Supplement Material for

**On optimization of calibrations of a distributed hydrological model with spatially distributed information on snow**

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**Table S1 SPAEF calibration with respect to March, February and January**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Calibration** | | | | |
| **Parameters** | **NSE** | **SPAEF\_March & NSE** | **SPAEF\_Feb & NSE** | **SPAEF\_Jan & NSE** |
| **1. Base refreezing temperature (mm/d)** | -1.049 | -1.879 | -0.661 | -1.432 |
| **2. Temperature threshold for melt Coniferous (°C)** | 0.827 | 3.374 | 0.830 | 3.194 |
| **3. Temperature threshold for melt Deciduous (°C)** | 0.241 | -1.797 | 3.941 | 3.923 |
| **4. Temperature threshold for melt Open (°C)** | -1.280 | -2.224 | -0.715 | -2.040 |
| **5. Melt factor for coniferous forests (mm/d per °C)** | 13.591 | 13.732 | 9.261 | 14.681 |
| **6. Melt factor for deciduous forests (mm/d per °C)** | 3.913 | 11.465 | 1.980 | 1.998 |
| **7. Melt factor for open areas (mm/d per °C)** | 9.841 | 13.395 | 14.430 | 8.410 |
| **8. Multiplication factor for PET** | 1.031 | 1.039\* | 0.958\* | 1.133\* |
| **9. Depth of the first soil layer (m.)** | 0.003 | 0.003\* | 0.100\* | 0.022\* |
| **10. Depth of the second soil layer (m.)** | 0.501 | 0.339\* | 0.199\* | 0.146\* |
| **11. Depth of the third soil layer (m.)** | 2.095 | 1.000\* | 2.175\* | 1.000\* |
| **Average SWE in corresponding month of SPAEF calibration** |  | 135.49 | 116.24 | 67.35 |
| **NSE** | **0.762** | **0.737** | **0.739** | **0.733** |
| **KGE** | **0.776** | **0.764** | **0.771** | **0.840** |
| **RMSE Spatial(mm)** | **45.35** | **39.38** | **51.90** | **50.23** |
| **SPAEF wrt SNODAS Jan** | **-0.027** | **0.01** | **0.077** | **0.101** |
| **SPAEF wrt SNODAS Feb** | **0.157** | **0.157** | **0.201** | **0.181** |
| **SPAEF wrt SNODAS March** | **0.192** | **0.232** | **0.197** | **0.167** |
| **Validation** | | | | |
| **NSE** | **0.735** | **0.747** | **0.770** | **0.756** |
| **KGE** | **0.757** | **0.789** | **0.803** | **0.838** |