

The Gibraltar National Museum



Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

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Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Conference Programme

Thursday 4th July, 2024

0900	Prof Catherine Bachleda, Vice Chancellor, University of Gibraltar
	Welcome to the University of Gibraltar
0910	The Hon Prof John E. Cortes, Minister for Education, the Environment, Sustainability, Climate Change, Heritage, Technical Services and Transport, HM Government of Gibraltar
	Official Opening of the Calpe 24 Conference
OPENING KEYNOTE LE	CTURE
0930	Robert J. Whittaker ⁽¹⁾ and José-María Fernández-Palacios ⁽²⁾ ,
	$^{\rm 1}$ University of Oxford, Oxford UK & $^{\rm 2}$ University of La Laguna, Tenerife, Spain
	Macaronesia: an introduction to the biogeography and conservation of an island region, with particular attention to the Canary Islands
1030	Coffee break
1100	Carl Beierkuhnlein, Bayreuth University, Germany
	Diversity in volcanic impacts and related generality in selection mechanism on Atlantic Islands
1200	Julio Peñas de Giles and Carlos Garcia-Verdugo, University of Granada, Spain
	Lucky castaways: why don't Macaronesian plant lineages follow common island biology predictions?
1300 – 1530	Lunch break
1530	Rui Freitas , Instituto de Engenharias e Ciências do Mar da Universidade Técnica do Atlântico, Cabo Verde
	Singularities of the marine biodiversity of Cabo Verde archipelago
1630	Tea break
17:00	Peter G. H. Evans, Sea Watch Foundation and University of Bangor, UK
	Marine mammals of the North Atlantic: past, present and future
18:00	José María Fernández-Palacios and Enrique Fernández-Palacios, University of La Laguna, Tenerife, Spain
	Anthropogenic driven extinctions in Macaronesia: How humans transformed a natural paradise

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Friday 5 th July, 2	.024
0930	Jaime Ramos, University of Coimbra, Portugal
	Terrestrial and marine avifauna of the Azores Islands: from speciation to historical declines and present conservation challenges
1030	Coffee break
1100	Juan Carlos Illera, Oviedo University, Spain
	What are we learning on speciation and extinction from the Macaronesian birds?
1200	Clive Finlayson and Stewart Finlayson , The Gibraltar National Museum, Gibraltar
	Birds on the Atlantic Islands: it's not about getting there, it's about what you do when you get there
1300 – 1430	Lunch break
1430	Nuno Ferrand, University of Oporto, Portugal
	The evolutionary history of the European rabbit (Oryctolagus cuniculus) and its human-mediated expansion in the Atlantic islands
1530	Africa Gomez, Hull University, UK
	Perspectives on Iberian Phylogeography: refugia within refugia coming of age
1630	Tea break
1700	Stewart Finlayson and Clive Finlayson, The Gibraltar National Museum, Gibraltar
	The magpie's tale: the story of a resilient avifauna squeezed between ice, sand and the ocean

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Saturday 6 th July, 2024		
0930	Juan Manuel Jiménez-Arenas, University of Granada, Spain	
	Another kind of island under the sun. Reflections from the Orce Archaeological Zone (Guadix-Baza Basin, Granada)	
1030	Coffee break	
1100	Juan Arroyo, Seville University, Spain	
	Islands on continents. The biogeographical significance of the bipartite Strait of Gibraltar region for plant ecology and evolution	
1200	Geraldine Finlayson, Stewart Finlayson, Alex Menez, Clive Finlayson, The Gibraltar National Museum, Gibraltar	
	What if Neanderthals had reached the Atlantic Islands?	
1300 – 1430	Lunch break	
1430	Geoff Bailey, University of York, UK	
	Drowned landscapes, climate change and human dispersals: perspectives in deep time	
1530	Christoph Zollikofer and Marcia Ponce de León, University of Zurich, Switzerland	
	Did Neanderthals die out because of global warming or cooling, or both, or neither?	
1630	Tea break	
CLOSING KEY NOTE I	ECTURE	

Islands in the Sun: Climate change, ecology and evolution on the

28th Calpe Conference

1700 **Carlos M Herrera**, Estación Biológica de Doñana, Spain Wild bees from a Mediterranean mountain: diversity, trends and thermal biology

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Abstracts

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Robert J. Whittaker and José-María Fernández-Palacios

Macaronesia: an introduction to the biogeography and conservation of an island region, with particular attention to the Canary Islands

Robert J. Whittaker - University of Oxford, United Kingdom, and José-María Fernández-Palacios - University of La Laguna, Tenerife, Spain,

Abstract

We will provide an overview of the Macaronesian biogeographical region and the sequence of development of the islands and archipelagos over geological time. With more particular reference to the Canaries, we will also review: the application of biogeographical and evolutionary models of palaeo- and neo-endemism (from relictualism to the development of rapid radiations of species); the general dynamic model of oceanic island biogeography and the impact of Pleistocene environmental change; and evidence of how human colonization has transformed the vegetation of the archipelago. We will also provide an overview of the Protected Area system of the archipelago and some of the challenges faced by it in the light of anthropogenic pressures and global climate change.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Carl Beierkuhnlein

Diversity in volcanic impacts and related generality in selection mechanism on Atlantic Islands

Bayreuth University, Germany

Abstract

Oceanic islands are defined by being located on the oceanic crust. They emerge above sea level through volcanic activity. In consequence, their parent material is dominated by magmatic rocks such as basalt or phonolite. In view of the volcanic bedrock that has been produced by lava flows during the active phase of the volcanos.

In fact, lava flows are the major contribution to the development of oceanic islands. Layer by layer they build up the volcano, in many cases over millions of years until the magma chamber in the Earth crust is exploited or cracks to the surface are closed. The archipelago of Hawaii illustrates the power of these processes with the highest mountain peak above the solid earth crust. However, there are additional processes taking place, which are of ecological relevance.

First, the so-called strombolian type of eruptions are regularly producing large amounts of pyroclastic ashes, which are deposited as tephra. These deposits are selecting previously established plants towards woodiness because only plants with stable structure that are not completely covered by the volcanic sediments, can reproduce. We show that the seed bank below the ash cannot be activated after a few centimetres of sediment cover.

Second, and very transient, toxic gases are emitted. During the three months of eruption of Tajogaite on the island of La Palma in the year 2021, huge amounts of sulfuric gases caused chlorotic damage and even total defoliation in a radius of 7 km from the volcano. Some months later, damaged trees were resprouting, showing very comparable behaviour to recovery after forest fires. However, not a single tree caught fire during the active phase of the volcano, even when being in direct contact with 1200 °C heat of the lava. With the lava flow, also carbon monoxide went downhill. No oxygen was available close to the ground and thus no fire was ignited.

The diversity of volcanic processes, which could be observed directly during the most recent eruption on the Canary Islands, helps to understand island syndromes, endemism, and adaptive radiation on volcanic islands. Even if we think that these events are rare in human time scales, we should not forget how frequent these events are during the millions of years of island history.

Gibraltar 2024

Julio Peñas de Giles and Carlos Garcia-Verdugo

Lucky castaways: why don't Macaronesian plant lineages follow common island biology predictions?

University of Granada, Spain

Abstract

Oceanic islands across the globe portray fascinating examples of repeated patterns of plant evolution, including low levels of genetic diversity, insular plant woodiness, limitations in propagule dispersal or loss of defensive traits, among others. In recent years, however, studies on Macaronesian plant lineages have reported some results that do not appear to support some of the general hypotheses typically accepted in mainstream island literature. In this presentation, we will focus on two particular facets of island plant biology: levels of neutral genetic diversity and dispersal ability. We will use the biogeographical framework provided by plant lineages with Mediterranean-Macaronesian distributions to analyse recent results on these two key aspects of island taxa. We will discuss if the apparently deviating behaviour of Macaronesian lineages may be the result of particular biases (i.e. our focus on specific plant lineages or the idiosyncratic nature of Macaronesia) or, on the contrary, whether the time may have come to revise some commonly accepted ideas on island plant biology.

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Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Rui Freitas

Singularities of the marine biodiversity of Cabo Verde archipelago Instituto de Engenharias e Ciências do Mar da Universidade Técnica do Atlântico, Cabo Verde

Abstract

The marine environment of the Cabo Verde archipelago has a unique marine fauna, characterized by a rich diversity. Its marine environment is considered one of the 10 hotspots of marine biodiversity worldwide, which are characterised by the occurrence of various endemisms, but they are subject to strong threats. Cabo Verde is situated at the eastern limit of the subtropical gyre of the North Atlantic and in the southern quadrant of the Canary Current and is also affected by the North Equatorial counter-current. The limited extension of the insular platform and reduced intertidal zones, the seasonality of oceanographic productivity and rainfall regimes are factors that result in low population density of marine organisms in the archipelago and contribute to a diverse but fragile ecosystem. The community structure and biogeography of the Cabo Verdean marine biota differs greatly from other nearby archipelagos as well as from the benthic coastal system of the Caribbean and Indo-Pacific region. In general, the archipelago hosts coastal species typical of tropical and subtropical seas, mostly associated with the Gulf of Guinea and Canary Islands and less with the Northwest African coast. Underlying factors for Cabo Verde's unique marine fauna are believed to include mainland and interisland distances, topographic and depth heterogeneity between island groups, and it is suspected that Cabo Verde may have been, during the last glacial maximum, an important "marine refuge zone" in the Atlantic.

Keywords: Cabo Verde, Marine Biodiversity, Biogeography + Corresponding author: rfreitas@uta.cv

Singularidade da biodiversidade marinha do arquipélago de Cabo Verde

O ambiente marinho do arquipélago de Cabo Verde possui uma fauna marinha única, caracterizada por uma rica diversidade. O seu entorno marinho é considerado um dos 10 pontos quentes da biodiversidade marinha mundial, que se caracterizam pela ocorrência de vários endemismos sujeitos a fortes ameaças. Cabo Verde está situado no limite oriental do giro subtropical do Atlântico Norte e no quadrante sul da Corrente das Canárias, estando ainda afectado pela contra-corrente Norte Equatorial. A limitada extensão da plataforma insular e zonas do intertidal reduzidas, a sazonalidade da produtividade oceanográfica e dos regimes de chuvas, são factores que resultam em baixa densidade populacional de organismos marinhos no arquipélago, e contribuem para um ecossistema diversificado, porém, frágil. A estrutura das comunidades e a biogeografia do biota marinho caboverdiano difere muito dos outros arquipélagos próximos, bem como também do sistema costeiro bentónico da região do Caribe e do Indo-Pacífico. Em geral, o arquipélago alberga espécies costeiras típicas de mares tropicais e subtropicais, associadas maioritariamente ao golfo da Guiné e das ilhas Canárias e menos com a costa Noroeste Africana. Acredita-se que factores subjacentes para a fauna marinha única de Cabo Verde incluam as distâncias do continente e entre-ilhas, hetero geneidade topográfica e de profundidades entre grupos de ilhas, e suspeita-se que Cabo Verde possa ter sido, durante o último máximo glacial, uma importante "zona de refúgio marinho" no Atlântico.

Palavras-chave: Cabo Verde, Biodiversidade Marinha, Biogeografia

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Peter G. H. Evans

Marine mammals of the North Atlantic: past, present and future

Sea Watch Foundation and University of Bangor, UK

Abstract

More than one-third of the world's marine mammals inhabit the North Atlantic Ocean. Over the last ten thousand years, they have withstood many changes to their environment. Although it is challenging piecing together the distribution and status of species until the last half century, it is clear that their fortunes have been intertwined with the history of humans in the region both over the continental shelf and in deeper waters around the Atlantic Islands. The relationship between the two started from a mixture of reverence and exploitation, but as humans increased their dominance upon the natural environment both on land and at sea, their impact steadily increased. First it was direct hunting, then the impacts of other human activities such as fishing, industrial development, and pollution. Now that humans are affecting the global climate, those are driving change for marine mammals in many different ways as seas warm, become more acidic, and experience greater storm frequencies.

The fate of the marine environment is bound up with the fortunes of marine mammals – those species that are at the top of the food chain of the oceans and contributing in important ways to the carbon cycle. Despite their iconic status as sentient beings with evidence of culture beyond what was apparent to us even just a decade ago, their future now lies firmly in the hands of humans.

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Gibraltar 2024

José María Fernández-Palacios and Enrique Fernández-Palacios

Anthropogenic driven extinctions in Macaronesia: How humans transformed a natural paradise

University of La Laguna, Tenerife, Spain

Abstract

Macaronesia is a biogeographical region composed by five volcanic archipelagos (Azores, Madeira, Selvagens, the Canaries and Cabo Verde) located in the NE Atlantic Ocean. They count with an incredible biodiversity, result of their persistent isolation and important elevation, such as Pico del Teide (Canaries) 3718 m, Fogo (Cabo Verde), 2829 m or Pico (Azores), 2351 m), which has given rise to unique ecosystems, among them relicts of former much wider distributed vegetation formations, such as the Tethyan-Tertiary laurel forest or the thermophilous woodlands, remnants of the African Rand Flora, and as many as 7 000 endemic species, including both neo and palaeoendemisms.

Humans only colonized Macaronesia ca. 2 Ka BP with the arrival of Berber tribes to the Canaries and their later conquest by Castilians at the beginning of the XV century. This same century Portuguese have colonized Madeira, Azores and Cabo Verde, in this order, archipelagos that were non-inhabited. Nevertheless, the human impact, first of Guanche people on the Canaries and later of Europeans on all the archipelagos, has profoundly transformed the Macaronesian nature with the collapse of several ecosystems, especially in Azores and Cabo Verde, and the extinction of many endemic species, among them ca. 40 vertebrates.

Gibraltar 2024

Jaime Ramos

Terrestrial and marine avifauna of the Azores Islands: from speciation to historical declines and present conservation challenges

University of Coimbra, Portugal

Abstract

In this talk I use historical chronicles to present an overview of pristine forest habitat conditions and seabird populations at the time of the colonization of the Azores. Then, I address the dramatic changes that occurred after the colonization of the archipelago by humans and the spread of exotic invasive species. I briefly review genetic studies that show: (1) a relatively recent colonization and poor speciation for most passerine species, and (2) possible role of nest-site competition for the speciation of the Monteiro's storm-petrel. I address the foraging ecology of the rare and endemic Azores bullfinch, particularly its fern feeding ecology and strong reliance on exotic invasive plant species. I take this last aspect further to present ecological networks for the Azores and show that birds are important in spreading invasive species. The strong biological invasion of forest habitats is the strongest conservation challenge in the archipelago but experiments show that correct habitat restoration is possible with strong and persistent efforts. Restoration of seabird colonies should take into account the strong intra- and inter- specific competition for nest sites and invasive mammal predators.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Juan Carlos Illera

What are we learning on speciation and extinction from the Macaronesian birds?

Oviedo University, Spain

Abstract

Oceanic islands are excellent systems to test ecological and evolutionary hypotheses due to their relative simplicity of habitats, naturally replicated study design and high levels of endemic taxa with conspicuous variation in form, colour and behaviour. Over the last three decades the volcanic archipelagos of Azores, Madeira, Selvagens, Canary Islands and Cape Verde (all five known as Macaronesia) have proved an ideal system for evolutionary biologists who seek to unravel how biodiversity arises and disappears. With the present talk I will evaluate the contribution of the study of Macaronesian birds to our understanding of how and why species occur and change over time. I will review some ideas related to biogeography, time of colonisation and diversification, and extinction. I will show that most of the extant species have colonised the region during the last three millions of years, and there is evidence that no species predates the age of the oldest emerged land. In addition, radiocarbon dates obtained of bone collagen on a selection of these species suggest extinction chronologies related with human colonisation events to Macaronesian islands. I will introduce some interesting results about ancient ecological relationships inferred from sympatric extant chaffinches and extinct greenfinches in Macaronesian forests. These results highlight the importance of performing compared studies between extinct and extant species to understand phenotypic evolution processes. Finally, I will provide future avenues of research that I feel will yield the most exciting and promising findings on island evolution in the coming years.

Gibraltar 2024

Clive Finlayson and Stewart Finlayson

Birds on the Atlantic Islands: it's not about getting there, it's about what you do when you get there

The Gibraltar National Museum; University of Gibraltar; Liverpool John Moores University, *Professor Clive Finlayson* and The Gibraltar National Museum; University of Gibraltar; Liverpool John Moores University, *Stewart Finlayson*

Abstract

Many bird species arrive on the Atlantic islands each year. Many arrive as vagrants. On the Azores, for example, almost half are Nearctic birds, yet none breed on these islands. It is popularly thought that the colonisers opf these islands are highly migratory trans-Saharan birds blown offshore during the course of their migration.

Here we will show that this is not the case, and that the majority of breeding species on the Atlantic Islands are of Palaearctic Origin, and are birds that do not typically cross the Sahara.

It is suggested that colonising success on these islands has had more to do with staying power once the islands have been reached.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Nuno Ferrand

The evolutionary history of the European rabbit (Oryctolagus cuniculus) and its human-mediated expansion in the Atlantic islands

University of Oporto, Portugal

Abstract

The European rabbit (*Oryctolagus cuniculus*) originated in the Iberian Peninsula a few million years before present. During the Pleistocene, climatic oscillations were responsible for the isolation and genetic differentiation of European rabbits in two refugia, one in the Southwest, leading to the emergence of the *O.c. algirus* subspecies, and the other in the Northeast, leading to the emergence of the *O.c. cuniculus* subspecies. While rabbit domestication likely happened in France and involved only the *cuniculus* subspecies, the later human-mediated expansion to the Atlantic islands (the archipelagos of Madeira, the Azores and the Canaries) resulted from the single contribution of a wild stock belonging to the *algirus* subspecies. In this presentation I will use both genetic and genomic data and will describe the on-going speciation process in Iberia, the origins of the single animal domestication in Europe and, most importantly, the remarkable process of colonization of the Atlantic islands.

Gibraltar 2024

Africa Gomez

Perspectives on Iberian Phylogeography: refugia within refugia coming of age

Hull University, UK

Abstract

The diverse eco-geographic setting of the Iberian Peninsula created a variable mosaic of refugia for temperate fauna and flora during the climatic oscillations of the Pleistocene Ice ages. This 'refugia within refugia' scenario had consequences for the phylogeographic patterns of species in the Iberian Peninsula and more widely. Since the refugia within refugia concept was proposed two decades ago, there have been dramatic advances in a range of scientific fields feeding onto our knowledge of phylogeography. On one hand, genomic sequencing and analysis has become mainstream and applied to the phylogeographic study of non-model organisms. Second, ancient DNA and paleogenetics has allowed us to sample the genomes of ancient organisms, including those of extinct species. Combined, these two advances have demonstrated that historical and ghost introgression between species is much more widespread than previously thought. Finally, remote sensing, GIS and climate science and big data analysis have helped simulate and understand the impact of glaciations on the available habitat and distribution of organisms. In this talk, I will present selected examples illustrating these advances and discuss their impact on the refugia within refugia concept.

Gibraltar 2024

Stewart Finlayson and Clive Finlayson

The magpie's tale: the story of a resilient avifauna squeezed between ice, sand and the ocean

The Gibraltar National Museum; University of Gibraltar; Liverpool John Moores University, *Professor Clive Finlayson* and The Gibraltar National Museum; University of Gibraltar; Liverpool John Moores University, *Stewart Finlayson*

Abstract

Until recently, it was thought that the azure-winged magpies that breed in the Iberian Peninsula were escapes of pet birds brought back from the far east by Portuguese mariners in the late Middle Ages. When the subfossil remains of this species were found in Pleistocene levels at Gorham's and Vanguard Caves, Gibraltar, the entire picture changed. These finds showed that these magpies had once a much wider distributions across the southern Palaearctic and provided an extreme example of a disjunct distribution. The Iberian magpies are now given specific status. The Pleistocene avifauna of Gibraltar, based on remains found in late Pleistocene contexts dating to 125 to 10 thousand years ago is the richest in species anywhere. The magpie story is one of many which will be summarised. An analysis of the geographical components of this avifauna will reveal components that have changed very little in distribution, others that have changed dramatically, the presence of non-analogue communities, and, rarely, the presence of species now extinct.

Gibraltar 2024

Juan Manuel Jiménez-Arenas

Another kind of island under the sun. Reflections from the Orce Archaeological Zone (Guadix-Baza Basin, Granada)

University of Granada, Spain

Abstract

Orce Research Project – University of Granada (Spain)

The Guadix-Baza Basin (GBB), located in Granada, Spain, at the southeast of the Iberian Peninsula, constitutes one of the richest Pleistocene vertebrate fossil records in Western Eurasia. It is an intramountainous basin surrounded by some of the highest mountain ranges of the Iberian Peninsula, giving it a certain degree of isolation. Connectivity with the exterior mainly occurs through natural corridors characterized by moderate or low slopes and altitudes.

During the Early Pleistocene, the southwestern part of the GBB, known as the Axial System, was dominated by a large river (the paleo-Fardes) that flowed into a saline lake (paleo-Baza). The Orce Basin Archaeological Zone (OBAZ), situated at the northeasternmost boundary of the GBB, provides evidence of two of the earliest sites with *Homo* presence in western Eurasia, Barranco León (BL, 1.4 Ma) and Fuente Nueva 3 (FN3, 1.2 Ma). Additionally, BL has yielded a *Homo* sp. deciduous lower molar.

The OBAZ is positioned near one of the main connecting corridors of the basin, the Los Vélez Corridor, and benefits from an abundance of fresh groundwater which, during the maximum transgression of the paleo-Baza lake, fed it. However, as the saline lake diminished in size due to the collapse of the Axial System from sediment transport and accumulation from the Transverse System, these fresh waters formed what is known as the Orce Wetlands.

In this talk we present a multi-proxy approach to evaluate the paleoecological context of these early hominin settlements in western Eurasia. Our results indicate that during the Early Pleistocene, the climate and habitat of Orce were Mediterranean, structurally similar to today although more humid. Despite recurrent summer droughts, some Tertiary relicts are recorded, such as Ophisaurus, Carya, Eucommia, and Zelkova. This prompts us to consider whether Orce acted as an "interior island", serving as an ecological refugium where numerous taxa, including Homo, found suitable conditions to develop their lives under the sun of the southern Iberian Peninsula.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Juan Arroyo

Islands on continents. The biogeographical significance of the bipartite Strait of Gibraltar region for plant ecology and evolution

Seville University, Spain

Abstract

Biodiversity, the diversity of life across all levels from genes to ecosystems, is unevenly distributed on Earth, mostly due to its geomorphological and historical dynamics and their interplay with organisms and among themselves. This is formalized in the widely recognized biodiversity hotspots, that is, regions and sites of high biological diversity, in contrast with coldspots. The fragmentary nature of current and past biological record across the world makes that biodiversity knowledge be mapped only for those relatively well-known taxonomic groups, such as vascular plants. Thus, plant biodiversity hotspots are reported due to their high floristic and endemic diversity. One of them is located in the Mediterranean Basin, which is subdivided in sub-hotspots coinciding mostly with mountains, islands, and refuges. One of such Mediterranean Basin 10 subhotspots is the Baetic-Rifan complex, which is divided by the Strait of Gibraltar. This small two-side region is characterized by particular ecological conditions at local scale (mild Mediterranean climate, historically buffered climatic variations, acidic soils) quite different from surrounding areas, which make it a spatiotemporal floristic island where, in some respects, time is frozen and pre-Mediterranean relicts are frequent, in comparison with abundant recent Mediterranean lineages in harsher conditions. These relicts are relevant at the levels of phylogenetic, phylogeographic and population ecology. At wider scale, this two-side island might be considered as a continental part of the "evolutionary" archipelago of Macaronesia.

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Geraldine Finlayson, Stewart Finlayson, Alex Menez and Clive Finlayson

What if Neanderthals had reached the Atlantic Islands? The Gibraltar National Museum University of Gibraltar

Liverpool John Moores University

Abstract

Research in Gorham's and Vanguard Caves, Gibraltar over the last 33 years, have given us a very clear picture of Neanderthal ecology. At Gibraltar, Neanderthals lived in a climatic refugium where they exploited a diversity of resources. It is now clear that maritime resources, such as cetaceans, fish and molluscs, were not beyond the reach of the Neanderthals.

Given our knowledge of Neanderthal ecology, we present a thought experiment to consider whether the characeteristics of the Altlantic islands, climatically not dissimilar to those at the Gibraltar refugium, would have been such as to permit the survival of Neanderthals had they ever reached these islands.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Geoff Bailey

Drowned landscapes, climate change and human dispersals: perspectives in deep time University of York, United Kingdom

Abstract

The primary context for this presentation is the increasingly well documented and well resolved pattern of sea-level change during human history – 'human history' to be taken here to refer to the world-wide evolutionary, cultural, intellectual and emotional history of the genus *Homo* over the past 2 million years.

Today, when we are increasingly concerned about the humanly induced causes and social impact of global warming and the prospect of a sea-level rise of 1 metre or more in the coming 100 years, it is a sobering commentary on present fears for the future that past human populations have repeatedly faced similar changes – similar in terms of their pace of change, but vastly different in their magnitude. During the most recent glacial-interglacial climate cycle, of greatest relevance to this meeting – 100,000 years or so – sea-level dropped to 130 metres below the present and stayed at about that level for more than 10,000 years, exposing new habitable territory, before rising to the present level and progressively drowning some 20 million square kilometres of previously exposed land.

The consequences are profound: for recognising the differential visibility or destruction of archaeological evidence in coastal regions; for reconstructing the changing palaeogeography of coastlines, archipelagos and offshore islands; and above all for investigating the ecological and social impact of sea-level fall and sea-level rise on past patterns of human settlement and dispersal. Yet these consequences have been repeatedly discounted in archaeological and anthropological discourse.

In this presentation, I will examine these patterns of sea-level change and their archaeological consequences, consider the challenges to their investigation, and provide examples of the ways in which those challenges are now being met by an ever-widening array of offshore and underwater projects in various parts of the world, with particular emphasis on the Mediterranean and Northwest Europe.

Gibraltar 2024

Christoph Zollikofer and Marcia Ponce de Leon

Did Neanderthals die out because of global warming or cooling, or both, or neither?

University of Zurich, Switzerland

Abstract

While Neanderthals have disappeared as a biological species, they still live on in the form of introgressed DNA in the human gene pool, testifying to close encounters between the two species and raising the question of why "they" went extinct and "we" did not. Among the many factors that could have contributed to their extinction, two are of particular interest: intra-/interspecific population dynamics and local/global climate dynamics. In this talk, we will present computational modelling approaches to address these questions together. We will also show how island models can contribute to a better understanding of climate-population interactions at the edge of extinction.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Carlos M Herrera

Wild bees from a Mediterranean mountain: diversity, trends and thermal biology Estación Biológica de Doñana, Spain

Abstract

Isolation, historical singularity and contrasting climate relative to surroundings, combine to turn "sky islands" into natural laboratories well suited for examining the ecological effects of climate change and identifying underlying mechanisms. The core of the Cazorla-Segura massif in the Baetic Ranges of southern Iberia is a large sky island possessing elevational, geological, ecological and climatic distinctiveness, and it represents a major biodiversity hotspot in the western Palaearctic context. The high preservation and integrity of their ecosystems also allow a separation of the effects of climate change from the possible confounding influence of air pollution, urbanization and habitat alteration. Long-term studies were carried out on the species-rich community (~400 species) of wild bees of the Cazorla-Segura massif over the last 30 years, a period during which the climate of the region has been warming at an increasing pace. The subset of larger-sized species of the bee assemblage, including some biogeographically distinctive elements which reach there their southernmost distributional boundaries, have been eroded by extinction and rarefaction. Total bee abundance (assessed by visitation to flowers), however, did increase over the same period, mostly reflecting the rising importance of small-sized taxa. In accordance with "body shrinking" expectations from climate warming models, mean body mass of individual species declined significantly over the last few decades, size reduction being strongest among large-bodied species. Bee families differed widely in thermal biology (ectothermy vs. endothermy, low vs. high temperature of flight muscles) and in the part exploited of daily and seasonal thermal gradients. Such heterogeneity reflects a deep phylogenetic split in the bees' evolutionary history. Detailed investigations on the thermal biology of the predominantly ectotherm, species-rich genus Andrena revealed that rising ambient temperatures increased the likelihood of thermal stress and constrained the daily and seasonal windows of foraging activity. Taken together, climate-related changes in diversity, species composition, size distribution, and thermal features of the bee community are expected to have manifold, complex consequences for the pollination, mating systems and population survival of the unique assemblage of beepollinated plants endemic to the study region.

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Speakers' Bios

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Juan Arroyo

Islands on continents. The biogeographical significance of the bipartite Strait of Gibraltar region for plant ecology and evolution

Bio

I got my BSc and PhD at the University of Seville, where I am currently Full Professor in Botany. I have done short postdoct stays at University of Haifa (Israel) and University of Toronto (Canada) and as visiting professor at UNAM (México), Institute for Ecology and Systematics, La Habana (Cuba) and State University of Sao Paulo (UNESP, Brazil). My research and teaching have been devoted mostly to the ecology and evolution of plant reproductive systems, with a focus on style polymorphisms, and to historical biogeography, with a focus on the Mediterranean. Lastly, both scientific fields have converged trying to explain the biogeographical basis of key plant trait evolution.



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Geoff Bailey

Drowned landscapes, climate change and human dispersals: perspectives in deep time

Bio

Prof Geoff Bailey is currently Professor of Archaeology Emeritus at the University of York, and Visiting Professor of Archaeology at Flinders University Australia. He took his early training at Cambridge University and remained there as Lecturer and College Fellow, subsequently moving to the Chair of Archaeology at the University of Newcastle upon Tyne, and from there to a foundation Anniversary Chair in Archaeology at the University of York in 2004. His primary interests are in the archaeology of coastlines, shell middens and submerged landscapes, and in the influence of geological instability in coastal and tectonically active regions on human lives, livelihoods and long-



term social and evolutionary trajectories. He has led fieldwork projects on these themes in Europe, Saudi Arabia, Kenya and Australia, and led the EU COST research network SPLASHCOS – Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf – aimed at promoting collaboration between archaeologists, marine geoscientists, heritage managers and industrial interests in offshore research. He is a Fellow of the Society of Antiquaries of London, Corresponding Fellow of the Australian Academy of the Humanities, Corresponding Member of the German Archaeological Institute, and Member of the Academia Europaea.

Gibraltar 2024

Carl Beierkuhnlein

Diversity in volcanic impacts and related generality in selection mechanism on Atlantic Islands

Bio

Prof Dr Carl Beierkuhnlein holds the Chair of Biogeography at the University of Bayreuth, Germany. He studied Geoecology and worked several years as a freelancer, mostly focused on compensation measures for environmental impacts. His PhD in 1994 was then on the ecology of mountain springs, using them as isolated indication systems for acidified catchments. The habilitation was focused on methodology in biodiversity assessments. In 1999 he became Associated Professor for Landscape Ecology at the University of Rostock. In 2002 he was elected for the Chair of Biogeography in Bayreuth. He has been acknowledged by several awards, e.g. for merits in European science. He supports the Bavarian Ministry for the Environment as biodiversity council, nature conservation council, and board member in the nature conservation fund of Bavaria.



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Peter G. H. Evans

Marine mammals of the North Atlantic: past, present and future

Bio

Dr Peter Evans is Director of the UK marine environmental research charity, Sea Watch Foundation, and Honorary Professor in the School of Ocean Sciences, Bangor University, Wales. He has studied marine mammals and birds for around half a century, establishing monitoring programmes for both taxa in the UK over that time period, with a focus upon tracking their conservation status, identifying human impacts, and investigating measures to protect and conserve species. He is author or editor of twelve books on marine mammals and birds, and



around 200 scientific papers. He was a founder of the European Cetacean Society, serving as its Secretary and then Chairman. He is a member of the Advisory Committee for the UNEP/ASCOBANS Regional Agreement for the Conservation of Small Cetaceans in the NE Atlantic, a Co-Chair of the Working Group on Marine Mammal Ecology for the International Council for the Exploration of the Sea, and advisor to DG Environment of the European Commission.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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José-María Fernández-Palacios

Macaronesia: an introduction to the biogeography and conservation of an island region, with particular attention to the Canary Islands

Bio

José María Fernández-Palacios is a professor of Ecology at the University of La Laguna. His scientific career is characterized by research lines related to island ecology in general and Macaronesia in particular, including island biogeography and ecology, forest dynamics of laurel forests and pine forests, paleobiogeography and paleoecology, and ecological restoration. His contributions in these areas include approximately 170 scientific articles in impact journals (with >13,500 citations and an h-index of 51 according to Google Scholar), more than half of which are published in first quartile journals (including



Nature and Science), and a dozen books, including "*Island Biogeography: Geoenvironmental Dynamics, Ecology, Evolution, Human Impact, and Conservation*" edited by Oxford University Press and recently published. He has authored over a hundred book chapters, popular articles, or opinion pieces. For 20 years, he led the Island Ecology and Biogeography research group at the University of La Laguna, supervising twelve doctoral theses and over fifty undergraduate, bachelor's, or master's theses. In 2022, he was nominated as a member (no. 5571) of the Academia Europaea and received the award for the best scientific researcher at the University of La Laguna. Currently, he serves as the president of the Society of Island Biology (SIB).

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Nuno Ferrand

The evolutionary history of the European rabbit (Oryctolagus cuniculus) and its human-mediated expansion in the Atlantic islands

Bio

Nuno Ferrand de Almeida is a biologist and Professor of Evolutionary and Conservation Biology at the University of Porto, Portugal, and Director of CIBIO, a Research Center in Biodiversity and Genetic Resources. He is also the Director of BIOPOLIS, a not-for-profit private association that now runs the biggest research program in Biodiversity in Europe, having as a major partner the University of Montpellier, France. He has also conceived, implemented and opened to the public the new Museum of Natural History and Science of the University of



Porto, which develops a new museological approach between art and science. He authored more than 150 scientific papers in international journals, and published several books. His main research interests are related to the understanding of the origins and maintenance of biological diversity at a global level, including current strategies leading to the sustainability of our planet. In addition, he also created the concept of TwinLab, which is a major tool used for longterm scientific collaborations between Portuguese speaking countries in the world, but that was extended to other geographies. He is the Director of BIODIV, a global PhD program that promotes the Training of a new generation of students from all nationalities. In more recent times, he has been awarded multiple honours, including the Gold and Merit Medals of the Municipalities of Vila do Conde and Porto, the Great Prize Ciência Viva 2022, and the Légion d'Honneur attributed in June 2023 by French President.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Clive Finlayson

Birds on the Atlantic Islands: it's not about getting there, it's about what you do when you get there

Bio

Professor Clive Finlayson, MBE, FLS, MSc, DPhil, FLS, MAE is the Director, Chief Scientist and Curator of the Gibraltar National Museum. Clive has a first class Honours Degree in Zoology from the University of Liverpool and was awarded a doctorate (DPhil) from the University of Oxford in 1980 based on work in bird ecology at the Edward Grey Institute of Field Ornithology. In 1991 he completed his MSc in Museum Studies at the University of Leicester. He was appointed a Beacon Professor of the University of Gibraltar in 2019.

Clive is an evolutionary ecologist and his main areas of research are the biogeography of hominins, avian biogeography and evolutionary ecology. Clive is Adjunct Professor at Liverpool John Moores University, and beacon Professor at the University of Gibraltar. He was appointed a Member of the Most Excellent Order of the British Empire (MBE) in Her Majesty's New Year Honours List in 2003. He



was elected a Member at the Academia Europaea in 2010, and in 2019 was awarded the Medallion of Distinction by unanimous decision of the Parliament of Gibraltar.

Clive's research interests are varied but revolve around the broad theme of evolutionary ecology. He has written widely on human evolution and co-directs a major research project on the Neanderthals, focused on the Gibraltar sites of Gorham's and Vanguard Caves. His other main line of work is bird ecology and migration but he retains a passionate interest in many fields of history, reflected in some of his books. He has written books for major international publishers, including *Birds of the Strait of Gibraltar* (Poyser), *Avian Survivors* (Bloomsbury), *Neanderthals and Modern Humans* (Cambridge University Press), *The Humans who went Extinct, the Improbable Primate* (Oxford University Press), *The Smart Neanderthal,* (Oxford University Press), *Al-Andalus* (Santana Books), and *Prion Birdwatchers' Guide to Southern Spain and Gibraltar* (Prion). Among his interests is a passion for nature photography, using his own photographs to illustrate his books and lectures. Clive has worked as a consultant for the UNESCO World Heritage Centre, Paris.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Geraldine Finlayson

What if Neanderthals had reached the Atlantic Islands?

Bio

Professor Geraldine Finlayson has been an active researcher for well over thirty years, during which time she has authored or coauthored over sixty peer-reviewed publications, and has presented over thirty papers at international conferences. Her research include interests the spatio-temporal distribution patterns of vegetation and animals, and the relationships between climate, vegetation landscape features and biodiversity mainly focused on the Iberian Peninsula within the Quaternary, focussing on the influence of climate on vegetation and bird distribution, and Neanderthal behaviour and has published widely in these fields. A keen nature photographer, she has used her images to support her research.

She also holds an MSc in Museum Studies and is the CEO of the Gibraltar National Museum, as well as World Heritage Site Coordinator of the Gorham's Cave Complex UNESCO World



Heritage Site, Gibraltar. She is Adjunct Professor at Liverpool John Moores University and a Research Fellow at the University of Gibraltar. In 2006 she was granted the Gibraltar Award in the Queen's Birthday Honours List, and in 2019 was awarded the Medallion of Distinction by unanimous decision of the Parliament of Gibraltar.

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Gibraltar 2024

Stewart Finlayson

Birds on the Atlantic Islands: it's not about getting there, it's about what you do when you get there

Bio

Dr Stewart Finlayson is the Director of the Natural History Department at The Gibraltar National Museum. His PhD was on the relationship between birds and Neanderthals, and how Neanderthals exploited these animals. Stewart is also working on birds as climate indicators, using the bird species found in the fossil record across Europe.

Stewart also heads a study of Chiroptera in Gibraltar since 2013. The study, aptly named Gib-Bats, has looked at the population status of bats within Gibraltar and identified which species have gone locally extinct, and also identified new species, which had not been described for Gibraltar before. He holds a grade 7 bat license in Gibraltar and an expert bat ringing licence in Spain. In 2017, He was unanimously voted into the council of the Spanish Association for Bat Research and Conservation (SECEMU), and in 2019, Stewart was also made a member of the IUCN Bat Specialist Group. He is the representative for Gibraltar and works with his counterparts in Spain and Portugal advising on species status in the Iberian Peninsula amongst other things.



One of his many interests is the history of the scientific studies and the natural history explorations of Gibraltar. Stewart is also a successful Wildlife Photographer, member of the Royal Photographic Society and has published his works in various books and magazines. He is co-author of 'A Guide to Wild Spain, Portugal and Gibraltar' published by Santana books and lead author of 'Lost World' Secrets of a World Heritage Site' published by the Gibraltar National Museum. He is currently writing his third book, this time with Pelagic Publishing.

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Rui Freitas

Singularities of the marine biodiversity of Cabo Verde archipelago

Bio

Rui Patrício Correia Motta Freitas is Marine biologist, Lecturer and Professor at the Cabo Verde Technical University of the Atlantic, Institute of Engineering and Sea Science. He has contributed to several studies evaluating the Environment and Marine Resources of coastal areas in the Archipelago since 2006. Full scientific collaborator in studies evaluating the ecosystems and marine resources of the marine and protected area of Baia de Murdeira, Sal island (2006-7); Ponta Preta, island of Maio (2008-9); Calhau, São Vicente island (2019) and is in the joint planning (survey design) of the same study for the Santa Luzia and Ilhéus AMP (since 2009).

An experienced scientific SCUBA diver, he is Environmental and Technical consultant in



coastal and marine science for: Future Proman and Mota Engil (Portugal), ENAPOR Cabo Verdean ports, NGO Biosfera I, BioTUR mainstreaming Biodiversity conservation into tourism project, Barlavento Chamber of Commerce (CCB), National Environmental Directorate, Education Ministry of CV, MEP Consulting, LLC and World Bank CF, Kontrol Segurança Ambiente Qualidade. Graduated in Marine Biology and Fisheries at the University of Algarve (Portugal) in 2005 and obtained an M.Sc in Marine Resources and Coastal Management from the University of Cabo Verde in 2008.

He is currently a full-time Professor at the Technical University of Atlantic, Institute of Engineering and Sea Science and the Chair of the Zoological Society of Cabo Verde (SCVZ, www.scvz.org). The latter publishes the open access journal Zoologia Caboverdiana, which is the first and only peer-reviewed publication of Cabo Verde. R. Freitas' main research project focuses on gathering the baseline community structure, ecology, biodiversity and biogeography of the reef fish from Cabo Verde Islands. His knowledge covers a wide spectrum of disciplines in marine sciences including marine biodiversity, ichthyology, coastal ecology and management, MPA studies - using GIS approaches and video cameras as research complement in the field.

Gibraltar 2024

Carlos Garcia-Verdugo

Lucky castaways: why don't Macaronesian plant lineages follow common island biology predictions?

Bio

Carlos García-Verdugo is an Associate professor at the University of Granada (Botany department). He is a botanist with a strong interest in the evolutionary processes and mechanisms that shape plant biodiversity patterns, particularly those operating at the intersection between and macromicroevolutionary scales. His research seeks to integrate complementary sources of evidence (mostly molecular, field and common garden data, but also meta-analysis) focusing on Macaronesian and Mediterranean plants. He has worked (and lived) on several island systems, including the Canary Islands, Hawai'i and the Balearic Islands. He has (co)authored c. 50 papers on island-related topics, and acted as Lead editor in one special issue on the evolution and ecology of island plants published in the Botanical Journal of the Linnean Society.



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Africa Gomez

Perspectives on Iberian Phylogeography: refugia within refugia coming of age

Bio

Africa Gómez is a senior lecturer in the University of Hull. She obtained her PhD in the University of Valencia (Spain) on the ecology and reproductive isolation of a rotifer species complex. She moved onto a postdoc, fellowship and then got a Lectureship at Hull where she used rotifer diapausing egg banks to understand the phylogeography of rotifer species in Iberian salt lakes. She has a long-term interest in passively dispersed invertebrates with diverse reproductive systems and has worked on the population evolution, structure and phylogeography of brine shrimps Artemia, bryozoans, Celleporella, and Triops using a range of genomic tools. She contributed to the



development of the concept of persistent founder events in passively dispersed invertebrates and authored a critical review where the concept of refugia within refugia was developed. Her current research focused on urban biodiversity in green and blue spaces and rewilding cities. 28th Calpe Conference

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Carlos M Herrera

Wild bees from a Mediterranean mountain: diversity, trends and thermal biology

Bio

Carlos M. Herrera Professor of Research Emeritus, Estación Biológica de Doñana, CSIC. His scientific work has mainly focused on the evolutionary ecology of interactions between plants and animals in Mediterranean environments, including plant-frugivore, plantpollinator, plant-herbivore and plant-pollinatorfungi systems. Scientific publications include 250+ articles/book chapters and 10 books/monographs. Has been also committed with scientific divulgation aimed at raising public awareness on the social and biological importance of Mediterranean biodiversity (80+ publications), and a lifelong involvement in the management and preservation of the Sierra de Cazorla protected area (Jaén, southeast Spain). Awards and honours include Spanish Premio Nacional de Investigación (Ciencias ٧ Tecnologías Recursos Naturales), British Ecological Society President's Gold Medal, American Society of Naturalists President's



Award, Premio Andalucía de Medio Ambiente, Ernst Haeckel Prize of the European Ecological Federation, and honorary memberships to American Ornithological Society, Botanical Society of America, Ecological Society of America, Spanish Society for Terrestrial Ecology, and Spanish Society for Evolutionary Biology.

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Juan Carlos Illera

What are we learning on speciation and extinction from the Macaronesian birds?

Bio

I am a biologist interested in understanding how species proliferate and change over time. My work uses molecular tools and fieldwork approaches to investigate evolutionary and ecological patterns and processes at both the individual and population level. Much of this work has focused on island birds (using extinct and extant taxa) where I investigate the causes and consequences of adaptive (and nonadaptive) genetic variation to understand the mechanisms driving genetic and phenotypic differentiation and, ultimately, avian radiations.



In addition, I am also interested in investigating the ecological and evolutionary role of microbes (pathogens and microbiome) on their island avian hosts.

Juan Carlos Illera, Senior Lecture (Associate Professor) in Ecology

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Gibraltar 2024

Juan Manuel Jiménez-Arenas

Another kind of island under the sun. Reflections from the Orce Archaeological Zone (Guadix-Baza Basin, Granada)

Bio

Dr Juan Manuel Jiménez Arenas is Assistant Professor at the Department of Prehistory and Archaeology, University of Granada, Spain. He obtained his PhD from the University of Granada (UGR) (Spain). Subsequently, he conducted research stays at the University of Zurich (Switzerland) and IPHES (Tarragona, Spain). Since 2017, he is the Director of the 'ProjectORCE' funded by the Junta de Andalucía. He has published around 50 articles in internationally recognized journals, focusing on human variability and the initial settlement of



the Iberian Peninsula and its paleoecological context. Additionally, from 2017 to 2021, he was the Director of the University Institute for Peace and Conflict Research at the UGR. In 2013 and 2022, he was awarded the research excellence prize by the UGR. During 2023 and 2024, he has been conducted a research stay at The Gibraltar National Museum (UK). Lastly, it is worth noting that, before shifting his professional career, he worked as a clarinetist for the Málaga Municipal Wind Orchestra (1988-2002).

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Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Alex Menez

What if Neanderthals had reached the Atlantic Islands?

Bio

Dr Alex Menez is Senior Scientific and Conservation Officer, and Honorary Fellow, at the Gibraltar National Museum. He is Associate Director, Gibraltar Caves Project, and a member of two statutory bodies in Gibraltar: the Nature Conservancy Council and the CITES Scientific Authority. He is Senior Associate Researcher and a member of the Field Ecology Research Group, at the University of Gibraltar. Alex is Member of the Royal Society of Biology and Fellow of the Linnean Society of London. He holds a Master of Enterprise Management degree. Alex's main interests are ecology, evolution, malacology, and natural history. His PhD centres on the ecology of land molluscs in southern Iberia, including biogeography and habitat structure effects on diversity. Alex has an active interest in the history of natural history in Gibraltar, including



geology, palaeontology, and palaeoanthropology. He has recently published several papers on these topics, and a book that explores the history of the Gibraltar Skull.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Julio Peñas de Giles

Lucky castaways: why don't Macaronesian plant lineages follow common island biology predictions?

Bio

Julio Peñas de Giles is a Full Professor in the department of Botany at the University of Granada. His research interests are focused on plant conservation and ecological restoration of areas affected by gypsum mining, particularly in Mediterranean-type ecosystems. He has published c. 180 articles and book chapters on vegetation, biogeography, endemic flora and biological conservation. He has participated in >80 national and international meetings and conferences, such as the Symposia of the International Association for Vegetation Science,



the European Conference on Ecological Restoration or the European Congress of Conservation Biology. He was awarded with the César Gómez Campo Award in 2017 for the best scientific article on Plant Conservation Biology (SEBiCoP). 28th Calpe Conference

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Marcia Ponce de Leon

Did Neanderthals die out because of global warming or cooling, or both, or neither?

Bio

Professor Marcia S. Ponce de León Marcia S. Ponce de León studied civil engineering in La Paz, Bolivia. In Switzerland, she studied biology (specializing in anthropology and genetics) and computer science. She graduated with a Master's degree in biology (1992) and a PhD in anthropology (2000). Together with Ch. Zollikofer she developed Computer-Assisted Paleoanthropology (CAP) as a new research field in physical anthropology. During her PhD studies, she used CAP to reconstruct a large series of fragmentary Neanderthal child specimens, and to compare Neanderthal and modern human patterns of growth and development. Her continuous research in this area led to recovery of the first complete fossil hominin ontogeny – that of the Neanderthals – from birth to death.



MPdL's research focuses on the evolutionary developmental biology of fossil and modern humans and great apes, with a

special interest in the evolution of the human birth process, brain ontogeny, and brain reorganization. Further areas of research are the implementation of new methods for morphometric analysis of patterns of craniofacial shape variation, and for the digital conservation of primate collections.

Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Jaime Ramos

Terrestrial and marine avifauna of the Azores Islands: from speciation to historical declines and present conservation challenges

Bio

Jaime A. Ramos holds a degree in Marine Biology from the University of the Algarve, and a DPhil in Zoology from the University of Oxford. He carried out post-graduate research at the University of the Azores, and then joined the University of Coimbra in 2000, where he currently teaches Conservation Biology at undergraduate and graduate levels. He did his DPhil thesis on the Ecology of the Azores bullfinch and since then has participated in several Life projects for the conservation of this species. He began also researching seabird ecology in the Azores in the 1990s, particularly terns and petrels, and later conducted seabird research on other Macaronesian Islands,



particularly Madeira and Cape Verde. He is currently the head of the research group "EcoTop - Ecology and Conservation of Top Predators" at the University of Coimbra, where he coordinates a team of researchers and students to study the reprodutive and foraging ecology of avian top predators for biodiversity conservation and environmental management. He has (co) authored 260 scientific papers and supervised 30 PhD students. 28th Calpe Conference Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

Gibraltar 2024

Robert J. Whittaker

Macaronesia: an introduction to the biogeography and conservation of an island region, with particular attention to the Canary Islands

Bio

Robert J. Whittaker is an Emeritus Fellow of St Edmund Hall and is Emeritus Professor of Biogeography of the School of Geography and Environment, University of Oxford. He is also a Distinguished Fellow of The International Biogeography Society and was awarded the society's Alfred Russel Wallace Award in 2023. He is editor in chief of the society's scientific journal, Frontiers of Biogeography. He is author of around 200 scientific papers and co-author of three books on aspects of biogeography, is an expert on the recolonization and subsequent



ecological dynamics of the Krakatau Islands following their sterilization by volcanic eruptions in 1883, and he has published extensively on the theme of island biogeography. His latest book, *Island biogeography: geo-environmental dynamics, ecology, evolution, human impact, and conservation* (by Robert J. Whittaker, José-María Fernández-Palacois and Thomas J. Matthews), was published by Oxford University Press in July 2023.

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Islands in the Sun: Climate change, ecology and evolution on the Atlantic Islands and its continental seaboard

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Christoph Zollikofer

Did Neanderthals die out because of global warming or cooling, or both, or neither?

Bio

Professor Christoph Zollikofer studied biology at the University of Zurich, Switzerland, and graduated with a Master's degree (1981). He switched fields to attain a MA in classical music (cello, 1983), and went back to academia for a PhD in neurobiology (1988). From 1992 onward he worked as a postdoc and senior lecturer at the Institute for Informatics and the Anthropological Institute of the University of Zurich, and habilitated in zoology and anthropology (2000). Together with Marcia Ponce de León he developed Computer-Assisted Paleoanthropology (CAP) as a new research field in physical anthropology, which has now become a worldwide standard.

ChZo is professor emeritus at the University of Zurich, Switzerland. His main research interests are morphological variation and evolutionary diversification in fossil and extant primates including humans, computational modeling of morphogenetic processes, and development of image-based



analytical tools for anthropology. Further areas of research are the implementation of new methods for morphometric analysis of patterns of human skeletal variation, and large-scale agent-based simulations of human dispersals under changing environmental conditions.