

Introduction

The Eight Lake is an unexplored small crater lake in the remote Suguta Valley in the Northern Kenya Rift. Far from any anthropological influence this lake offers unique possibilities to study the natural sedimentation patterns that are directly influenced by the hydrological variations and thus climate over the past few centuries. Based on core EIG12-1A (Fig. 1) we attempt to unravel the sedimentation pattern order to question if Eight Lake is a representable climate record to reconstruct past climate changes, especially over the past 200 years.



Setting

The Eight Lake, located north of the equator (1°42'N 36°27'E, 350 m asl.), is a maar crater lake at the northern end of a NNE-SSW directed chain of maar craters in the Northern Kenya Rift. The bright green lake is around 5 m deep, has an area of ca. 0.02 km², and a small catchment restricted to the crater walls of 0.18 km². As one of the hottest places on earth, the region of the lake experiences on average 2200 mm of evaporation, but only 850 mm of precipitation during the two rainy seasons every year with a temperature range between 30-50 °C.



Figure 1

Methods

1. Sampling & onsite Parameters

The cores were taken on the Sep. 17th, 2012. PH, salinity & conductivity of water on top of the core and at the lake surface were measured. The core was directly spitted into 33 samples. Afterwards, the samples were stored at ca. 5°C.

2. Water content & Density

Water content and sediment density help support the semiquantitative grain size analysis.

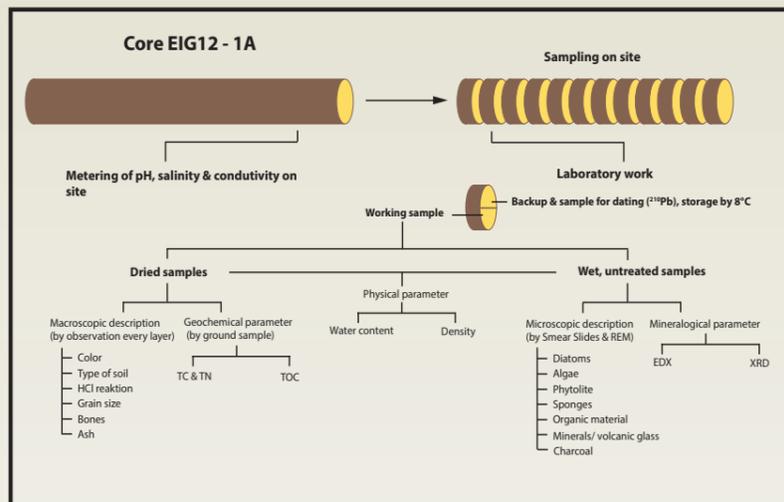


Figure 2: Flow diagram gives an overview about the experimental procedure used for this project.

3. Macroscopic Description

Macroscopic description of the sample, such as semiquantitative grain sizes, larger organic and anorganic fragments, color and HCL reactivity for carbonate content.

4. Geochemical parameters

Total carbon (TC), Nitrogen (TN) and Total organic carbon (TOC) were quantified on a Vario EL III element analyzer.

5. Mineralogical Parameter

The mineralogical analysis were surveyed by EDX (*energy dispersive X-ray spectroscopy*) and XRD (*X-ray diffraction*).

6. Microscopic Analysis

For the microscopic description of the particles of the sediment, smear slides as well as SEM (scanning electron microscope) were used to identify diatoms, phytolites, sponges, minerals, insects or small plants and charcoal. Some high-resolution pictures are presented here.

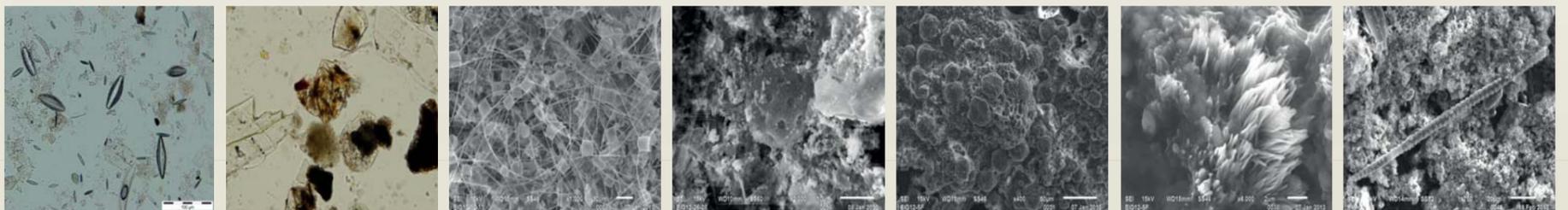
From left to the right:

- 19-20 cm: Diatoms- *Rhopalodia sp.*, *Epithemia sp.*, *Navicula eklab sp.*
- 42-44 cm: Minerals & volcanic glasses,
- 12-13 cm: Lots of *Chaetoceros sp.* [by SEM]

4. 26-28 cm: Pollen [by SEM]

5&6. Surface: Bubbles of sulfuric & crystalline halite [by SEM],

7. 04-05 cm: Phytolite

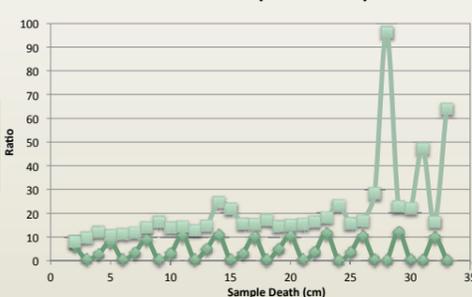


Results

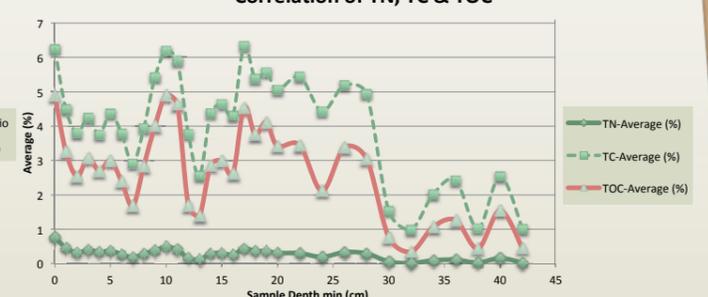
Water content compared to Grain Size



The TOC/TN and TC/TN ration



Correlation of TN, TC & TOC



References:

- Garcin, Y., Junginger, A., Melnick, D., Olago, D.O., Strecker, M.R., Trauth, M.H. (2009): Late Pleistocene-Holocene rise and collapse of Lake Suguta, northern Kenya Rift, *Quaternary Science Reviews*. 28(9-10), 911-925
- Dunkley, P.N., Smith, M., Allen, D.J., Darling W.G. (1993): The geothermal activity and geology of the northern sector of the Kenya Rift Valley, British Geological Survey, Research Report SC/93/1
- Castanier, S., Barnet-Rollande, M.C., Maurin, A., Perthuisot, J.P. (1993): Effects of microbial activity on the hydrochemistry and sedimentology of Lake Logipi, Kenya
- Barsch, H., Billwitz, K., Scholz, E. (1984): *Labormethoden in der physischen Geographie*, Haack Gotha
- Carter, M.R. (1993): *Soil Sampling and Methods of Analysis*, Lewis Publishers