

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	$\pm 30\%$
	Tropical trees PET factor	1.785	3.315	$\pm 30\%$
Potential Evapotranspiration (PET)	Tropical tall grass PET factor	0.854	1.586	$\pm 30\%$
	Full light attenuation leaf area index (LAI) for Tropical Broad/Needleleaf	3.3	5	Hoffmann et al., 2005
	Tropical normal maximum stomatal conductance	1.5	9.3	Kelliher et al., 1995
Stomatal conductance	Maximum conductance of Broad/Needleleaf Tropical Grass			Kelliher et al., 1995; Schulze et al., 1994; Jarvis 1976; Emanuel et al., 2007
		4	12	
	Maximum conductance of Broad/Needleleaf Tropical Tree			Kelliher et al., 1995; Schulze et al., 1994; Gao et al., 2000; Juhrbandt et
		2.9	9.3	

	Maximum conductance of Broad/Needleleaf Tropical Shrub	1.5	7.5	al., 2004 Gao et al., 2000; Neilson, 1995
	Minimum conductance of Broad/Needleleaf Tropical Grass	0	0.2	Neilson, 1995; Schulze et al., 2005
	Minimum conductance of Broad/Needleleaf Tropical Tree	0	1.5	Juhrbandt et al., 2004; Neilson, 1995; Kelliher et al., 1995
	Minimum conductance of Broad/Needleleaf Tropical Shrub	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	$\pm 30\%$
	Apply maximum LAI:AT ratio below this value for Broad/Needleleaf Grass	700	1300	$\pm 30\%$
	Maximum LAI:actual transpiration (AT) ratio for Broad/Needleleaf Tree (LAI/mm)	0.175	0.325	$\pm 30\%$
	Apply maximum LAI:AT ratio below this value for Broad/Needleleaf Tree	700	1300	$\pm 30\%$
	Maximum LAI:actual transpiration (AT) ratio for Broad/Needleleaf Shrub (LAI/mm)	7	13	$\pm 30\%$
	Apply maximum LAI:AT ratio below this value for Broad/Needleleaf Shrub	175	325	$\pm 30\%$
	Wilting point for Needle/Broadleaf Tropical Grass	-3	-0.7	Schulze et al., 2005; Hoffmann et al., 2005; Engelbrecht

				and Kursar, 2003
	Wilting point for Needle/Broadleaf Tropical Tree	-3	-0.7	Schulze et al., 2005
	Wilting point for Needle/Broadleaf Tropical Shrub	-6	-0.7	Schulze et al., 2005; Neilson, 1995
Transpiration coefficients	Transpiration coefficient Needle/Broadleaf Grass	0.07	0.13	$\pm 30\%$
	Transpiration coefficient Needle/Broadleaf Tree	-0.962	-0.518	$\pm 30\%$
	Transpiration coefficient Needle/Broadleaf Shrub	-1.04	-0.56	$\pm 30\%$
Actual transpiration (AT) rate	Coefficient of model of transpiration ratio for Tropical Needleleaf Grass	2.975	5.525	$\pm 30\%$
	Coefficient of model of transpiration ratio for Tropical Broadleaf Grass	2.345	4.355	$\pm 30\%$
	Coefficient of model of transpiration ratio for Tropical Needleleaf Tree	2.45	4.55	$\pm 30\%$
	Coefficient of model of transpiration ratio for Tropical Broadleaf Tree	2.66	4.94	$\pm 30\%$
	Coefficient of model of transpiration ratio for Tropical Needleleaf Shrub	5.075	9.425	$\pm 30\%$
	Coefficient of model of transpiration ratio for Tropical Broadleaf Shrub	5.075	9.425	$\pm 30\%$
Potential Evapotranspiration (PET) and Stomatal Conductance	Parameter controlling the sensitivity of stomatal conductance to PET for Tropical Broad/Needleleaf Grass	0.0014	0.0026	$\pm 30\%$
	Parameter controlling the sensitivity of stomatal conductance to PET for Tropical Broad/Needleleaf Tree	0.07	0.13	$\pm 30\%$
	Parameter controlling the sensitivity of stomatal conductance to PET for	0.021	0.039	$\pm 30\%$

	Tropical Broad/Needleleaf Shrub			
Runoff	Coefficient of surface runoff	1.19	2.21	±30%
Potential Evapotranspiration (PET) model	Tropical Grass/Shrub/Tree measurement height for winds	7	13	±30%
	Tropical Mid- and short grass roughness length	0.00035	0.00065	±30%
	Tropical Tree roughness length	0.014	0.026	±30%
	Tropical Shrub and Tall Grass roughness length	0.0007	0.0013	±30%
Soil water processes	Parameter	Min	Max	Reference
Soil layers thickness	Surface soil layer thickness	500	2700	Canadell et al., 1996; Neilson, 1995
	Intermediate soil layer thickness	700	1300	±30%
	Deep soil layer thickness	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 potential model for surface, intermediate and deep layers	3.0513	5.6667	±30%
	Coefficient 3 of soil water potential model for surface, intermediate and deep layers	33.39	62.01	±30%

Percolation	Coefficient for infiltration, surface runoff and saturated percolation for surface soil layer	0.7	1.3	$\pm 30\%$
	Coefficient for infiltration and saturated percolation for intermediate soil layer	1.75	3.25	$\pm 30\%$
	Coefficient for infiltration and saturated percolation for deep soil layer	7	13	$\pm 30\%$
	Coefficient for infiltration, surface runoff and unsaturated percolation for surface soil layer	1.75	3.25	$\pm 30\%$
	Coefficient for infiltration and unsaturated percolation for intermediate soil layer	2.1	3.9	$\pm 30\%$
	Coefficient for infiltration and unsaturated percolation for deep soil layer	7	13	$\pm 30\%$
	Coefficient for infiltration, surface runoff and saturated drainage for surface soil layer	0.35	0.65	$\pm 30\%$
	Coefficient for infiltration and saturated drainage for intermediate soil layer	0.56	1.04	$\pm 30\%$
	Coefficient for infiltration and saturated drainage for deep soil layer	0.56	1.04	$\pm 30\%$
	Coefficient for infiltration, surface runoff and unsaturated drainage for surface soil layer	0.56	1.04	$\pm 30\%$
	Coefficient for infiltration and unsaturated drainage for intermediate soil layer	0.35	0.65	$\pm 30\%$
	Coefficient for infiltration and unsaturated drainage for deep soil layer	0.14	0.26	$\pm 30\%$

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