

Table A 3 Soil and runoff characteristics of the 30 experimental setups with model parameters.

| Exp. No. | Experimental measurements |                               |                          |                                                     |             |                     |                       |                       |                     |                       |                       |                                            |                                            |                                           |                              | Model parameters                                        |                                                         |           |                         |                                           |                       |
|----------|---------------------------|-------------------------------|--------------------------|-----------------------------------------------------|-------------|---------------------|-----------------------|-----------------------|---------------------|-----------------------|-----------------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|------------------------------|---------------------------------------------------------|---------------------------------------------------------|-----------|-------------------------|-------------------------------------------|-----------------------|
|          | Duration<br>(s)           | Slope<br>(m m <sup>-1</sup> ) | Organic<br>matter<br>(%) | Precipitation<br>intensity<br>(mm h <sup>-1</sup> ) | Clay<br>(%) | Fine<br>silt<br>(%) | Medium<br>silt<br>(%) | Coarse<br>silt<br>(%) | Fine<br>sand<br>(%) | Medium<br>sand<br>(%) | Coarse<br>sand<br>(%) | V <sub>s,obs</sub><br>(m s <sup>-1</sup> ) | V <sub>r,obs</sub><br>(m s <sup>-1</sup> ) | Q <sub>cum,obs</sub><br>(m <sup>3</sup> ) | S <sub>cum,obs</sub><br>(kg) | k <sub>STr</sub><br>(m <sup>1/3</sup> s <sup>-1</sup> ) | k <sub>STs</sub><br>(m <sup>1/3</sup> s <sup>-1</sup> ) | cf<br>(-) | f <sub>mak</sub><br>(-) | f <sub>crit</sub><br>(N m <sup>-2</sup> ) | Θ <sub>i</sub><br>(%) |
| 1        | 3600.0                    | 0.138                         | 1.8                      | 62.40                                               | 22.5        | 7.4                 | 21.1                  | 43.5                  | 3.5                 | 1.5                   | 0.5                   | 0.152                                      | 0.246                                      | 0.911                                     | 84.2                         | 37.0                                                    | 41.0                                                    | 0.010     | 1.4                     | 0.710                                     | 20.2                  |
| 2        | 3540.0                    | 0.172                         | 1.8                      | 62.40                                               | 27.6        | 7.1                 | 20.0                  | 40.4                  | 3.3                 | 1.2                   | 0.4                   | 0.171                                      | 0.221                                      | 0.742                                     | 74.7                         | 45.5                                                    | 45.5                                                    | 0.007     | 1.8                     | 0.650                                     | 19.1                  |
| 3        | 3540.0                    | 0.117                         | 1.8                      | 62.40                                               | 23.5        | 7.3                 | 21.2                  | 42.5                  | 3.8                 | 1.3                   | 0.4                   | 0.165                                      | 0.247                                      | 0.805                                     | 82.0                         | 47.6                                                    | 50.0                                                    | 0.007     | 1.8                     | 0.460                                     | 19.2                  |
| 4        | 2940.0                    | 0.121                         | 1.8                      | 62.40                                               | 21.3        | 6.7                 | 22.2                  | 43.5                  | 4.1                 | 1.6                   | 0.6                   | 0.156                                      | 0.175                                      | 0.745                                     | 63.2                         | 44.0                                                    | 44.0                                                    | 0.003     | 1.1                     | 0.570                                     | 19.8                  |
| 5        | 3180.0                    | 0.163                         | 1.7                      | 62.40                                               | 15.2        | 5.2                 | 24.9                  | 48.1                  | 3.7                 | 2.4                   | 0.5                   | 0.133                                      | 0.300                                      | 1.033                                     | 109.2                        | 25.0                                                    | 42.0                                                    | 0.025     | 1.0                     | 0.000                                     | 21.8                  |
| 6        | 3300.0                    | 0.163                         | 1.9                      | 62.40                                               | 16.8        | 5.3                 | 23.4                  | 48.4                  | 4.3                 | 1.4                   | 0.4                   | 0.122                                      | 0.239                                      | 0.987                                     | 70.2                         | 23.0                                                    | 28.0                                                    | 0.017     | 1.1                     | 1.200                                     | 25.6                  |
| 7        | 4800.0                    | 0.094                         | 2.5                      | 60.30                                               | 25.3        | 6.2                 | 20.5                  | 44.2                  | 2.8                 | 0.8                   | 0.2                   | 0.180                                      | 0.183                                      | 1.027                                     | 27.5                         | 54.0                                                    | 60.0                                                    | 0.002     | 1.5                     | 0.773                                     | 25.4                  |
| 8        | 4680.0                    | 0.139                         | 2.5                      | 63.30                                               | 28.6        | 7.8                 | 21.2                  | 39.9                  | 1.9                 | 0.5                   | 0.1                   | 0.118                                      | 0.200                                      | 0.882                                     | 53.0                         | 25.0                                                    | 29.0                                                    | 0.011     | 4.3                     | 1.100                                     | 27.3                  |
| 9        | 7500.0                    | 0.137                         | 2.0                      | 34.40                                               | 30.1        | 5.0                 | 20.9                  | 40.4                  | 2.6                 | 0.8                   | 0.2                   | 0.115                                      | 0.141                                      | 0.620                                     | 12.7                         | 25.0                                                    | 41.0                                                    | 0.009     | 3.0                     | 0.760                                     | 25.4                  |
| 10       | 4800.0                    | 0.137                         | 2.0                      | 62.40                                               | 30.1        | 5.0                 | 20.9                  | 40.4                  | 2.6                 | 0.8                   | 0.2                   | 0.141                                      | 0.195                                      | 0.864                                     | 42.5                         | 32.0                                                    | 38.0                                                    | 0.008     | 4.9                     | 0.970                                     | 25.4                  |
| 11       | 5880.0                    | 0.137                         | 2.0                      | 44.60                                               | 30.1        | 5.0                 | 20.9                  | 40.4                  | 2.6                 | 0.8                   | 0.2                   | 0.100                                      | 0.159                                      | 0.611                                     | 22.4                         | 25.0                                                    | 29.0                                                    | 0.010     | 3.4                     | 0.950                                     | 25.4                  |
| 12       | 4800.0                    | 0.151                         | 2.5                      | 62.40                                               | 21.1        | 7.3                 | 22.2                  | 44.8                  | 3.1                 | 1.1                   | 0.4                   | 0.142                                      | 0.150                                      | 1.053                                     | 139.3                        | 32.0                                                    | 33.0                                                    | 0.003     | 2.0                     | 0.750                                     | 18.4                  |
| 13       | 5100.0                    | 0.157                         | 2.2                      | 60.60                                               | 26.6        | 6.0                 | 21.5                  | 42.7                  | 2.6                 | 0.5                   | 0.1                   | 0.084                                      | 0.126                                      | 0.475                                     | 8.8                          | 17.5                                                    | 17.5                                                    | 0.009     | 5.0                     | 1.720                                     | 19.8                  |
| 14       | 5100.0                    | 0.143                         | 1.8                      | 60.60                                               | 27.4        | 5.6                 | 22.6                  | 41.0                  | 2.6                 | 0.6                   | 0.2                   | 0.128                                      | 0.155                                      | 0.614                                     | 24.0                         | 32.0                                                    | 33.0                                                    | 0.005     | 3.2                     | 1.098                                     | 13.6                  |
| 15       | 5160.0                    | 0.143                         | 1.6                      | 60.60                                               | 27.2        | 6.0                 | 21.5                  | 42.1                  | 2.5                 | 0.6                   | 0.1                   | 0.083                                      | 0.110                                      | 0.437                                     | 10.8                         | 18.2                                                    | 18.2                                                    | 0.006     | 5.2                     | 1.540                                     | 12.1                  |
| 16       | 4320.0                    | 0.147                         | 2.2                      | 60.60                                               | 21.8        | 6.2                 | 21.9                  | 45.1                  | 3.6                 | 0.9                   | 0.5                   | 0.170                                      | 0.187                                      | 0.622                                     | 32.3                         | 50.0                                                    | 49.0                                                    | 0.003     | 2.2                     | 0.855                                     | <b>15.0</b>           |
| 17       | 4339.8                    | 0.147                         | 1.6                      | 60.60                                               | 20.6        | 5.5                 | 23.5                  | 45.1                  | 3.9                 | 1.1                   | 0.3                   | 0.128                                      | 0.145                                      | 0.458                                     | 15.7                         | 34.0                                                    | 34.0                                                    | 0.004     | 3.8                     | 1.060                                     | <b>13.0</b>           |
| 18       | 4260.0                    | 0.146                         | 1.7                      | 60.60                                               | 18.9        | 6.2                 | 23.8                  | 45.3                  | 4.2                 | 1.1                   | 0.5                   | 0.110                                      | 0.220                                      | 0.642                                     | 42.5                         | 25.0                                                    | 30.0                                                    | 0.015     | 2.0                     | 0.910                                     | <b>15.0</b>           |
| 19       | 5460.0                    | 0.144                         | 2.0                      | 60.60                                               | 24.3        | 7.6                 | 22.2                  | 42.7                  | 2.5                 | 0.5                   | 0.2                   | 0.105                                      | 0.205                                      | 0.619                                     | 21.6                         | 25.5                                                    | 29.0                                                    | 0.014     | 4.8                     | 1.030                                     | <b>13.0</b>           |
| 20       | 4860.0                    | 0.132                         | 1.6                      | 60.60                                               | 24.1        | 7.0                 | 22.4                  | 42.7                  | 3.0                 | 0.6                   | 0.2                   | 0.078                                      | 0.185                                      | 0.438                                     | 16.3                         | 16.7                                                    | 24.0                                                    | 0.020     | 4.5                     | 0.950                                     | <b>12.0</b>           |
| 21       | 3840.0                    | 0.168                         | 1.1                      | 62.40                                               | 16.6        | 6.1                 | 20.4                  | 41.9                  | 7.9                 | 5.0                   | 2.1                   | 0.165                                      | 0.193                                      | 0.995                                     | 114.7                        | 39.0                                                    | 39.0                                                    | 0.005     | 1.6                     | 0.750                                     | 20.1                  |
| 22       | 4080.0                    | 0.149                         | 1.4                      | 63.00                                               | 18.7        | 5.9                 | 23.4                  | 47.0                  | 3.7                 | 0.9                   | 0.4                   | 0.098                                      | 0.180                                      | 0.302                                     | 19.1                         | 24.0                                                    | 27.0                                                    | 0.013     | 5.5                     | 0.945                                     | <b>12.0</b>           |
| 23       | 4080.0                    | 0.149                         | 1.6                      | 59.90                                               | 17.8        | 5.9                 | 23.1                  | 48.1                  | 3.9                 | 0.9                   | 0.3                   | 0.186                                      | 0.194                                      | 0.457                                     | 29.4                         | 51.0                                                    | 65.0                                                    | 0.005     | 3.8                     | 0.550                                     | <b>13.0</b>           |
| 24       | 5049.6                    | 0.179                         | 1.6                      | 60.60                                               | 17.1        | 7.5                 | 23.9                  | 46.3                  | 3.0                 | 1.3                   | 0.9                   | 0.048                                      | 0.162                                      | 0.617                                     | 81.6                         | 25.0                                                    | 5.0                                                     | 0.009     | 3.0                     | 1.027                                     | <b>14.0</b>           |
| 25       | 4500.0                    | 0.178                         | 1.6                      | 60.60                                               | 16.8        | 5.8                 | 24.8                  | 46.4                  | 4.2                 | 1.3                   | 0.7                   | 0.135                                      | 0.255                                      | 0.746                                     | 115.8                        | 31.3                                                    | 35.0                                                    | 0.016     | 1.8                     | 0.746                                     | <b>15.0</b>           |
| 26       | 4500.0                    | 0.178                         | 1.6                      | 62.30                                               | 16.8        | 5.8                 | 24.8                  | 46.4                  | 4.2                 | 1.3                   | 0.7                   | 0.139                                      | 0.228                                      | 0.666                                     | 45.8                         | 34.0                                                    | 35.0                                                    | 0.012     | 2.8                     | 1.020                                     | <b>14.0</b>           |
| 27       | 5280.0                    | 0.182                         | 1.5                      | 59.20                                               | 12.7        | 5.1                 | 24.1                  | 51.1                  | 4.8                 | 1.4                   | 0.8                   | 0.172                                      | 0.203                                      | 0.882                                     | 182.9                        | 40.0                                                    | 45.0                                                    | 0.007     | 2.0                     | 0.552                                     | <b>15.0</b>           |
| 28       | 4200.0                    | 0.148                         | 1.6                      | 64.80                                               | 17.3        | 5.3                 | 21.5                  | 49.5                  | 4.5                 | 1.3                   | 0.6                   | 0.135                                      | 0.171                                      | 0.614                                     | 61.9                         | 33.3                                                    | 35.0                                                    | 0.006     | 3.5                     | 0.850                                     | <b>14.0</b>           |
| 29       | 3720.0                    | 0.150                         | 1.3                      | 62.40                                               | 15.6        | 5.4                 | 23.9                  | 47.3                  | 4.1                 | 3.2                   | 0.5                   | 0.170                                      | 0.182                                      | 1.051                                     | 134.4                        | 39.0                                                    | 43.0                                                    | 0.004     | 1.3                     | 0.620                                     | 21.8                  |
| 30       | 4860.0                    | 0.132                         | 1.6                      | 60.60                                               | 24.4        | 7.6                 | 21.2                  | 43.0                  | 3.0                 | 0.6                   | 0.2                   | 0.107                                      | 0.250                                      | 0.593                                     | 25.9                         | 25.0                                                    | 39.0                                                    | 0.020     | 4.0                     | 0.705                                     | <b>14.0</b>           |

Note: Only the initial soil moisture values (Θ<sub>i</sub>) shown in **bold** are calibrated.