

**Table S3 Hydrologic modeling of modern and paleo-lake systems, Sahelo-Sudanian end-member**

**Lake systems**

*Paleolake Darfur*    *Paleolake Fezzan*    *Paleolake Chad*    reference

<b>measured physical parameters</b>	<b>symbol</b>	<b>units</b>				
lake area	$A_w$	km <sup>2</sup>	32288	126500	344724	(1)
land area	$A_L$	km <sup>2</sup>	91912	203000	1185802	(1)
lake area ratio	$a_w$	-	0.260	0.384	0.225	(1)
land area ratio	$a_b$	-	0.74	0.62	0.77	
lake highstand elevation	masl	m	573	521	325	
pressure	P	kPa	94.78	95.37	97.59	

**Lake Victoria end-member**

**Radiation**

fractional cloud cover	c	-	0.42	0.42	0.42	
clear sky radiation (with clouds)	$R_{sw}$	MJ m <sup>-2</sup> day <sup>-1</sup>	23.00	23.00	23.00	(3)
surface albedo	$\alpha$	-	0.07	0.07	0.07	(4)
net shortwave absorbed at surface	$R_{sw}(1-\alpha)$	MJ m <sup>-2</sup> day <sup>-1</sup>	21.39	21.39	21.39	
surface emissivity	$\varepsilon$	-	0.96	0.96	0.96	(5)
net longwave emitted from surface	$R_{LW}$	MJ m <sup>-2</sup> day <sup>-1</sup>	4.4	4.4	4.4	(6)
net radiation at surface	$R_n=R_{sw}(1-\alpha)-R_{LW}$	MJ m <sup>-2</sup> day <sup>-1</sup>	17.0	17.0	17.0	

**assumed physical parameters**

surface air temperature	T	°C	22.3	22.3	22.3	(2)
surface water temperature	T	°C	25.4	25.4	25.4	(2)
wind speed assumed	U	m sec <sup>-1</sup>	1.95	1.95	1.95	(2)

**Priestly-Taylor**

slope of sat vapor curve	$\Delta$	kPa °C <sup>-1</sup>	0.16	0.16	0.16	(7)
T-P constant	$\alpha(P-T)$	-	1.26	1.26	1.26	(7)
psychometric constant	$\gamma$	kPa °C <sup>-1</sup>	0.06	0.06	0.06	(7)
latent heat of vaporization	$\lambda$	MJ kg <sup>-1</sup>	2.45	2.45	2.45	(7)
evaporation rate	E	mm yr <sup>-1</sup>	2290	2286	2271	(7)

### Penman combination

sat. vapor pressure	$e_s$	kPa	2.69	2.69	2.69	(7)
vapor pressure measured	$e_a$	kPa	2.00	2.00	2.00	(7)
wind speed	U	m sec <sup>-1</sup>	1.95	1.95	1.95	(7)
psychometric constant	$\gamma$	kPa °C <sup>-1</sup>	0.07	0.07	0.07	(7)
evaporation due to wind	Ea	mm day <sup>-1</sup>	0.37	0.37	0.37	(7)
slope of saturation vs T de/dT	$\Delta$	kPa °C <sup>-1</sup>	0.16	0.16	0.16	(7)
Evaporation rate	E	mm day <sup>-1</sup>	4.97	4.97	4.93	(7)
Evaporation rate	E	mm yr <sup>-1</sup>	1816	1813	1801	(7)

### Results

lake area ratio observed	$a_w$ observed		0.260	0.384	0.225	
lake area ratio calculated	$a_w$ calculated		0.258	0.383	0.223	w: 2.53
calculated evapotranspiration	Eb	mm yr <sup>-1</sup>	1123	1210	1081	
calculated run-off coefficient	k		0.14	0.16	0.13	
<b>iterated Precipitation</b>	<b>P</b>	<b>mm yr<sup>-1</sup></b>	<b>1300</b>	<b>1440</b>	<b>1240</b>	iterated P

### References

- (1) DEM this study
- (2) Yin & Nicholson (1998)
- (3) Ba et al. (2001)
- (4) Abtew&Malesse (2013)
- (5) Sellars (1965)
- (6) Budyko (1974)
- (7) Supplemental text