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Guest Editorial

South American Zooarchaeology



Research in Zooarchaeology of South America has considerably increased in recent decades. Many South American archaeologists and biologists began to give greater attention to fauna remains recovered from archaeological sites. Initially, their researches focused on making a list of taxa based on the taxonomic identification of bones and teeth. Subsequently, the zooarchaeological record was studied from human paleoeconomic and paleoenvironmental perspectives. In the last decades, taphonomy took a lead role in zooarchaeological studies of South America, being directly applied to archaeofaunistic record or through actualistic works. With new techniques, this discipline was crucial to evaluate the origin of fossil assemblages. Recently, the inclusion of morphometric and isotopic analysis has taken great relevance in South American zooarchaeology.

This volume is the result of the session organized by Luis Manuel del Papa and Fernando Julian Fernández entitled “South American Zooarchaeology”, presented during the “12th International Conference of ICAZ (International Council for Archaeozoology)” in San Rafael, Mendoza Province, Argentina, 22–27 September, 2014. This conference was the first organized in South America and the second in Latin America, after the 10th International Conference of ICAZ developed in Mexico in 2006. Here, we present a series of papers focus on a variety of topics concerning the zooarchaeology of South America, including fishing strategies in central Argentina and north of Chile, fish bone diagenesis in south Brazil, paleoenvironmental reconstruction in west and south of Argentina using small mammal remains or pollen from coprolites of extinct megafauna, subsistence systems of hunter–gatherers of the north, central and south of Argentina, and the use of modern analogues through osteometric and taphonomic analysis in central and south Argentina.

For the first of these issues, Rebolledo et al. analyze maritime fishing during the Middle Holocene in the hyperarid coast of the Atacama Desert. This study contains ichthyoarchaeological information from the Zapatero site and contributes to understand the adaptation process of local communities to the driest coastal desert in the world. The evidence shows a specialized maritime economy based on the exploitation of different fish resources from the area during ca. 7500 and 5000 cal BP, but at the same time an important intensification in the harvesting of the jack mackerel *Trachurus murphyi*. The authors conclude that environmental changes, social interaction, demographic pressure, new technologies, and the accumulated knowledge of fishermen in their environment may have encouraged the maritime economic intensification, specialization and storage.

The article of Barboza offers a new zooarchaeological study at northeastern Argentina (Corrientes Province). She focuses on the Late Holocene ichthyoarchaeological record of Los Bananos archaeological site, placed in an alluvial plain of middle Paraná basin. She presents zooarchaeological and taphonomic evidence that supports a wide range of taxa exploited by prehistoric humans, including fish (mainly Siluriformes), some mammals and birds with a certain grade of dependence to aquatic environment. She also indicates the increasing importance in the role of fish in the prehistoric diet from the earliest to the latest human occupation.

Aguilera et al. analyze fish bones recovered from Tarioba shell mounds of prehistoric settlements in southeastern Brazil, dated between 5100 and 1300 cal BP. They emphasize upon that bones of the whitemouth croaker *Micropogonias furnieri* of Tarioba can be used as paleoclimatic proxy based on diagenetic changes and isotope paleo-thermometer. They present evidence of diagenetic changes on fish bone from ca. 4600 to 3200 cal BP, and they suggest humid burial conditions with the loss of hydroxyapatite and the enrichment of exogenous calcite. According to $\delta^{18}\text{O}$ -derived paleotemperature data, they also reveal that sea level oscillations and upwelling strength during the human occupation of the shell mounds may have resulted in anomalous temperature records.

In order to expand the paleoenvironmental knowledge of south Patagonia, the paper by Velázquez et al. constitutes an original pollen analysis of the extinct megaherbivore (*Mylodontidae*) coprolite recovered from the Cerro Casa de Piedra 7 archaeological site, dated at $10,530 \pm 620$ BP. Based on the dominance of Poaceae in the coprolite they indicate a grazing habit of the large extinct ground sloths during the Pleistocene–Holocene transition. However, the authors also note the contributions of shrubs or dicotyledonean herbaceous in the paleodiet of ground sloths. They conclude that the presence of taxa with zoophilous pollination in coprolites and their absence in sediments reinforces the relevance of the pollen analysis of coprolites to paleoenvironmental reconstructions.

The work by López et al. explores the taphonomic processes and paleoenvironmental issues based on small mammals recovered from two archaeological sites (Vaquería Gruta 1 and Rincón de los Helados) of central west Argentina. They present taphonomic evidence and conclude that small mammal remains were accumulated by diurnal and nocturnal raptor birds. Taking into account the comparison between the taxonomic structures of small mammals of both archaeological and current assemblages, they suggest the existence of a greater environmental heterogeneity during the Late Holocene. However, they point out that the anthropic activities

could have negatively affected the diversity, richness and abundance of small mammals since the XVI century.

Fernández et al. analyze the zooarchaeological record of the cave site Epullán Chica, located in the middle Limay River basin at Northwestern Patagonia, Argentina. The taphonomic analysis shows the natural death *in situ* of some fauna species, the action of humans and different kinds of predators. According to the recorded micromammals, paleoenvironments mostly consisted in open shrubby areas intermixed with large rocky outcrops, depicting a great stability during the last 2200 years BP, with minor changes in humidity and temperature. The authors point out a diversified economy of Late Holocene hunter–gatherers with great stability in the use of faunal resources through the last 2200 years BP.

Gómez et al. study the zooarchaeological, geological and phytoarchaeological material from Dupuy rockshelter archaeological site, central Argentina. The zooarchaeological evidence indicates that *Lama guanicoe* (guanaco) and *Ozotoceros bezoarticus* (Pampas deer) were the main exploited species by hunter–gatherers which inhabited Dupuy rockshelter ca. 350 B P, under more humid conditions than current times. Based on these lines of analyses, the authors observe a greater breadth of human diet towards the upper levels of the sequence, including rodents, armadillos, fish, reptiles and vegetables, which could have been used as alternative food resources due to the reduction of the population of *L. guanicoe* in central Argentina.

Scheifler and Messineo carry out a zooarchaeological and paleoenvironmental analysis of Laguna Cabeza de Buey 2 archaeological site, located on the margins of a small shallow lake in the west area of the Humid Pampas subregion, central Argentina. They point out a specialized hunter–gatherer subsistence strategy during the Middle and Late Holocene focused on *Lama guanicoe*, followed by *Ozotoceros bezoarticus*, while Dasypodidae were occasional in the human diet, strategy that contrasts with what is recorded in other areas of the Pampean region. In historical times, the exotic and domestic ungulates *Equus caballus* (horse) and *Bos taurus* (cow) were incorporated to human diet. The paleoenvironmental evidence displays that human occupations were developed under a relatively stable environment, with a more arid climate during the Middle Holocene, which decreased up to current humid temperate.

del Papa presents data of the use of tortoises (*Chelonoidis chilensis* [Chaco tortoise]) by prehistoric humans of the Chaco-Santiagueña archaeological region of Argentina, during the late agro-pottery stage (between 1200 and 1500 AD). Using zooarchaeological record from Beltrán Onofre Banegas-Lami Hernández site and ethnographic sources of the study region and surrounding areas, he suggests that *C. chilensis* was opportunistically exploited by ancient inhabitants mainly during spring–summer. According to the ethnographic sources, tortoises were not only for consuming nutrients, but also as containers, for medicinal or aesthetic purposes, and symbolic rituals.

Borella et al. investigate the use of modern analogues in the study of the pinnipeds *Arctocephalus australis* (South American fur seal) and *Otaria flavescens* (South American sea lion) recovered in archaeological sites from northern Patagonia, through osteometric analysis. Taking into account a previous work about shifts in

body size observed in modern populations of *O. flavescens* by the effects of the intensive exploitation of marine ecosystem, allowed them to raise that potential biases could affect the use of modern analogues in the study of archaeological samples of such otariids. Using traditional osteometric techniques on modern collections of skulls of adult males of *A. australis* from northern and central Patagonia, They show that there is no evidence of variations in the skull size during the last three decades. Therefore, they support the use of traditional osteometric techniques in modern populations of *A. australis* for evaluating the zooarchaeological remains of this otariid.

Finally, the paper by Montalvo et al. offers new data about the taphonomic processes suffered by bone accumulations produced by the Crowned Solitary Eagle *Buteogallus coronatus* in numerous nests located in the semi-arid and arid landscapes of central and central west Argentina. The authors note that *B. coronatus* yields great accumulations of osteoderms and endoskeletal elements of the armadillos *Zaedyus pichiy* (pichi) and *Chaetophractus villosus* (large hairy armadillo) in their nests, with distinctive taphonomic features that can be used as an actualistic model to be applied to such deposits in open-air archaeological or paleontological sites.

In conclusion, this volume provides different aspects of the zooarchaeology of South America, particularly southeastern Brazil, northern Chile and Argentina. Placing this volume in context, the fact that the International Conference of ICAZ has been developed for the first time in South America shows the growth of zooarchaeological research in this subcontinent. Indeed, approximately 28% of the participants of the 12th International Conference of ICAZ were from South America, mainly from Argentina (20%), followed from Chile (4%), and with ~1% from Brazil, Colombia, Peru, Bolivia and Uruguay (data taken from ICAZ Newsletter, 2014, Volume 15, No. 2). This scenery certainly affected the composition of this volume. However, in spite of the fact that the distribution of attendants by country was not balanced, the diversity of issues represented, most of them with multidisciplinary focuses, also reflects the good health of the “South American Zooarchaeology”.

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