

Figure S1. Laguna Pastos Grandes sedimentary system, showing sampling sites (modern carbonates) used for isotope measurements.

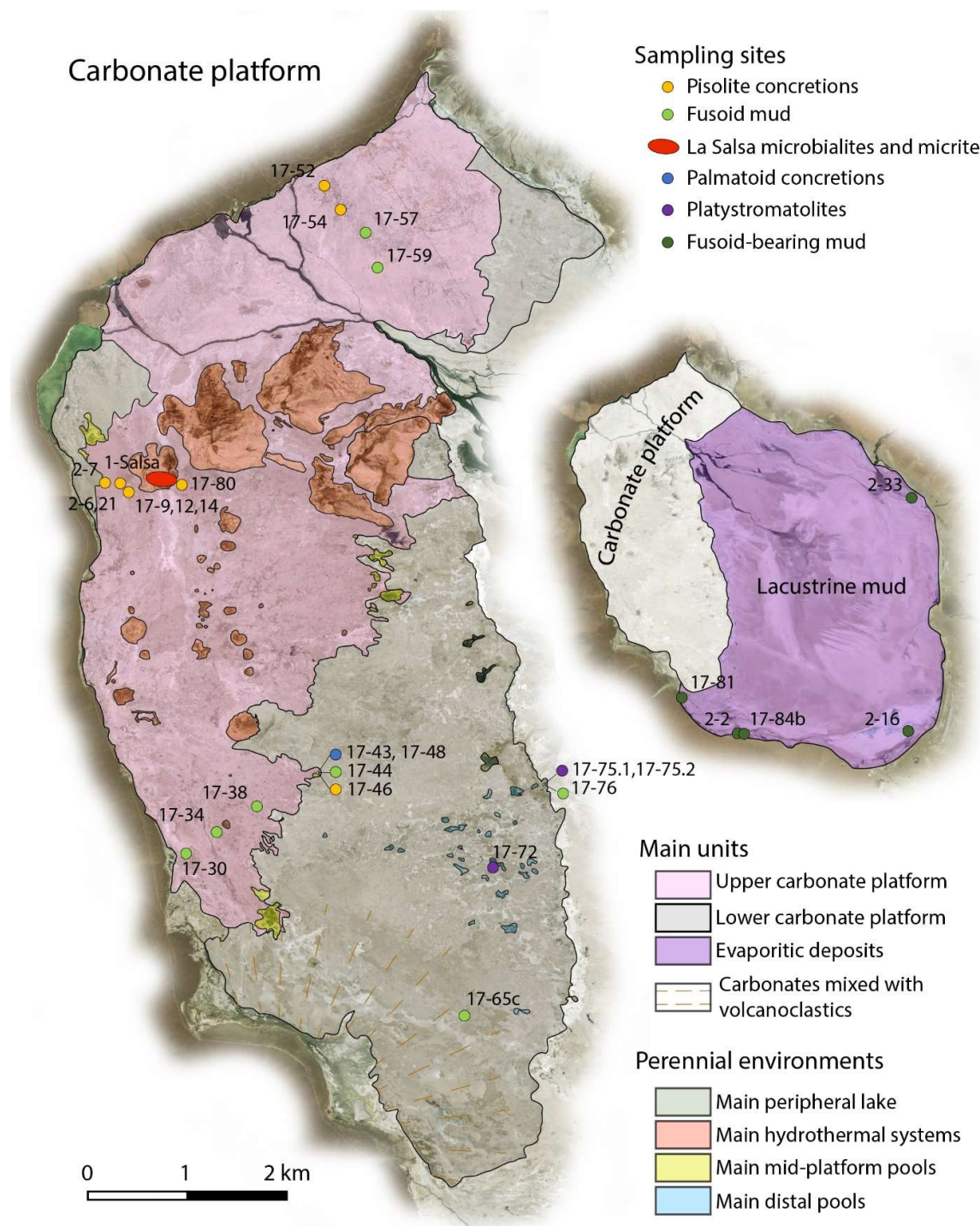
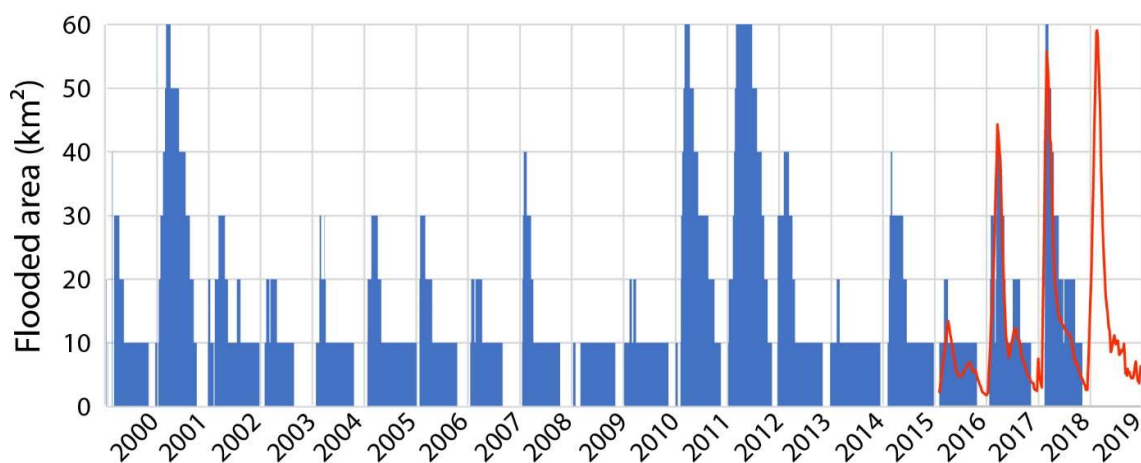


Table S1. Location of samples from the carbonate platform used for U-Th dating.

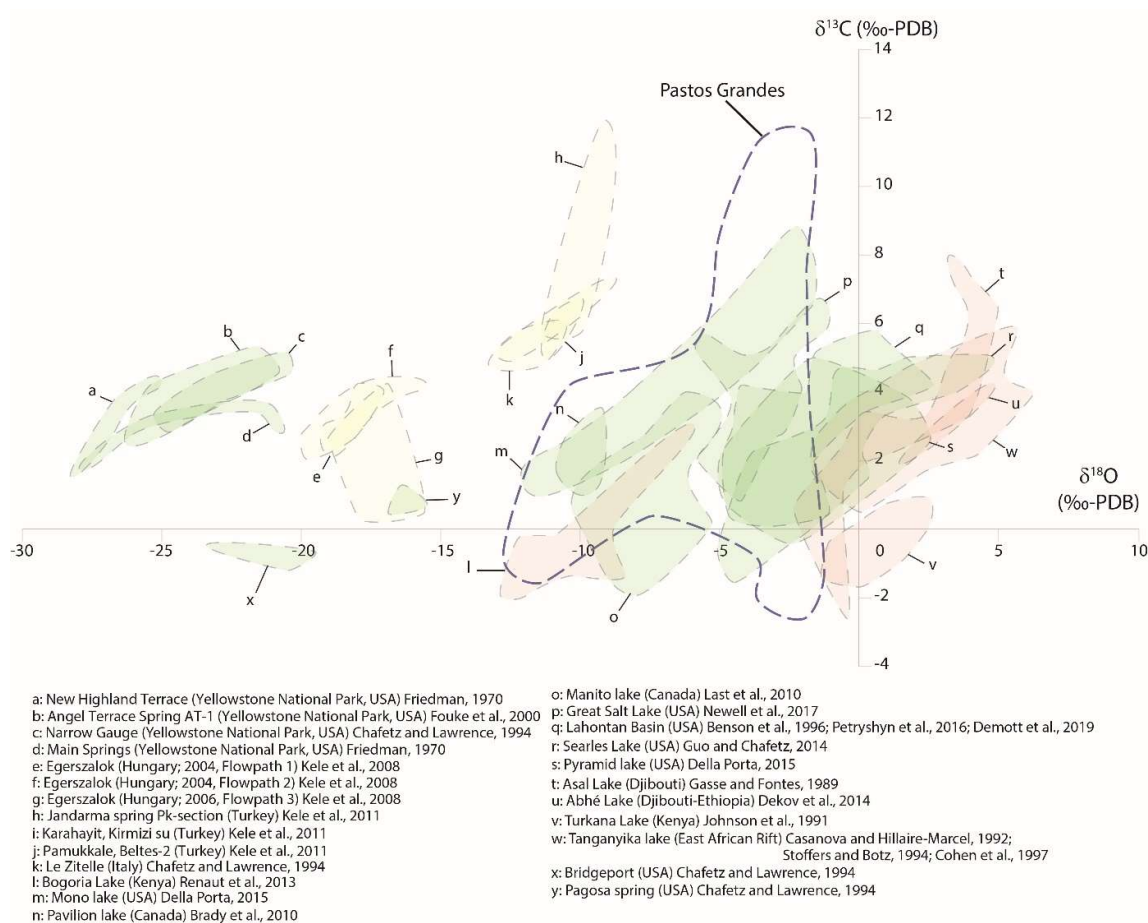
Sample name	Sample type	Latitude (°N)	Longitude (°E)
PG17-14	Pisolite core	-21.62077	-67.84990
PG17-33	Pisoidic rudstone	-21.65179	-67.84143
PG17-37	Peloidal grainstone	-21.64967	-67.83761
PG17-63	Peloidal grainstone	-21.67477	-67.82306
PG17-69	Botryoidal cement	-21.66588	-67.81560
PG17-77	Fusoid mud	-21.65364	-67.80833

Figure S2. Lake level fluctuations from 2000 to 2019. In blue, estimated surface area of the lake, based on morphological variation, as seen in Aqua and Terra MODIS satellite views (2000-2019). In red, precise surface area of the lake, calculated from a dataset of post-2015 Sentinel-2 satellite images (<https://scihub.copernicus.eu>), using the Normalized Difference Water Index (NDWI; McFeeters, 1996), with the free Q-GIS software. The lake morphology thus calculated was then used to produce the estimated surface area by morphological analogy.



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Figure S3. $\delta^{13}\text{C}$ - $\delta^{18}\text{O}$ values, recorded in modern to recent carbonates, precipitating in hydrothermal to lacustrine settings, in Africa (in red), Europe (in yellow), and North America (in green).



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