

Supplementary Materials

The Relationship of Lake Morphometry and Phosphorus Dynamics of a Tropical Lake: Lake Tana, Ethiopia

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Table S1. Sediment available phosphorus concentration collected from 60 bottom sediment samples and dissolved phosphorus concentration collected from 143 water samples of Lake Tana.

		AvP		DP		DP		DP		DP	
Easting	Northing	(mg/kg)	Easting	Northing	(mg/l)	Easting	Northing	(mg/l)	Easting	Northing	(mg/l)
315000	1330000	25.67	325014	1285031	0.19	314985	1325001	0.23	345023	1345004	0.46
330000	1330000	23.11	319998	1285031	0.26	320024	1325001	0.24	343741	1350043	0.23
315000	1340000	34.19	325014	1290021	0.19	325019	1325001	0.23	340027	1350043	0.25
300000	1330000	18.85	319989	1290021	0.18	330015	1325001	0.22	334988	1350043	0.31
315000	1320000	20.55	314990	1290021	0.32	334967	1325001	0.21	329993	1350043	0.20
325000	1295000	27.37	320007	1295011	0.27	340005	1325001	0.36	324997	1350043	0.21
325000	1310000	16.29	324996	1295011	0.20	344632	1325001	0.21	320002	1350043	0.33
335000	1320000	13.74	329507	1295011	0.17	345001	1329996	0.18	315028	1350043	0.31
340000	1330000	3.51	329765	1300018	0.21	339984	1329996	0.22	309685	1350043	0.24
283500	1315500	19.70	325014	1300018	0.11	334988	1329996	0.15	304798	1350043	0.25
320000	1350000	17.14	319989	1300018	0.11	329993	1329996	0.19	299977	1350043	0.14
295000	1345000	22.26	315531	1300018	0.19	324997	1329996	0.21	295003	1350043	0.22
290000	1330000	10.33	330004	1304991	0.34	320002	1329996	0.21	290029	1350043	0.23
310000	1310000	18.85	324997	1304991	0.10	315006	1329996	0.16	295025	1354300	0.17
334000	1316500	23.11	319990	1304991	0.19	310011	1329996	0.09	299977	1354995	0.34
346000	1331000	29.93	314966	1304991	0.16	305016	1329996	0.05	315025	1355039	0.29
328000	1356500	14.59	338561	1310015	0.30	299998	1329996	0.18	320045	1355039	0.15
294000	1315000	8.62	334994	1310015	0.15	295025	1329996	0.19	323953	1282700	0.25
283000	1315000	9.47	330004	1310015	0.11	290029	1329996	0.12	325019	1354974	0.22
325600	1285000	13.74	324997	1310015	0.12	284990	1329996	0.28	330036	1354974	0.20

286200	1325000	15.44	320007	1310015	0.45	284990	1334914	0.12	335010	1354974	0.54
286000	1335200	8.62	314982	1310015	0.12	290007	1334914	0.18	339766	1354974	0.36
287500	1345000	12.03	309993	1310015	0.12	295025	1334914	0.18	335010	1359991	0.37
290000	1310300	21.41	305020	1310015	0.00	300042	1334914	0.10			
325000	1354000	14.59	300013	1310015	0.17	305016	1334914	0.21			
290000	1320000	7.77	295006	1310015	0.24	309967	1334914	0.10			
290000	1350000	12.03	289998	1310015	0.18	315006	1334914	0.16			
290000	1340000	27.37	284991	1315032	0.24	320024	1334914	0.16			
296000	1353000	6.92	290008	1315032	0.19	325062	1334914	0.14			
300000	1310000	7.77	295025	1315032	0.24	329971	1334914	0.26			
300000	1340000	25.67	299998	1315032	0.23	335010	1334914	0.32			
300000	1320000	8.62	305016	1315032	0.18	339984	1334914	0.37			
335000	1354000	30.78	309620	1315032	0.13	345023	1334914	0.37			
310000	1347000	25.67	315007	1315032	0.15	348360	1335311	0.56			
300000	1350000	17.14	319980	1315032	0.15	348976	1340031	0.67			
304000	1315000	14.59	324997	1315032	0.22	345023	1340031	0.22			
315000	1305000	9.47	329993	1315032	0.21	340006	1340031	0.27			
320000	1290000	18.00	335010	1315032	0.25	334988	1340031	0.24			
328000	1290000	12.88	340005	1320049	0.26	330014	1340031	0.14			
316000	1300000	18.85	335010	1320049	0.26	325014	1340031	0.09			
324000	1303000	28.22	330010	1320049	0.24	320024	1340031	0.15			
320000	1310000	24.81	292603	1305870	0.25	315006	1340031	0.16			
326000	1320000	23.96	324998	1320049	0.21	309667	1340031	0.20			
318000	1356000	31.63	320005	1320049	0.20	304994	1340031	0.19			
325000	1345000	6.92	315006	1320049	0.18	299998	1340031	0.14			
330300	1300000	18.00	309881	1320049	0.18	295046	1340031	0.19			
331200	1304600	17.14	305015	1320049	0.18	290029	1340031	0.20			
335000	1310000	32.48	300020	1320049	0.24	285816	1340031	0.19			
330000	1340000	32.48	294981	1320049	0.16	286554	1345004	0.18			
330000	1350000	27.37	299950	1306770	0.12	290007	1345004	0.53			
340000	1350000	18.85	282132	1315758	0.13	295025	1345004	0.18			

336500	1359000	23.96	290007	1320049	0.12	300020	1345004	0.19
340000	1320000	26.52	285012	1320049	0.11	305015	1345004	0.18
348000	1338000	29.07	284991	1325001	0.13	309989	1345004	0.22
340000	1340000	25.67	290007	1325001	0.12	315006	1345004	0.30
344400	1344700	27.37	295003	1325001	0.13	320024	1345004	0.16
343000	1325000	18.00	300020	1325001	0.18	325019	1345004	0.17
330000	1315000	20.55	304985	1325001	0.01	329993	1345004	0.25
329000	1304600	6.07	340003	1317335	0.20	334988	1345004	0.23
327500	1298600	38.45	309989	1325001	0.19	340005	1345004	0.36

Table S2. Descriptive statistics for sediment available and dissolved phosphorus concentration in bottom sediments and lake water

Statistical parameter	Sediment available phosphorus concentration (mg/kg)	Dissolved phosphorus concentration (mg/kg)
	Mar, 2018	Mar, 2017
Mean	19.3	0.21
Standard Error	1.08	0.01
Median	18.85	0.2
Mode	18.85	0.18
Standard Deviation	8.3	0.1
Sample Variance	68.85	0.01
Kurtosis	-0.78	4.8
Skewness	0.12	1.65
Range	34.94	0.67
Minimum	3.51	0
Maximum	38.45	0.67
Count	59	143
Confidence Level (95.0%)	2.16	0.02

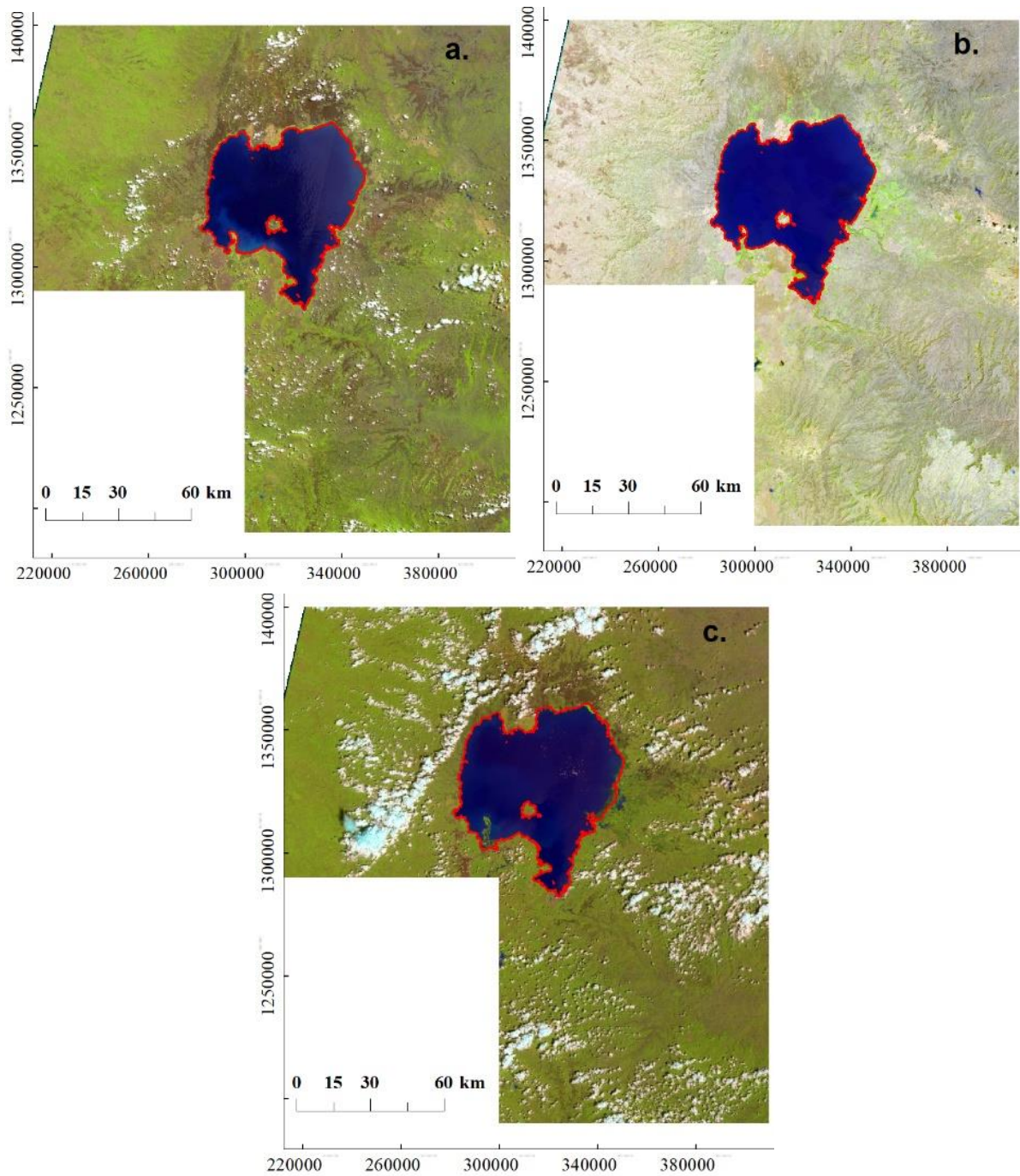


Figure S1. Extracted shape files overlaid on the mosaiced sentinel-2 images of Lake Tana downloaded from <https://earthexplorer.usgs.gov>: (a) minimum lake level, (b) average lake level, and (c) maximum lake level

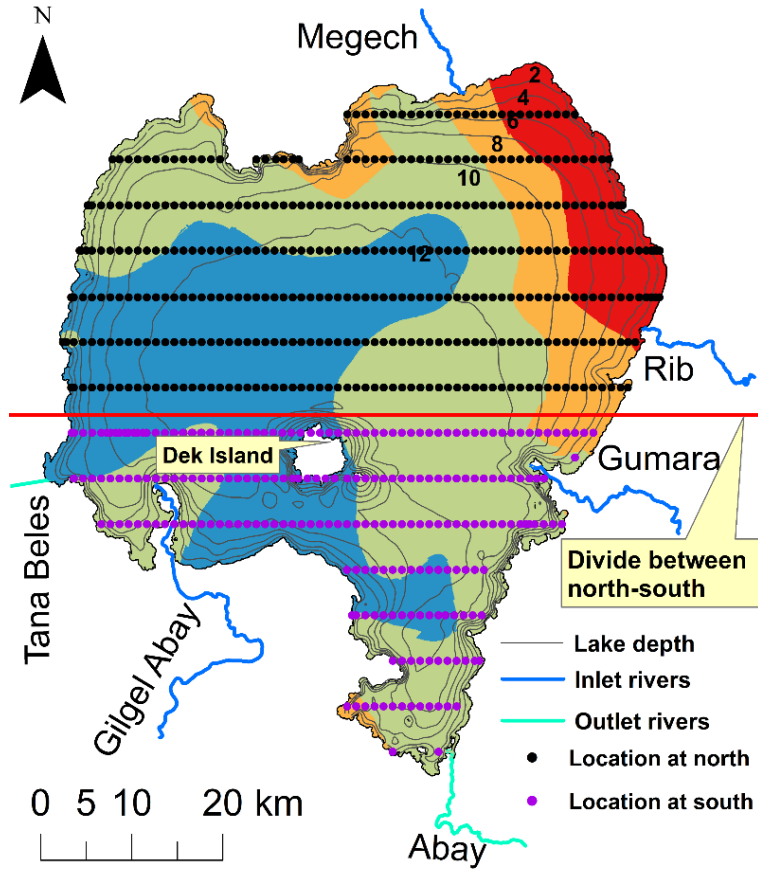


Figure S2. Extracted sampling location for sediment available and dissolved phosphorus concentration of Lake Tana

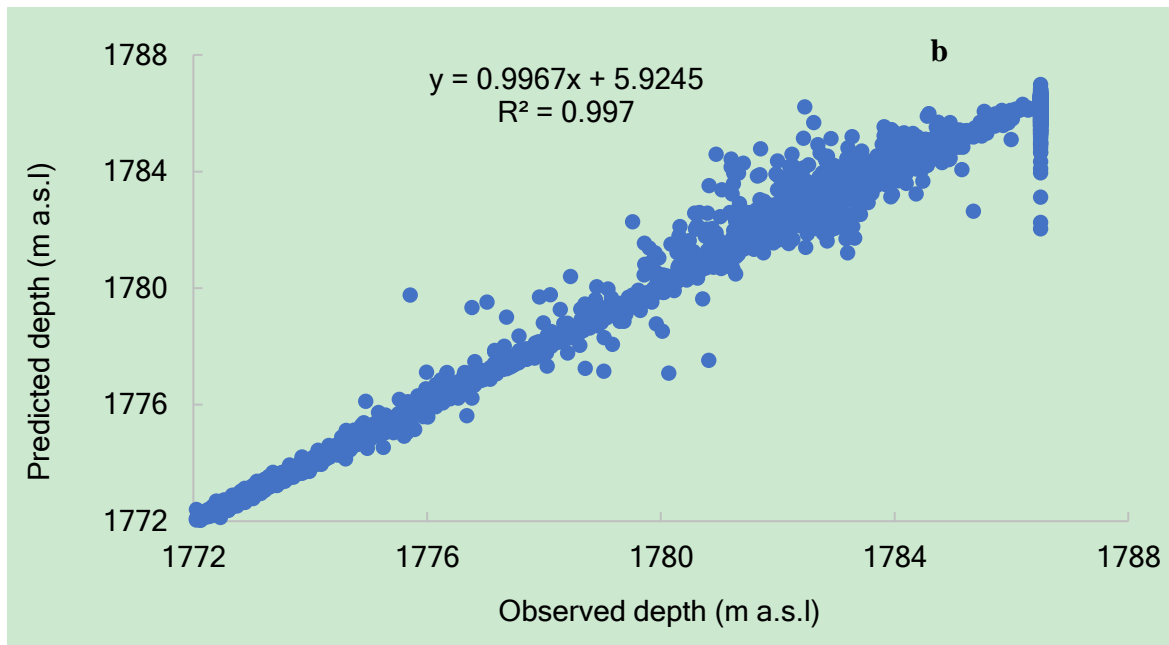
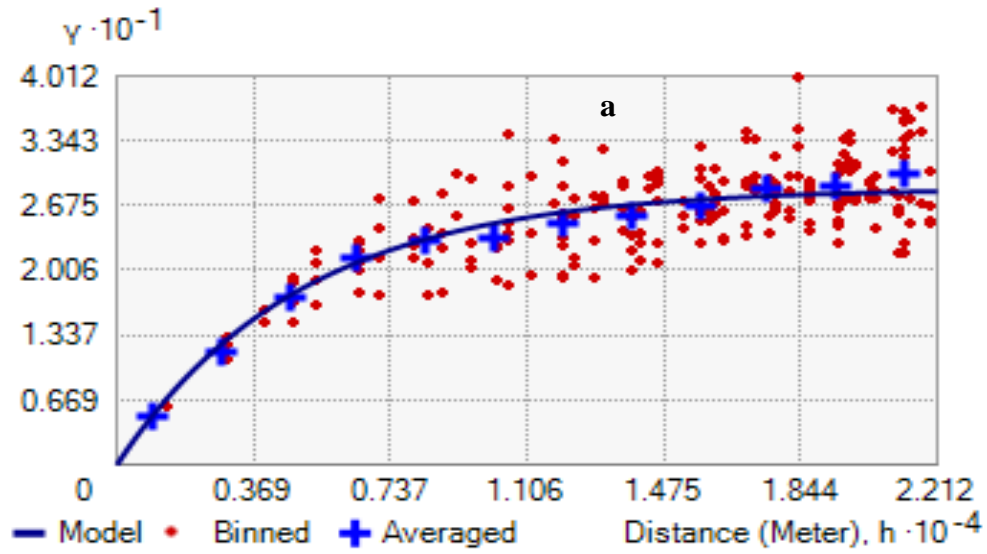


Figure S3. A plot of observed and predicted depth measurements of Lake Tana (a) exponential semi-variogram model of ordinary kriging interpolation method (b) Observed versus predicted depth plot for the 2017 bathymetric survey

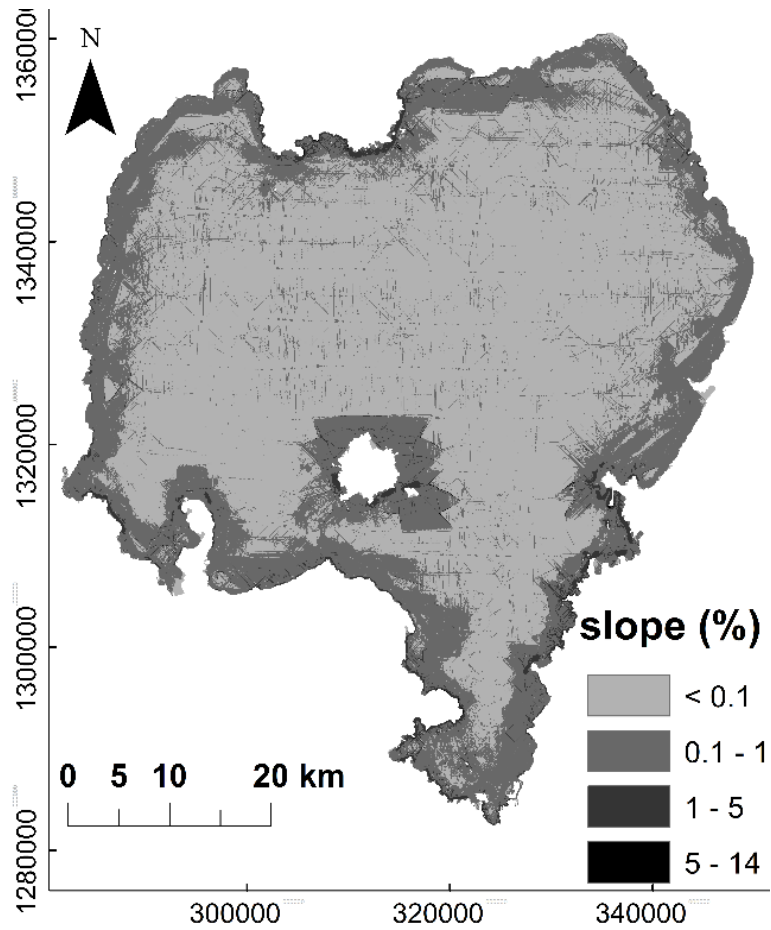


Figure S4. Slope map of Lake Tana bottom topography derived from the bathymetric survey in 2017

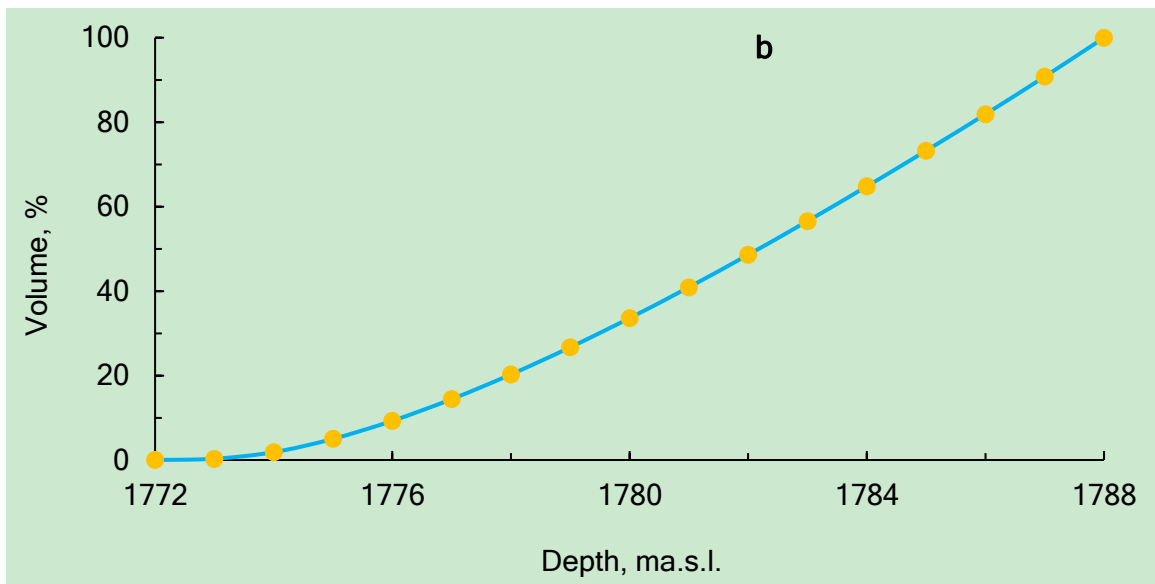
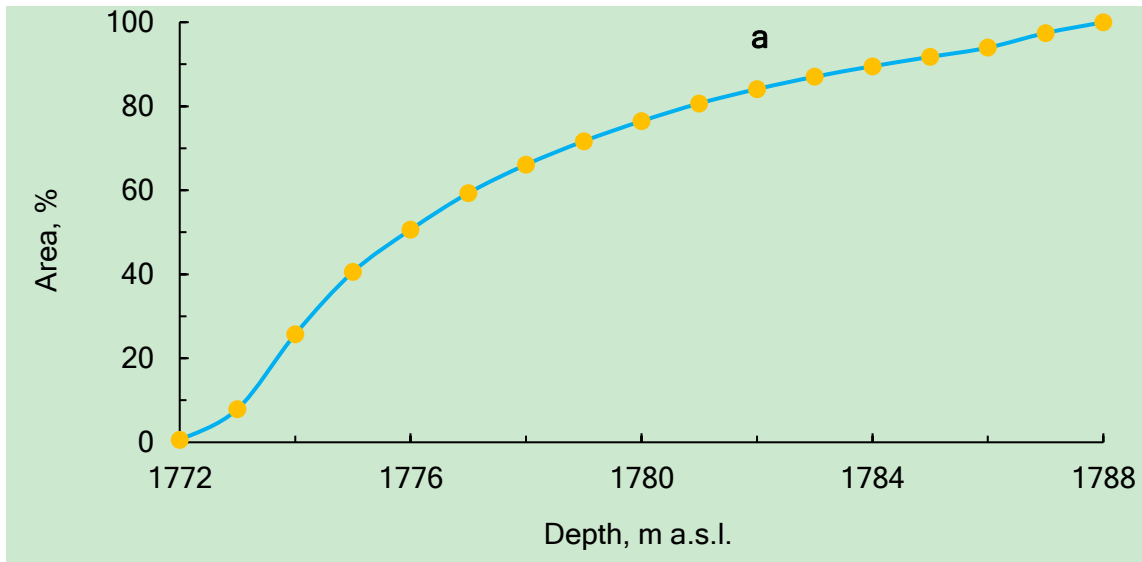


Figure S5. Elevation - area and elevation - volume relationship of Lake Tana (a) Lake depth versus percentage of area curve (b) Lake depth versus the percentage of volume curve