



# NEW INSIGHTS INTO THE PALEOENVIRONMENTS OF AUSTRALOPITHECUS ANAMENSIS

Laurence Dumouchel<sup>1</sup>

<sup>1</sup>Center for the Advanced Study of Human Paleobiology, George Washington University



## INTRODUCTION

*Australopithecus anamensis* was possibly the earliest obligate bipedal hominin (Wood and Leakey 2011). Most *Au. anamensis* fossils are from c.4 Ma sites in the Omo-Turkana Basin, such as Mursi (Ethiopia), Allia Bay (Kenya) and Kanapoi (Kenya). Although *Au. anamensis* probably occurred throughout the region, the majority of the fossils attributed to this species have been found at Kanapoi (c.70%), some have been discovered at Allia Bay (c.30%) (Ward et al. 2013) and none have been found so far at Mursi (Fig 1).

The research question addressed here hinges on the relationship between hominin abundance and ecology. **What were the paleoenvironments of *Australopithecus anamensis* in the Omo-Turkana Basin and how did they vary among sites?**

Kanapoi contains the highest abundance of *Au. anamensis* fossils and is thus expected to have been preferred by this hominin. Mursi has yielded no hominin remains and would thus be predicted as having environments unfavorable to *Au. anamensis*. According to the existing evidence, we expect the three sites to range from open environments at Kanapoi, to less open environments at Allia Bay, to more forested mosaic environments at Mursi (Wynn 2000, Levin et al. 2011).

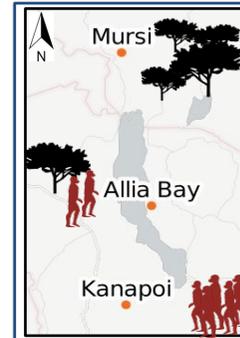


Fig 1: Omo-Turkana Basin fossil localities c.4 ma with hypothetical distribution of hominins and vegetation cover

## MATERIALS AND METHODS

### Methods

Taxonomic identification and abundance of the fossil remains

Carbon isotopic ratio

Mesowear: wear facets on teeth linked to diet

Ecomorphology: morphological differences between species due to habitat

### Materials

Bovid fossil remains from

Kanapoi (n= 213, published)

Allia Bay (n= 513, unpublished)

Mursi (n=15, published).



## RESULTS

### Taxonomy

Bovid tribe composition at Allia Bay is significantly different ( $p < 0.01$ ) from that of Kanapoi and Mursi. Browsers are most common at Mursi and grazers are most common at Kanapoi ( $p < 0.05$ , Fig 2)

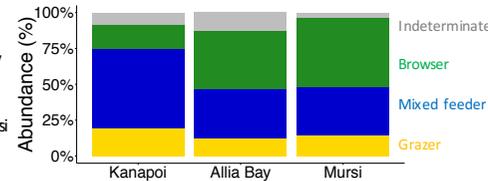


Fig 2: Bovid distribution (%) at Kanapoi, Allia Bay and Mursi, classified by diet category

### Mesowear

Allia Bay mesowear scores are indicative of a relatively open mosaic habitat: both an attrition dominated diet and a mixed diet are common in the assemblage (Fig 4)

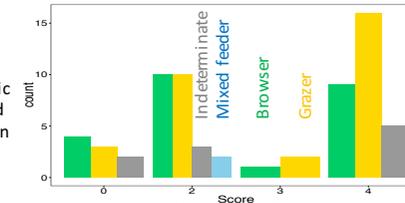


Fig 4: Distribution of Allia Bay bovids by mesowear scores (n= 67)

### Stable Isotopes

Carbon isotopic ratios are generally more depleted at Mursi, intermediate at Allia Bay and less depleted at Kanapoi ( $p < 0.001$ , Fig 3)

(data from Levin 2008 and Drapeau et al., 2014, Allia Bay: n=24, Kanapoi: n=15, Mursi: n=4)

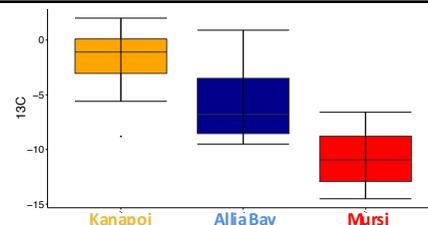


Fig 3: Distribution of carbon isotopic ratios from bovid teeth from Allia Bay, Kanapoi and Mursi

### Ecomorphology

Allia Bay bovid astragali suggest a forested habitat (Fig 5)

(Extant data from Scott and Barr 2014: n=187, Allia Bay: n=23)

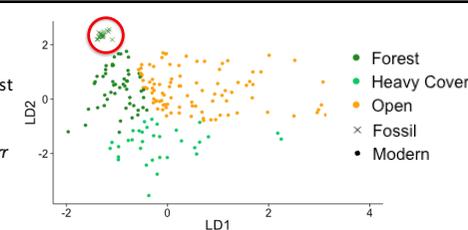


Fig 5: Distribution of Allia Bay bovid astragali according to predicted habitat categories

## CONCLUSIONS

Overall, as predicted, the analyses of the bovid remains of Allia Bay reveal a mosaic environment that is intermediate between the more open site of Kanapoi and the more forested site of Mursi. Although these results are promising, the analysis of the complete collections from each site using more variables is needed in order to confirm the patterns observed in this pilot study. This research project is key to understanding the environmental context within which humans developed one of our most important adaptations, bipedality.

## REFERENCES

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Email: [ldumouchel@gwu.edu](mailto:ldumouchel@gwu.edu)

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