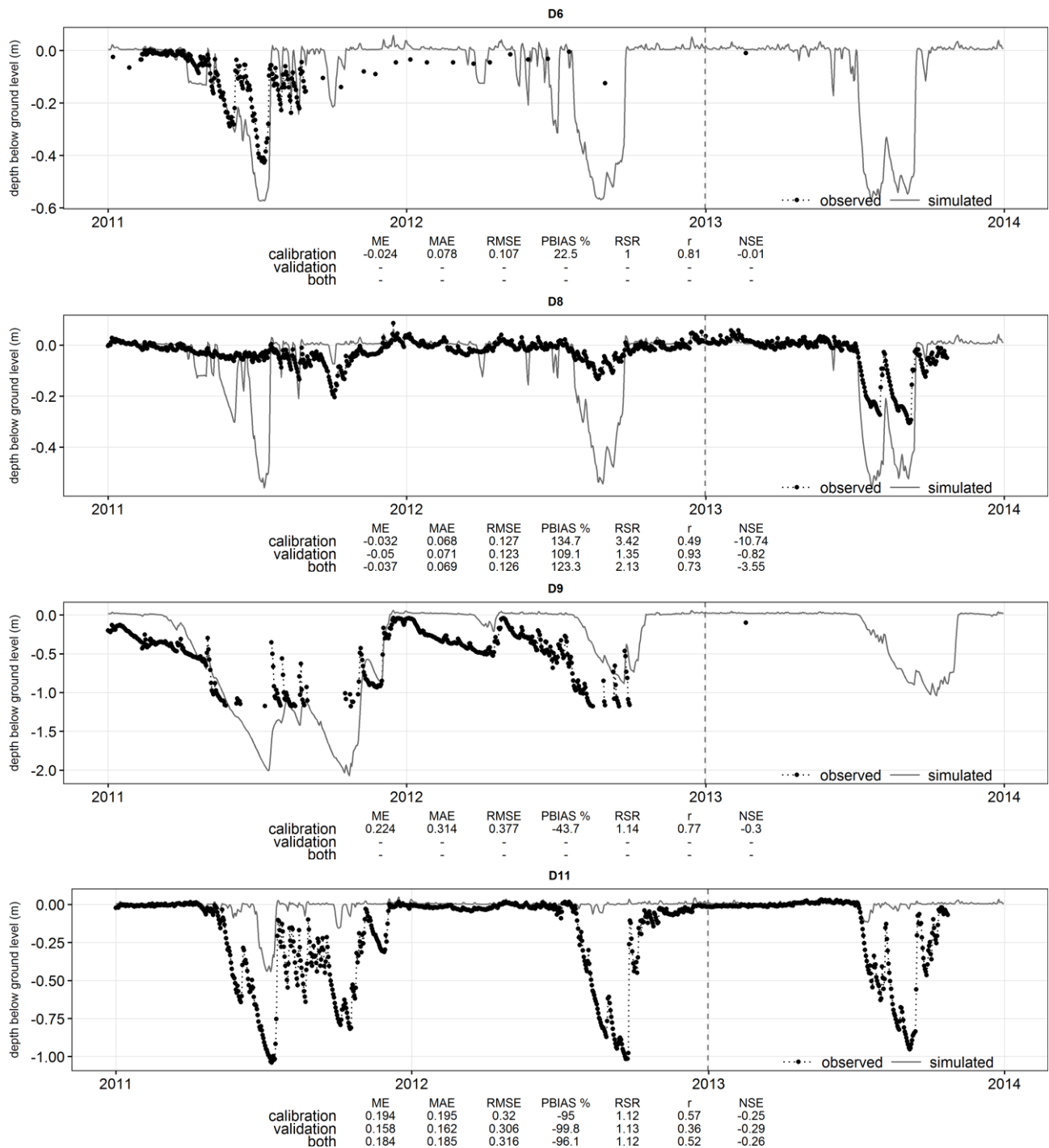
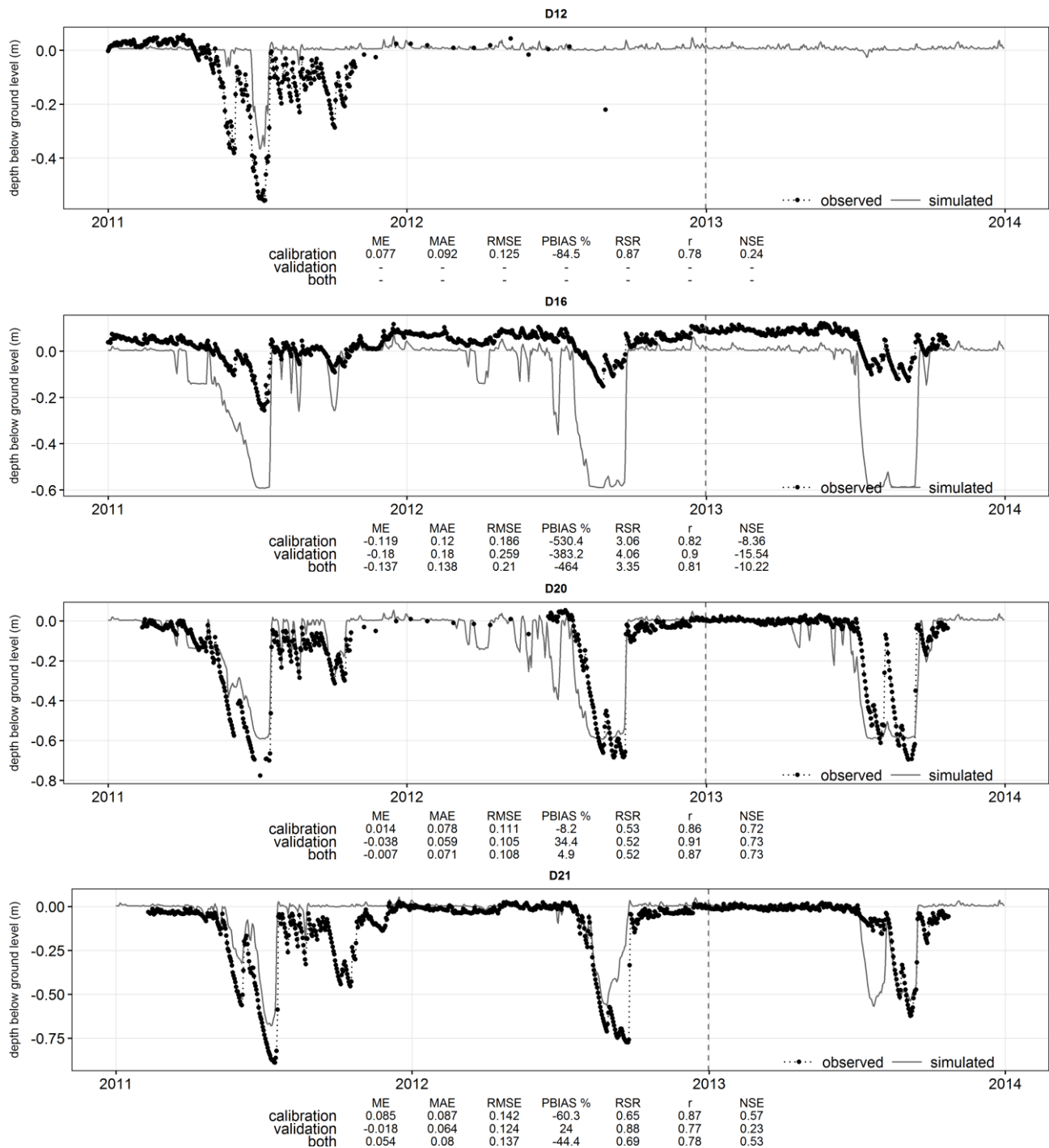


Figure S1. Observed and simulated stream discharge and model performance statistics for two locations within the Dauges catchment (01/01/2011–31/12/2013). Note different y-axis ranges.



5 **Figure S2. Observed and simulated groundwater table depth and model performance statistics for selected dipwells within the Dauges catchment (01/01/2011–31/12/2013). Note different y-axis ranges.**



5 **Figure S2 (continued).** Observed and simulated groundwater table depth and model performance statistics for selected dipwells within the Dauges catchment (01/01/2011–31/12/2013). Note different y-axis ranges.

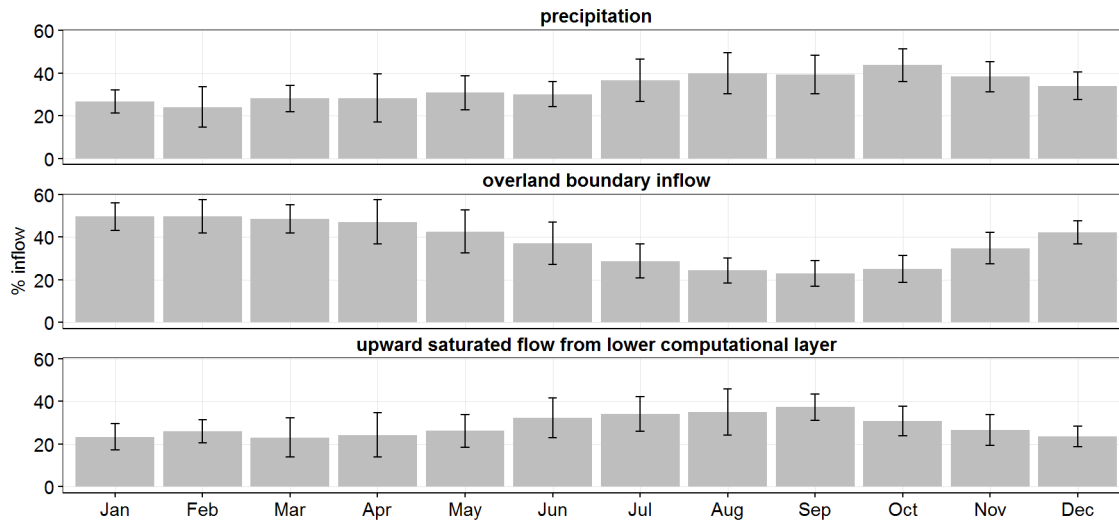


Figure S3. Mean monthly proportion of simulated inflow to the Dauges mire from different sources (2001–2013). Whiskers show the standard deviation. Lateral saturated boundary flow from the mineral catchment and from the river account for less than 0.6 % of total inflows at all times and are therefore not shown.

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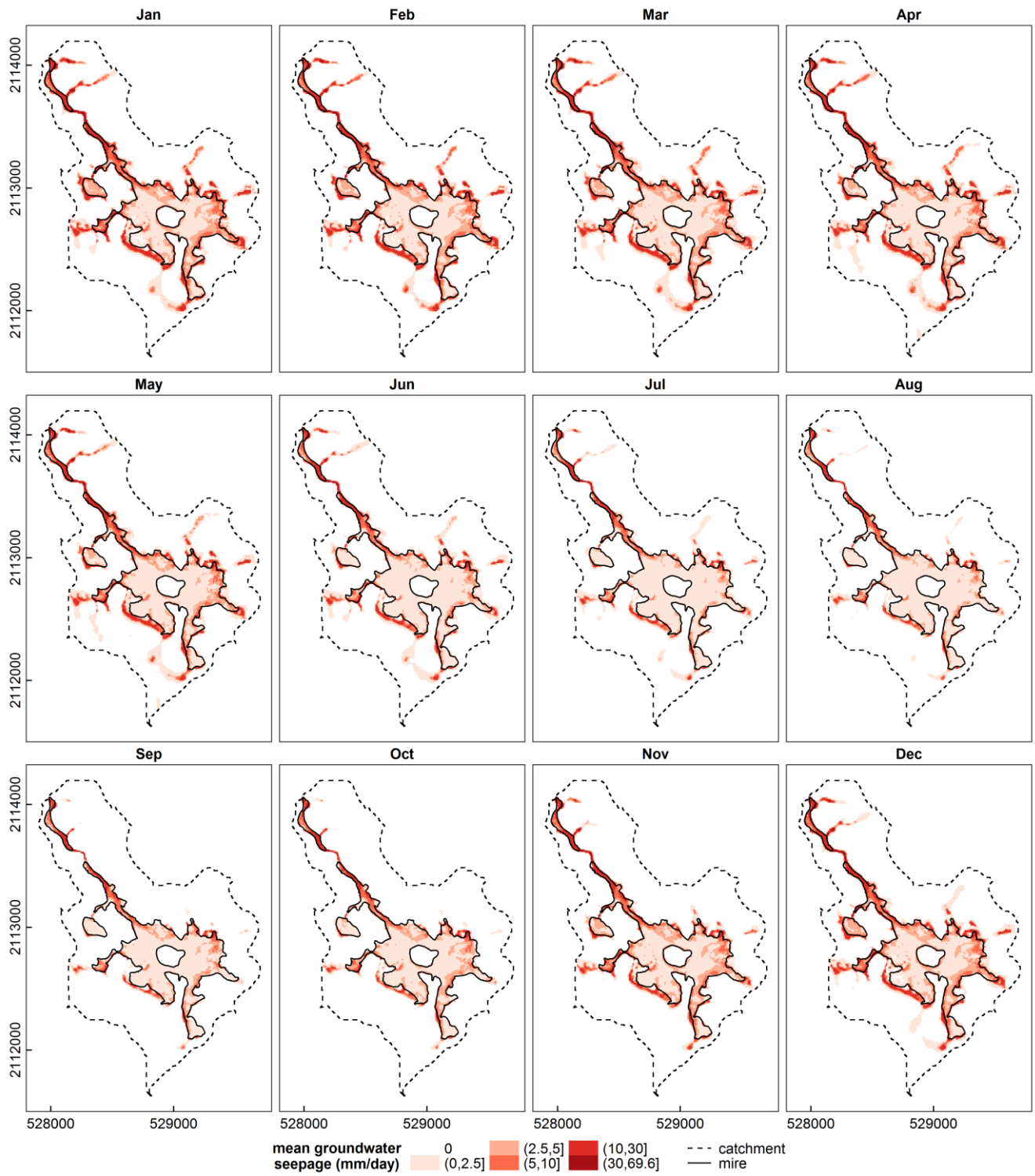
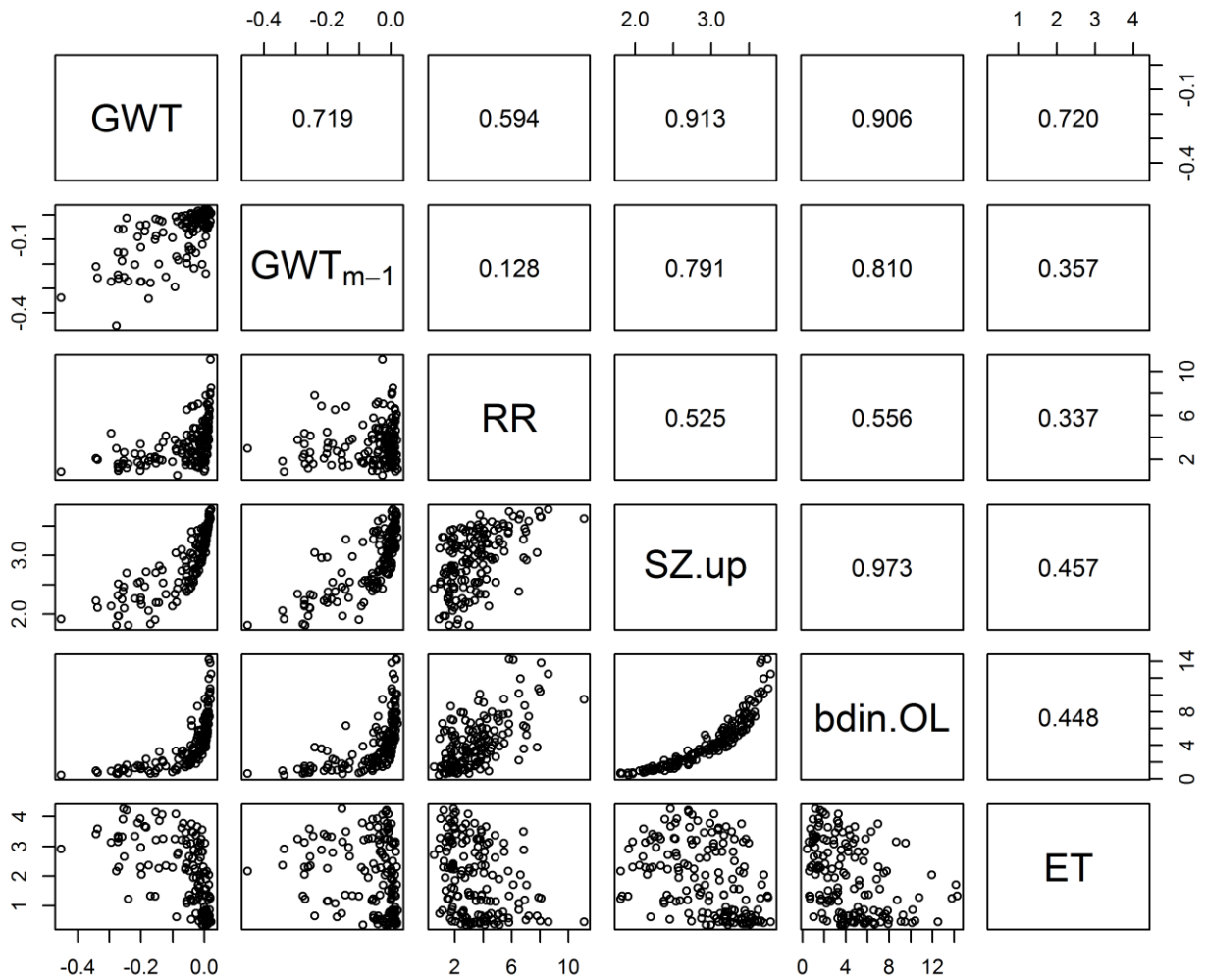


Figure S4. Simulated mean monthly groundwater seepage rate (2001–2013).



5 Figure S5. Scatterplot matrix of selected items of the mire water balance (simulated monthly means). GWT: groundwater table depth (m), GWT_{m-1}: groundwater table depth in preceding month, RR: precipitation (mm day⁻¹), SZ.up: groundwater upwelling (mm day⁻¹). bdin.OL: overland boundary inflow (mm day⁻¹), ET: actual evapotranspiration (mm day⁻¹). The top right panels show Spearman's rank correlation.