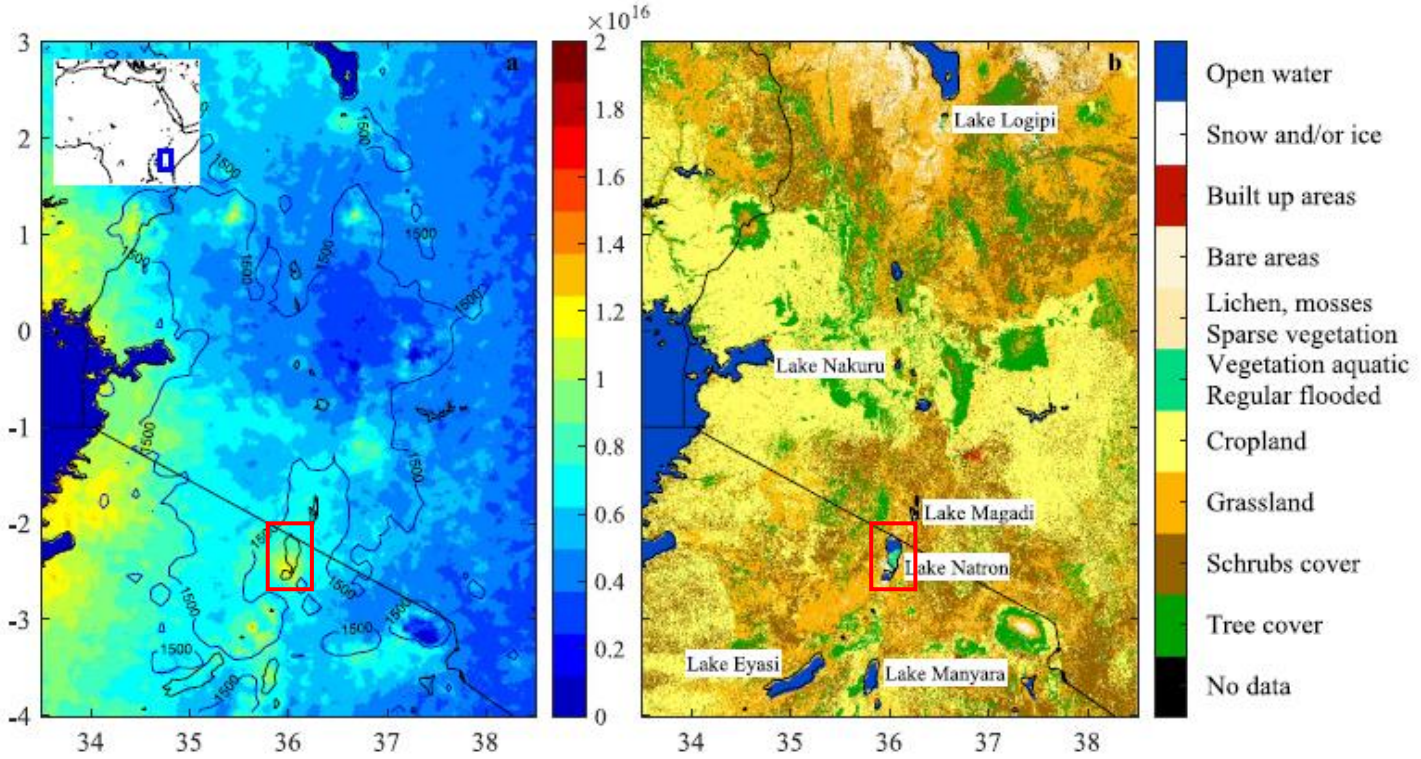
NH3 from Lake Natron

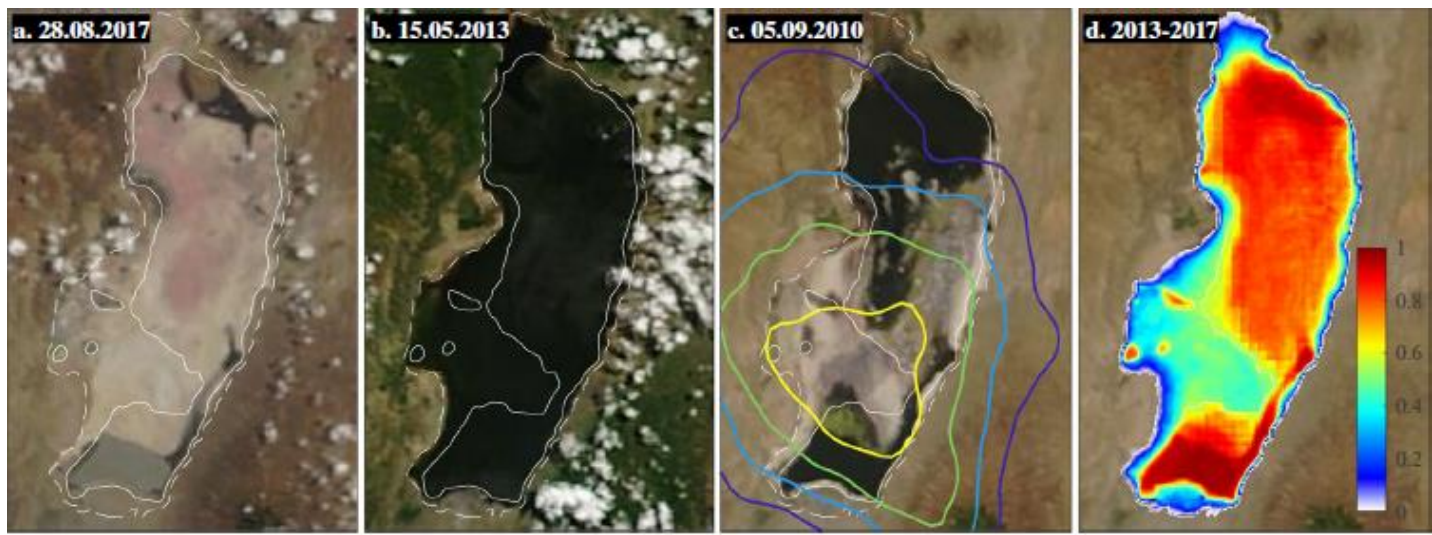
Zhenqi Luo 2020.12

Background information

(Clarisse et al., 2019)

- Location:
  - North Tanzania on the Kenyan border
  - Eastern Rift Valley
- water surface extent: periodically dried out
- an archetype soda lake
  - Sodium (Na)
  - Carbonate (CO3)
  - Chlorine (Cl)
- pH levels: 9-11.5
- productive biologically: well-adapted plankton
- Waterbird species: *lesser flamingo*
- Population: 1000+ each village

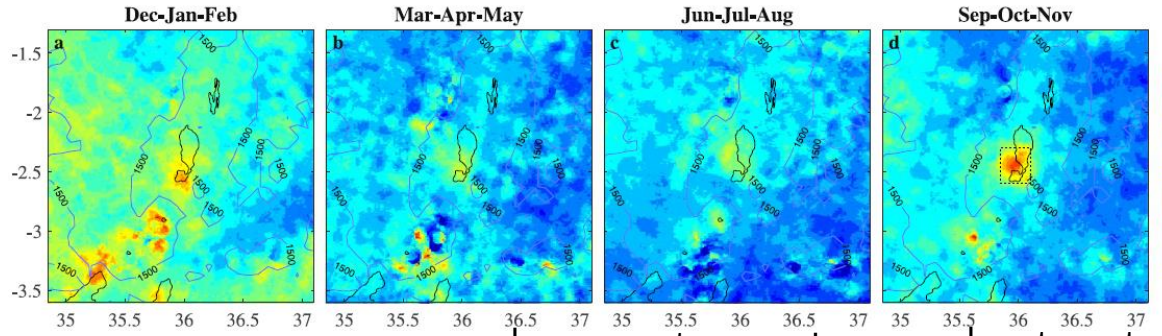




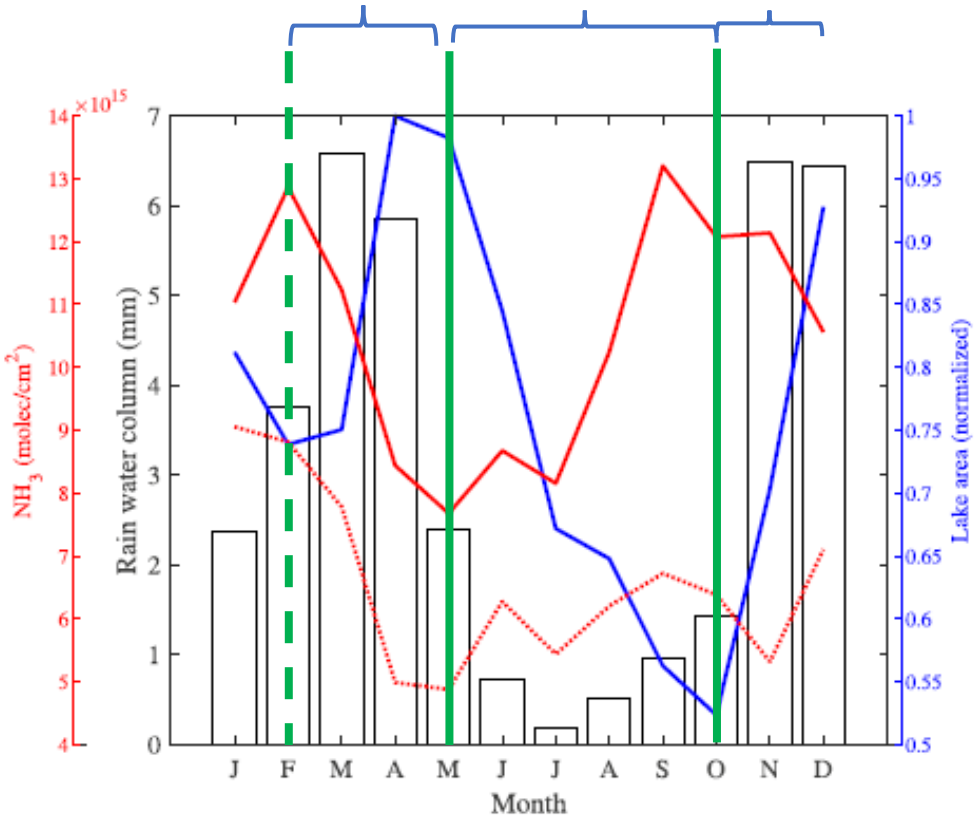
NH3 at Lake Natron

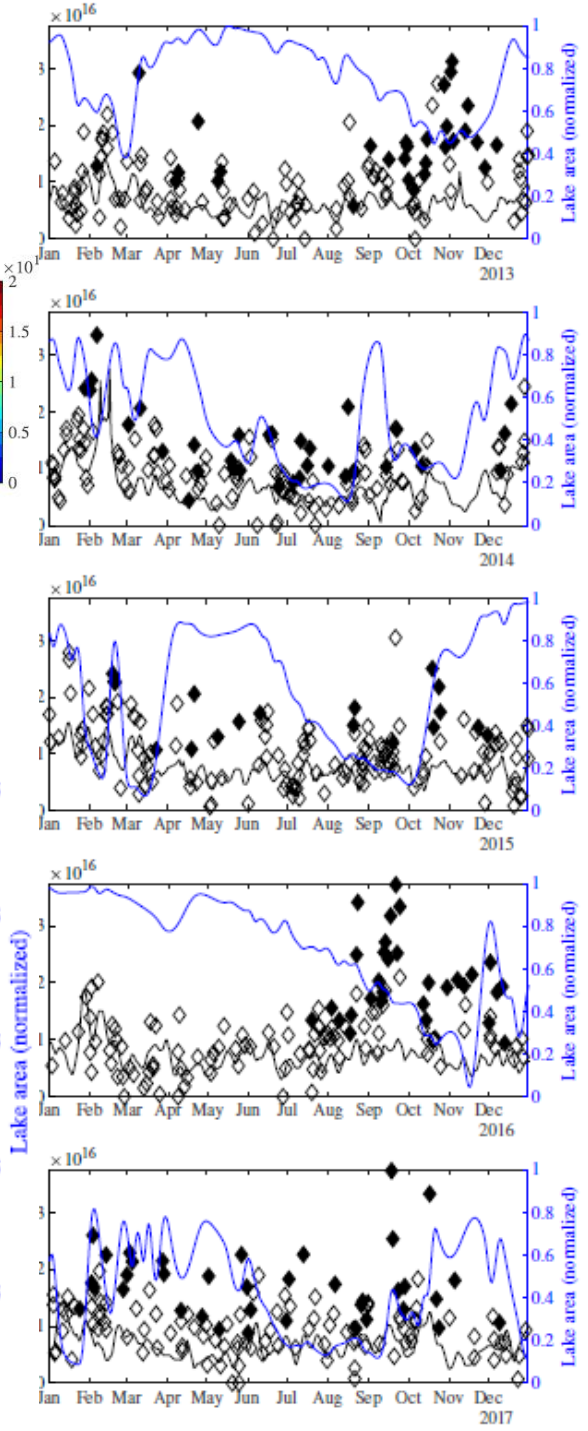
(Clarisse et al., 2019)

- Where: lower-half of the lake
- When:
  - the largest: Sep to Nov
  - the lowest: Mar to Aug
- Seasonality
  - Background double in Jan, Feb
  - Wet seasons
    - Nov-Dec: short
    - Feb-May: long
  - Dry seasons: May-Oct
  - lake area: smallest at the end of the dry season
- link with lake surface area: relate closely
  - Occur throughout the year
  - Episodic and separated at times



long wet dry short wet

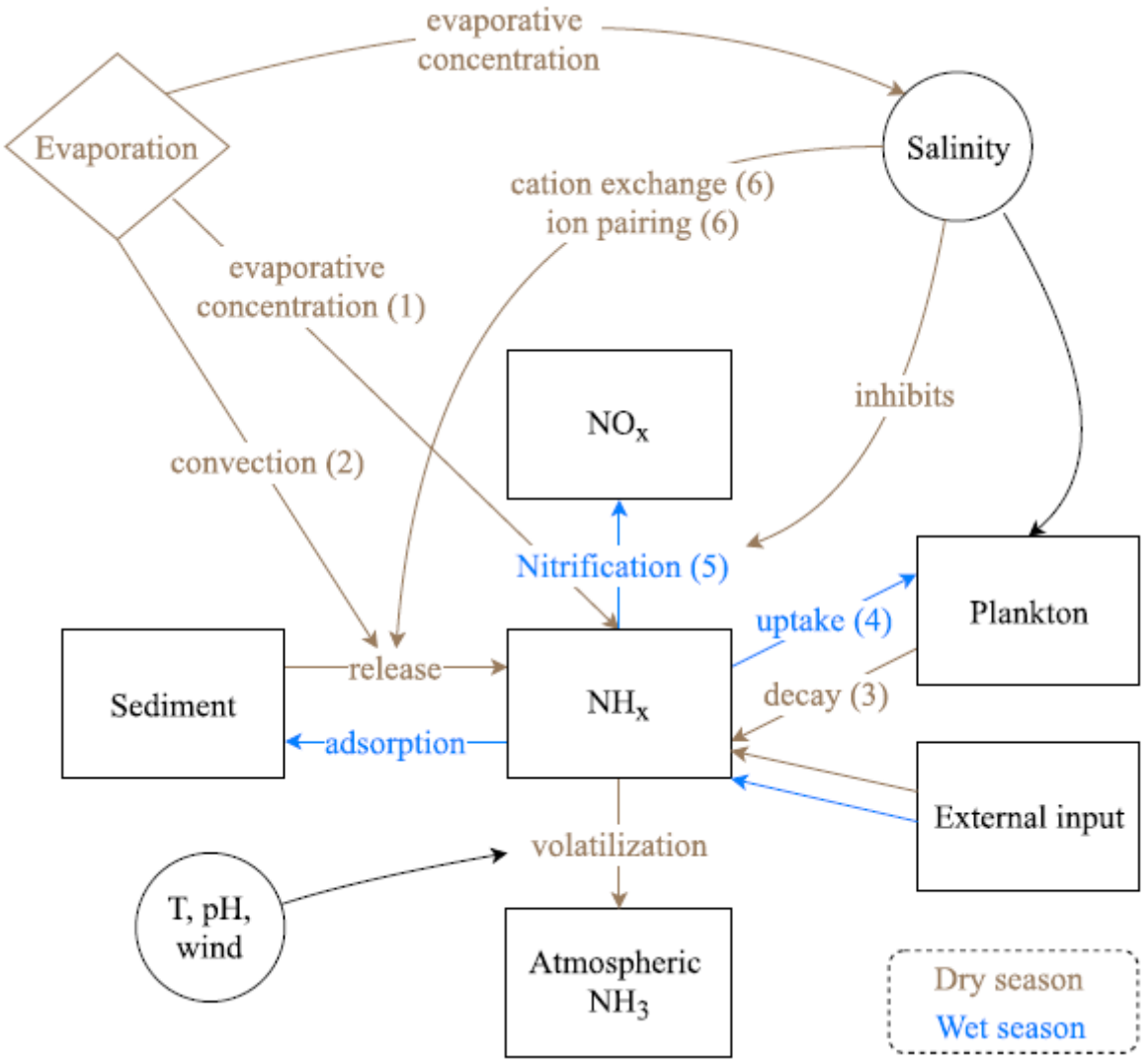




Possible mechanisms——$NH_4^+ + OH^- \leftrightarrow H_2O + NH_3$

- Evaporative concentration: the available NH3 concentrates increases the surface-atmosphere concentration gradient
- Convection: dissolved NH3 can be transported to the surface
- Decay of plankton: breakdown and ammonification of the biomass
- Assimilation: a decreased uptake of NH3
- Nitrification: inhibited beyond a certain salinity threshold
- Cation exchange: determines how much NH+4 can be reversible adsorbed on soil colloids
- Ion pairing: stimulate diffusion of NH+4 out of the sediment

(Clarisse et al., 2019)



Questions?