

# Supplement S3

- This supplement is a supporting analysis of the calibration process improvements, when compared to the model with default  
 5 parametrisations. The analysis is based on the slope of the regression line ( $b$ ) and the coefficient of determination ( $r^2$ ) from Fig.  
 2 and the corresponding supplementary images (S2). We calculated how many times the calibrated parameter values resulted in  
 improvements for these variables (in boldface), how many times these values are roughly the same (the value from the default  
 simulation is within 5 % of the corresponding value from the calibration process) and how many times the calibration has  
 worsened the results (italic).  
 10 We urge caution in making detailed or definate conclusions based on these supporting results. This is because the Ball-  
 Berry model and the variants are here coupled to the JSBACH model without any initial calibration. The default parameter  
 values for these models are taken from literature – it is possible that the combination of these values and the JSBACH default  
 parametrisation (for the other parameters) results in inferior behaviour. Therefore, comparing the calibrated results to these  
 simulations may not be meaningful.

**Table S3a.** Model spesific analysis of the calibration process for the validation period. Improvements are given in boldface, similar behaviour without any accent and deteriorations in italic.

mode	$b(\text{ET})$	$r^2(\text{ET})$	$b(\text{GPP})$	$r^2(\text{GPP})$	$\Sigma$
Base	<b>2,3,5</b>	<b>9,1,0</b>	<b>8,0,2</b>	<b>8,2,0</b>	<b>27,6,7</b>
Bethy	<b>3,1,6</b>	<b>9,1,0</b>	<b>8,0,2</b>	<b>10,0,0</b>	<b>30,2,8</b>
BB	<b>7,1,2</b>	<b>10,0,0</b>	<b>9,0,1</b>	<b>9,1,0</b>	<b>35,2,3</b>
Leu	<b>5,0,5</b>	<b>10,0,0</b>	<b>8,0,2</b>	<b>8,2,0</b>	<b>31,2,7</b>
F&K	<b>2,2,6</b>	<b>10,0,0</b>	<b>8,0,2</b>	<b>10,0,0</b>	<b>30,2,8</b>
USO	<b>2,2,6</b>	<b>9,1,0</b>	<b>7,0,3</b>	<b>8,2,0</b>	<b>26,5,9</b>
$\Sigma$	<b>21,9,30</b>	<b>57,3,0</b>	<b>48,0,12</b>	<b>53,7,0</b>	

**Table S3b.** Site spesific analysis of the calibration process for the validation period. Improvements are given in boldface, similar behaviour without any accent and deteriorations in italic. Validation site identifiers have also been italisised.

site	$b(\text{ET})$	$r^2(\text{ET})$	$b(\text{GPP})$	$r^2(\text{GPP})$	$\Sigma$
CA-Obs	<b>3,3,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>21,3,0</b>
CA-Qfo	<b>2,1,3</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>20,1,3</b>
FI-Hyy	<b>3,2,1</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>3,3,0</b>	<b>18,5,1</b>
FI-Ken	<b>1,0,5</b>	<b>3,3,0</b>	<b>5,0,1</b>	<b>6,0,0</b>	<b>15,3,6</b>
FI-Sod	<b>0,0,6</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>18,0,6</b>
RU-Fyo	<b>3,3,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>2,4,0</b>	<b>17,7,0</b>
<i>CA-Ojp</i>	<b>2,0,4</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>20,0,4</b>
<i>FI-Let</i>	<b>6,0,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>6,0,0</b>	<b>24,0,0</b>
<i>RU-Zot</i>	<b>1,0,5</b>	<b>6,0,0</b>	<b>1,0,5</b>	<b>6,0,0</b>	<b>14,0,10</b>
<i>US-Prr</i>	<b>0,0,6</b>	<b>6,0,0</b>	<b>0,0,6</b>	<b>6,0,0</b>	<b>12,0,12</b>
$\Sigma$	<b>21,9,30</b>	<b>57,3,0</b>	<b>48,0,12</b>	<b>53,7,0</b>	