Regional differences in faunal communities around Lake Lorenyang between ~2 and 1.4 Ma

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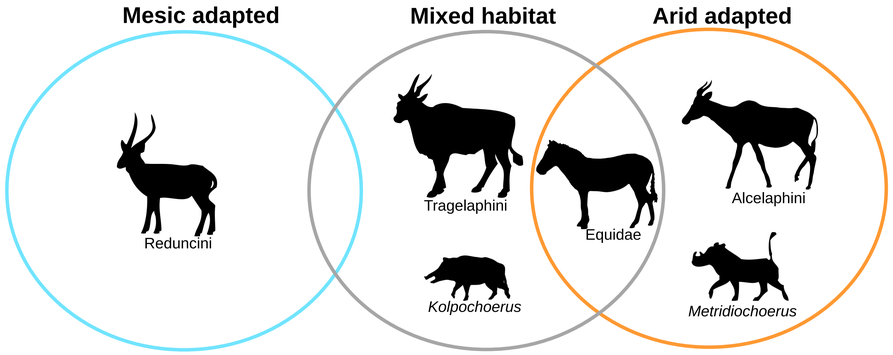
Introduction

- Significant behavioral and anatomical changes occurred within the hominin lineages between ~2-1.4 Ma[1]
- The regression of Lake Lorenyang approximately 1.8 Ma potentially caused a restructuring of the ecosystems and mammalian communities in the Turkana Basin[1]

Hypothesis:

- **The Shungura Fm. to the north provided a buffer to mesically-adapted taxa while the lake levels decreased and ecosystem restructuring occurred**
- Expectation: Observe an increase in mesically-adapted taxa in the Shungura Fm. and an increase in arid-adapted taxa in the Koobi Fora and Nachukui Fm. during ~1.87-1.56 Ma



Study Areas

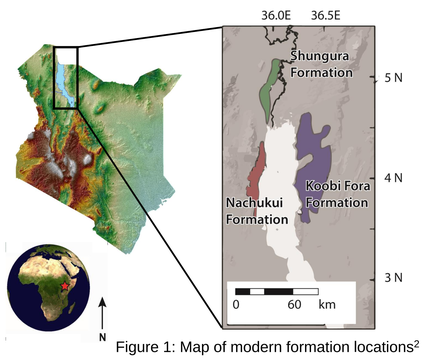


Figure 1: Map of modern formation locations[2]

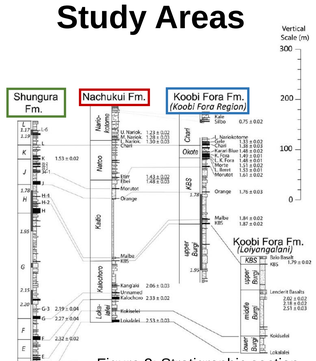


Figure 2: Stratigraphic section of formations[3]

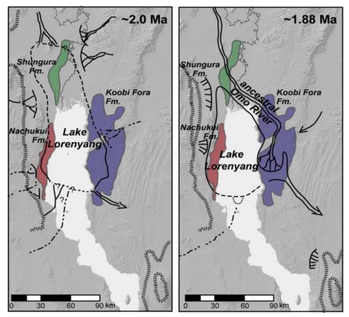


Figure 3: Map of past formation locations and reconstruction of Lake Lorenyang[2]

Materials & Methods

- NISP faunal abundance data (n= 6,117) of Bovidae (n = 3,977), Suidae (n = 1,628), and Equidae (n= 512) were compiled for the Koobi Fora[1], Nachukui[4], and Shungura[5] Fm. between ~2-1.4 Ma
- Faunal abundance numbers were converted to percentages to create graphs (i.e. percent of Alcelaphini based on total Bovidae)
- 3-way Chi-Square tests were used on raw counts to test the amount of significant difference between each Family level grouping at each region at each time period
- Post-hoc Chi-Square tests were used to determine which groupings were driving the significance

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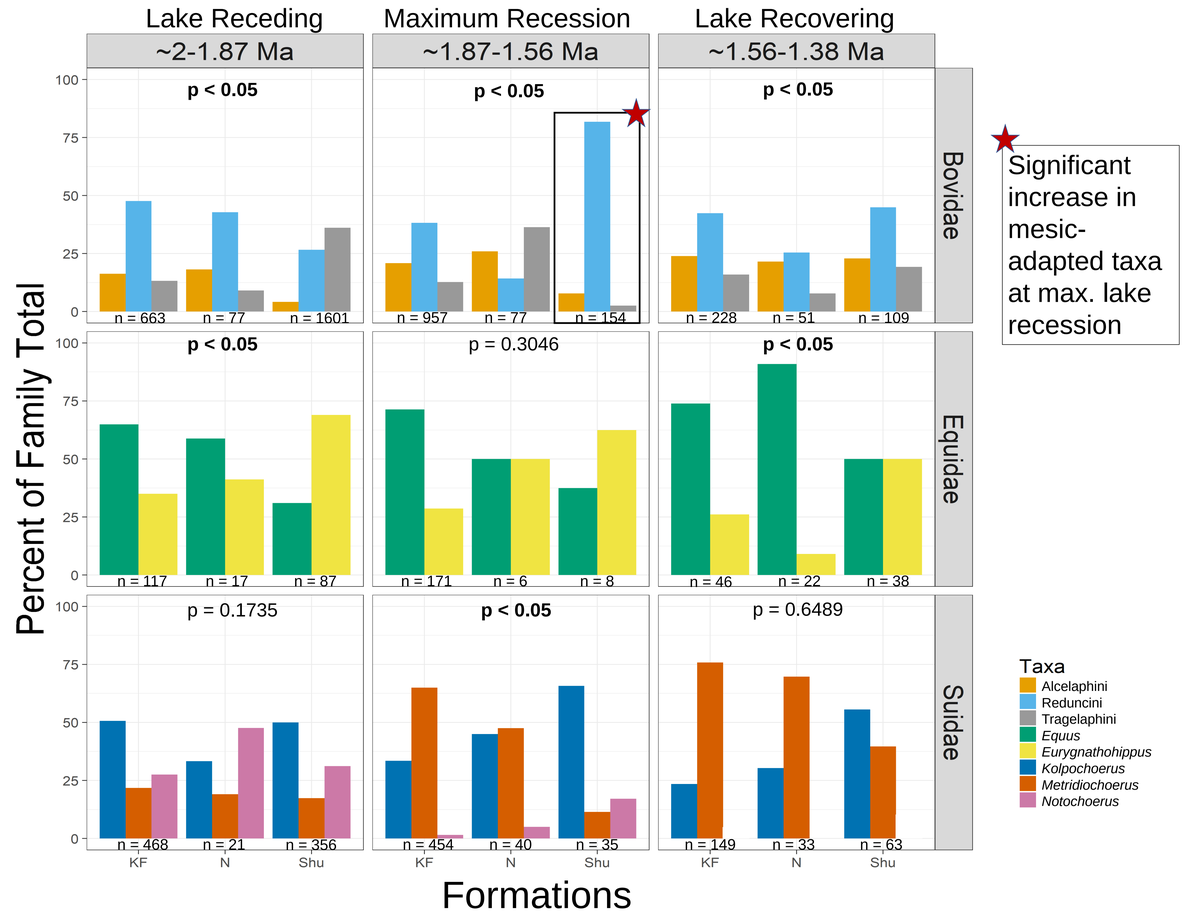
Results



Significant increase in mesic-adapted taxa at max. lake recession

Conclusion

- Our results indicate that the Shungura formation could have acted as a buffer zone for mesically-adapted taxa during periods of fluctuating lake size and aridity
  - We see a dramatic increase in mesic-adapted fauna (Reduncini) in the Shungura Fm. during maximum lake recession (~1.87-1.56 Ma) while the Koobi Fora and Nachukui Fm. display an increase of arid-adapted taxa (Alcelaphini)
- Mixed habitat *Kolpochoerus* and arid-adapted *Metridiochoerus* further support this conclusion
  - *Kolpochoerus* are most abundant in the Shungura Fm. starting at ~1.87 Ma onward while *Metridiochoerus* dominated the Koobi Fora and Nachukui Fm.

References
1. Patterson et al., 2017 Ecosystem evolution and hominin paleobiology at East Turkana, northern Kenya between 2.0 and 1.4 Ma. PPP
2. Adapted from Levin et al. 2011
3. Brown and McDougal 2011
4. Turkana Public Database https://naturalhistory.si.edu/ete/ETE_Datasets_Turkana.html
5. Shungura American Database

Alcelaphini http://phylopic.org/image/21020aad-069b-404e-a998-77460995320f/
Tragelaphini http://phylopic.org/image/7db171af-ac7a-4859-9c2b-66488a5a5c95/
Reduncini http://phylopic.org/image/f93103f1-e2a0-4c73-b274-c7b51afe4db0/
Equidae http://phylopic.org/image/a31e7527-3203-4233-b0da-c415cc7d1664/
Metridiochoerus http://phylopic.org/image/d594a0c4-2708-4cde-ba41-08fde8b1184f/
Kolpochoerus http://phylopic.org/image/98e22998-78de-4ba5-921d-de520e5f847b/