

## ABSTRACTS

Investigation of multifaceted identities in frontier contexts advances our understanding of relationships between the Andean Tiwanaku state (C.E. 500-1100) and coeval populations. In the Middle Moquegua Valley of southern Peru, relations between Tiwanaku colonists, indigenous mid-valley Huaracane, and coastal peoples remains unclear. It has been argued that Tiwanaku settlement in the Middle Moquegua Valley was almost entirely isolationist. The present study hypothesizes that some individuals interred at the Middle Moquegua Valley Tiwanaku provincial center of Omo M10 engaged in non-Tiwanaku dietary practices during life. New stable isotope data for six individuals buried there is compared with published paleodiet data for Omo M10, a Huaracane site, and two coastal sites. Five Omo M10 individuals had a dietary profile typical of Tiwanaku colonists. Young adult female M10A-7 (buried in an isolated group of tombs) had stable isotope ratios outside the range of the other Tiwanaku individuals and within the ranges of the Huaracane and the two coastal sites, suggesting the need for further research to better understand this anomalous Omo M10 tomb and cemetery context. One hypothesis for M10A-7 is that she was a Huaracane individual who married into the Tiwanaku group. Perhaps she was not considered a full member of the Tiwanaku community who merited burial in a proper cemetery. In conclusion, this study contributes to a deeper anthropological understanding of peripheral contexts as dynamic sites of interaction and exchange rather than static cultural borders.

### Validation of the auricular surface method for sex estimation in non-adult human remains

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Sex of non-adult individuals is usually not estimated in bioarchaeological and forensic studies because it is argued that skeletal sexual dimorphism is minimal before puberty. However, several methods have been developed to address this issue. In 2017, a new approach based on the shape of the auricular surface of the ilium was proposed by Luna and co-authors after the analysis of the Coimbra skeletal Collection. The present study aims to test if the sexual dimorphic variables obtained in that research are equally accurate in another sample that includes younger ages. Sixty-one individuals (30 males, 31 females) from the Lisbon Collection, aged between 1 day and 18 years-old, were analyzed by two observers without previous knowledge of the sex of the individuals. Data shows a low interobserver error

(ICC>0.92; K>0.74). The discriminant function classified correctly 86.7% of the males and 71% of the females, and the logistic regression, 80.0% and 74.2%. The percentage of accuracy of both the overall and apex morphology was found to be 76.7% for males and 80.6% for females, and the morphometric ratios provide correct results in at least 76.7% of males. The method was equally reliable in younger (0-12y.o.) and older (13-18y.o.) individuals and slightly more accurate in males. The percentages of correct estimations are not influenced by the cause of death (e.g. infectious, heart problems) of the individuals. This study confirms the usefulness of auricular surface shape for sexual estimation of non-adult individuals. Additional validation tests in documented individuals from other geographic regions are suggested.

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### Detecting shifts in the trophic niches of sympatric Verreaux's sifaka (*Propithecus verreauxi*) and ring-tailed lemurs (*Lemur catta*) using stable isotope analyses

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Behavioral observations have revealed that primate dietary patterns are flexible and reflect phenological and seasonal changes. Throughout the year, primates readily consume their preferred plants species and organs when they become available. These food resources are partitioned differently among primates living in communities. We examined how sympatric Verreaux's sifaka (*Propithecus verreauxi*) and ring-tailed lemurs (*Lemur catta*) co-exist within a small forest by their differing reliance on the plants available to them. We collected fecal matter and behavioral observations from collared individuals during a nine-month period. To examine trophic niches, we analyzed the fecal stable carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) isotope values of lemurs and sifaka (n=224), and the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values of the plants they consumed (n=128). Fecal stable isotope values represent the undigested portions of diet and should agree with our feeding observations and plant isotope values. We then transformed the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values into two-dimensional space to represent each species'  $\delta$ -space as a proxy of their trophic niche. The  $\delta$ -space of the lemurs was large, encompassing the  $\delta$ -space of the sifaka. The  $\delta$ -space of each primate overlapped with the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values of the plants they consumed and agreed largely with our observations. The fecal  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values and  $\delta$ -space for each species revealed significant differences between groups, habitat,

and seasons (P <0.05). Our data also revealed intragroup differences demonstrating individual feeding decisions on a month-to-month basis. Overall, the use of isotopic analyses provides a powerful tool for assessing niche space in wild primates.

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### Sensory cues related to short distance foraging choices in a nocturnal, folivorous primate

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Primates have a keen spatial and temporal memory which helps them locate food. Upon detection of a potential food patch, other external senses are required to assess the edibility of potential feeding items. As small-bodied, nocturnal, folivores, *Avahi meridionalis* must be selective in the leaves they eat to avoid over-ingesting harmful plant secondary metabolites. Here we investigate the sensory foraging methods used to locate food and the differences in food sensory cues. We collected behavioral data on sensory foraging methods and used dynamic headspace sampling to collect the volatile organic compounds (VOCs) of feeding and non-feeding leaves of *A. meridionalis*. We analyzed leaf VOCs using thermal desorption and GC-MS. *Avahi meridionalis* used visual scanning in 55% of foraging attempts (FAs) and olfaction in 44% of FAs. We found a significant difference in the use of sensory foraging methods among the top three feeding species, *Harungana madagascariensis*, *Cynometra* sp. and *Canephora madagascariensis* ( $X^2=29.2$ , df=6,  $p < 0.0001$ ). The frequency of olfactory investigation was higher in tree species with fewer VOCs per sample, including *Cynometra* sp. (mean VOC=5.0) and *Canephora madagascariensis* (mean VOC=3.7), compared to *Harungana madagascariensis* (mean VOC=11.3), where visual scanning was used more frequently when foraging. *Avahi meridionalis* rely on both vision and olfaction when foraging for leaves. When foraging on tree species with visually conspicuous differences in leaf morphs (*H. madagascariensis*), *A. meridionalis* appear to rely on vision, whereas on species with less conspicuous leaf differences (*Cynometra* sp., *C. madagascariensis*), olfaction is more important in making foraging decisions.