

1 **Supplementary material**

2 Table 1. Model (MAPSS) parameters used in the uncertainty analysis, classified by
 3 model process, and the minimum and maximum values used to build their uniform
 4 probability distribution function. For conceptual parameters minimum and maximum
 5 values were estimated as $\pm 30\%$ from their default value (Zahele et al., 2005).

Vegetation processes	Parameter	Minimum	Maximum	Reference
Rainfall interception	Rainfall coefficient for number of rain events (RC)	0.7	1.3	$\pm 30\%$
	Potential evapotranspiration (PET) threshold (mm/month) for determination of maximum number of events	25	75	$\pm 30\%$
	Maximum number of events at PET \leq RC	3.5	6.5	$\pm 30\%$
	Maximum number of events at PET $>$ RC	7	13	$\pm 30\%$
	Maximum precipitation interception per event (mm)	2.1	3.9	$\pm 30\%$
Potential Evapotranspiration (PET)	Tropical trees PET factor	1.785	3.315	$\pm 30\%$
	Tropical tall grass PET factor	0.854	1.586	$\pm 30\%$
Stomatal conductance	Full light attenuation leaf area index (LAI) for Tropical Broad/Needleleaf	3.3	5	Hoffmann et al., 2005
	Tropical normal maximum stomatal conductance (mm/s)	1.5	9.3	Kelliher et al., 1995
	Maximum conductance of Broad/Needleleaf Tropical Grass (mm/s)			Kelliher et al., 1995; Schulze et al., 1994; Jarvis 1976; Emanuel et al., 2007
	Maximum conductance of Broad/Needleleaf Tropical Tree (mm/s)	4	12	Kelliher et al., 1995; Schulze et al., 1994; Gao et al., 2000;
		2.9	9.3	

	Maximum conductance of Broad/Needleleaf Tropical Shrub (mm/s)	1.5	7.5	Juhrbandt et al., 2004 Gao et al., 2000; Neilson, 1995
	Minimum conductance of Broad/Needleleaf Tropical Grass (mm/s)	0	0.2	Neilson, 1995; Schulze et al., 2005
	Minimum conductance of Broad/Needleleaf Tropical Tree (mm/s)	0	1.5	Juhrbandt et al., 2004; Neilson, 1995; Kelliher et al., 1995
	Minimum conductance of Broad/Needleleaf Tropical Shrub (mm/s)	0	0.8	Neilson, 1995; Hallgren and Pitman, 2000
Actual transpiration (AT) and Leaf Area Index (LAI)	Maximum LAI:actual transpiration (AT) ratio Broad/Needleleaf Grass (LAI/mm)	10.5	19.5	±30%
	Apply maximum LAI: actual transpiration (AT) ratio below this value of AT for Broad/Needleleaf Grass (mm)	700	1300	±30%
	Maximum LAI:actual transpiration (AT) ratio for Broad/Needleleaf Tree (LAI/mm)	0.175	0.325	±30%
	Apply maximum LAI:AT ratio below this value of AT for Broad/Needleleaf Tree (mm)	700	1300	±30%
	Maximum LAI:actual transpiration (AT) ratio for Broad/Needleleaf Shrub (LAI/mm)	7	13	±30%
	Apply maximum LAI:AT ratio below this value of AT for Broad/Needleleaf Shrub (mm)	175	325	±30%

Wilting point	Wilting point for Needle/Broadleaf Tropical Grass (MPa)	-3	-0.7	Schulze et al., 2005; Hoffmann et al., 2005; Engelbrecht and Kursar, 2003
	Wilting point for Needle/Broadleaf Tropical Tree (MPa)	-3	-0.7	Schulze et al., 2005
	Wilting point for Needle/Broadleaf Tropical Shrub (MPa)	-6	-0.7	Schulze et al., 2005; Neilson, 1995
Transpiration coefficients	Transpiration coefficient Needle/Broadleaf Grass	0.07	0.13	±30%
	Transpiration coefficient Needle/Broadleaf Tree	-0.962	-0.518	±30%
	Transpiration coefficient Needle/Broadleaf Shrub	-1.04	-0.56	±30%
Actual transpiration (AT) rate	Coefficient of model of transpiration ratio for Tropical Needleleaf Grass	2.975	5.525	±30%
	Coefficient of model of transpiration ratio for Tropical Broadleaf Grass	2.345	4.355	±30%
	Coefficient of model of transpiration ratio for Tropical Needleleaf Tree	2.45	4.55	±30%
	Coefficient of model of transpiration ratio for Tropical Broadleaf Tree	2.66	4.94	±30%
	Coefficient of model of transpiration ratio for Tropical Needleleaf Shrub	5.075	9.425	±30%
	Coefficient of model of transpiration ratio for Tropical Broadleaf Shrub	5.075	9.425	±30%
	Parameter controlling the sensitivity of stomatal conductance to PET for Tropical Broad/Needleleaf Grass	0.0014	0.0026	±30%
Potential Evapotranspiration (PET) and Stomatal Conductance	Parameter controlling the sensitivity of stomatal conductance to PET for	0.07	0.13	±30%

	Tropical Broad/Needleleaf Tree			
	Parameter controlling the sensitivity of stomatal conductance to PET for Tropical Broad/Needleleaf Shrub	0.021	0.039	±30%
Runoff	Coefficient of surface runoff	1.19	2.21	±30%
Potential Evapotranspiration (PET) model	Tropical Grass/Shrub/Tree measurement height for winds (m)	7	13	±30%
	Tropical Mid- and short grass roughness length (cm)	3.5	6.5	±30%
	Tropical Tree roughness length (cm)	140	260	±30%
	Tropical Shrub and Tall Grass roughness length (cm)	7	13	±30%
Soil water processes	Parameter	Min	Max	Reference
Soil layers thickness	Surface soil layer thickness (cm)	500	2700	Canadell et al., 1996; Neilson, 1995
	Intermediate soil layer thickness (cm)	700	1300	±30%
	Deep soil layer thickness (cm)	1800	3900	Schenk and Jackson, 2002
Soil saturated water holding capacity (SWHC)	Soil saturated water holding capacity (SWHC) as percentage of volume at saturation for surface, intermediate and deep layers (%)	42	52	Saxton and Rawls, 2006; Neilson, 1995
Soil field water capacity	Soils field water capacity (as fraction of SWHC) for surface, intermediate and deep layers	0.22	0.84	Saxton and Rawls, 2006
Soil Water Potential Model	Coefficient 1 of soil water potential model for surface, intermediate and deep layers	-	-	
		43026.788	79906.892	±30%
	Coefficient 2 of soil water	3.0513	5.6667	±30%

Percolation	potential model for surface, intermediate and deep layers			
	Coefficient 3 of soil water potential model for surface, intermediate and deep layers	33.39	62.01	±30%
	Coefficient for infiltration, surface runoff and saturated percolation for surface soil layer	0.7	1.3	±30%
	Coefficient for infiltration and saturated percolation for intermediate soil layer	1.75	3.25	±30%
	Coefficient for infiltration and saturated percolation for deep soil layer	7	13	±30%
Drainage	Coefficient for infiltration, surface runoff and unsaturated percolation for surface soil layer	1.75	3.25	±30%
	Coefficient for infiltration and unsaturated percolation for intermediate soil layer	2.1	3.9	±30%
	Coefficient for infiltration and unsaturated percolation for deep soil layer	7	13	±30%
	Coefficient for infiltration, surface runoff and saturated drainage for surface soil layer	0.35	0.65	±30%
	Coefficient for infiltration and saturated drainage for intermediate soil layer	0.56	1.04	±30%
	Coefficient for infiltration and saturated drainage for deep soil layer	0.56	1.04	±30%
	Coefficient for infiltration, surface runoff and unsaturated drainage for surface soil layer	0.56	1.04	±30%
Coefficient for infiltration and unsaturated drainage for intermediate soil layer	0.35	0.65	±30%	

Coefficient for infiltration
and unsaturated drainage
for deep soil layer

0.14

0.26 ±30%

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