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Pleistocene human dispersals: Climate, ecology and social behavior



The modern history of thinking about the origin of species has been dominated by the relationship between environments -and their changes- and the process of speciation. Darwin's original argument for evolution by means of natural selection (Darwin, 1859) is an ecological argument: species 'adapt' to their physical and biotic environments. Those best adapted to their environment survive and leave more descendants than those that are less adapted. This reasoning clearly works on biological, even paleontological terms. But, does it work on social and cultural ones? And, if it does, how? This volume discussed these questions in the context of human evolution, and covering both continental lands and islands.

The research on human dispersals out of Africa, into Eurasia, Australia and the Americas, has changed the ideas about chronologies and the ecological scenarios where humans were able to colonize new territories with new environments in different and, sometimes, inhospitable climates with marked seasonality.

The oldest human record in Eurasia is found in Dmanisi -Georgia, Caucasus-, dated 1.85 Ma, during the Olduvai normal chron. The fossil record of Eurasia reveals an important faunal turnover at this moment and also the arrival of several large mammals' species of African origin, chronologically coincidental with this human dispersal. Later, different speciation waves and other subsequent dispersals into Eurasia of fauna and hominins are coincidental during the Pleistocene. This geographic theatre increases when the megafaunal extinction around the planet -Eurasia, Australia and the Americas- can be related with the expansion of early modern humans, *Homo sapiens*, to these territories.

Climate changes, faunal turnovers, and human dispersals into new continents, seem to be coincidental. What is not so clear is how and to what degree social and cultural human evolution interacted with them. In this sense, an important question to be addressed is the effect of the increasing of sociality in early and more recent humans in order to be more successful during the global dispersal process, in competition with other faunal species and/or human populations.

Participants of this volume contributed ideas and engaged in discussions related to this general topic, from a wide diversity of perspectives and backgrounds: Prehistory, Paleontology, Paleoclimatic Sciences, Complex Systems' Analysis, and Cultural evolution and transmission. The volume is divided two parts. The first one is related to Old World, and the second one is dedicated to the Americas and the latest Pleistocene-Holocene megafaunal extinction.

The volume begins with a paper by Alicia M. DeLoize et al. dealing with the appearance of *Homo erectus* and the increase of meat on its diet and the effects provoked by the increase in

dopamine in the capabilities of the neuro-capabilities of this species. The second contribution, by Maria Rita Palombo, presents the large mammals faunal turnovers in southern Europe during the post-Olduvai period, relating them with human dispersals. The next paper, by Tsegai Medin and coauthors, describes the omnivorous diet of *Ursus etruscus* from Orce sites in Southern Spain, and its potential competition with humans. The contribution by Joan Madurell-Malapeira and coworkers is based on the extremely good record of the Vallparadis site -Terrassa, Catalonia, Spain. They discuss the potential influence of climate and competition with large carnivores over dispersal and survival of *Homo* during the Epivillafranchian.

Iza Romanowska et al. shift to a macroscopic approach in the next article. More concretely, they test the dispersal of the Movius Line based on the simulation of demography, suggesting that "dispersal is not a gradual attenuation of the population size away from the point of origin but a pattern of ecologically driven local variation in population density". The following contribution by Christina Papouliá is about the first human colonization of the Aegean Islands, and suggests that most of the earliest record is documented by Musterian stone tools, although it is necessary to check the potential finding of Acheulian artifacts. The paper by Trine Kellberg Nielsen and coworkers deals with Neanderthal dispersal into the north of Europe during the last interglacial. This first part of the special issue devoted to dispersals in the Old World is completed with a work by Manuel Alcaraz-Castaño and others, whom address Upper Paleolithic -Solutrean- in central Spain, at the site of Las Delicias.

The second part of the volume begins with the contribution of Daniel S. Amick, which discusses the first human colonization of North America regarding the relevance of the critical role of different social factors such as prestige-seeking and symbolic representation of inter-group relationships. After this discussion, Soledad de Azevedo and coworkers discussed the fossil human record of the Americas and its connection with the Asian populations. They analyzed a large sample of human skulls from Asia and America and show how neutral versus non-neutral evolutionary forces are relevant to understand global patterns of craniofacial diversity among human populations.

The Ramón Viñas-Vallverdú et al. paper presents the new archaeo-paleontological findings from Barranca del Muerto in Mexico. Their main conclusion is that the fauna recovered represents a warm and humid climate which favored the development of a tropical deciduous forest follow by grasslands and savannas. Rafael Suárez, discuss the human colonization of the Uruguayan lowlands of the South American Southern Cone. The author

suggests that chronological and cultural variability respond to an internal hunter-gatherers social reorganization dealing with climate change, faunal, ecologic shifts associated with the expansion of the subtropical forest during the Pleistocene Holocene transition.

Finally, the special volume is closed by three papers by Adrian Monjeau et al., Guillermo Abramson et al. and Bernardo Araujo et al., which critically review different hypotheses of the latest Quaternary megafaunal extinction in the Americas. Monjeau et al. studied the historical Quaternary megafaunal extinctions debate since the XVIII Century applying the Model of Controversial Spaces. They postulate that nowadays this debate is in a period of conceptual blockage due that the academy is assembled around two major paradigms: environmental versus anthropic causes. Abramson et al. propose a mechanistic mathematical model of extinction and coexistence in a generic predator-two prey ecosystem; a typical scenario of human invasion and environmental change, concomitant with the megafaunal extinction. They reveal that the presence of humans pushes the superior herbivore to extinction even when the pressure of hunting is lower than on the inferior one. Araujo and colleagues using new fossil dating and past climatic models in a high-resolution quantitative analysis analyzed the roll of human dispersal in the Late Quaternary Extinction around the world. They concluded that the timing of human invasion a particular region is determinant to the faunal extinction; more than climate and environmental changes.

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José Luis Lanata
IIDyPCa, CONICET, UNRN, Mitre 630, San Carlos de Bariloche, 8400,
Argentina

Sergi Lozano*
IPHES, Institut Català de Paleoecologia Humana i Evolució Social,
Zona Educativa 4, Campus Selscelades URV (Edifici W 3), 43007,
Tarragona, Spain

Àrea de Prehistoria, Universitat Rovira i Virgili (URV), Tarragona,
Spain

Bienvenido Martínez-Navarro
IPHES, Institut Català de Paleoecologia Humana i Evolució Social,
Zona Educativa 4, Campus Selscelades URV (Edifici W 3), 43007,
Tarragona, Spain

Àrea de Prehistoria, Universitat Rovira i Virgili (URV), Tarragona,
Spain

ICREA, Pg. Lluís Companys 23, 08010, Barcelona, Spain

* Corresponding author. IPHES, Institut Català de Paleoecologia
Humana i Evolució Social, Zona Educativa 4, Campus Selscelades
URV (Edifici W 3), 43007, Tarragona, Spain.
E-mail address: slozano@iphes.cat (S. Lozano).