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LANDSCAPES AND RESOURCES IN THE BRONZE AGE OF SOUTHERN SPAIN

Editors
Martin Bartelheim,
Francisco Contreras Cortés &
Roland Hardenberg

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Climatic Crisis, Socio-Cultural Dynamics and Landscape Monumentalisation during the Bronze Age of La Mancha

The Motilla Culture as an Adaptation to the Changes of the End of the 3rd mill. calBC

Keywords: prehistoric archaeology, climate change, western Mediterranean, South Iberian Plateau, Chalcolithic, resilience, groundwater

Acknowledgements

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Abstract

The Motilla Culture may be the oldest evidence for large-scale groundwater management in Europe. The archaeological and paleoenvironmental data suggest a close relationship between the location of the *motillas* and the geological landscape. *Motillas* were built during the 4.2 ka calBP climate event, at a time of environmental stress. This event has been related to the collapse of diverse civilisations around the world. In the Iberian Peninsula, it occurred at the transition between the Copper Age and Bronze Age in La Mancha. At that time, there also was a rapid disappearance of peninsular men on the occasion of the arrival of settlers from the eastern steppes of Europe, carrying chromosome Y R1b (Olalde et al. 2019; Villalba-Mouco et al. 2021). One of them was buried in Tomb 4 of Castillejo del Bonete (Terrinches) with a woman genetically compatible with Iberian populations of the Copper Age. She lived and died in the centre of the Iberian Peninsula and, although she lacked ancestry of the steppes, she fed on protein from marine resources and wore clothes with ivory buttons. This sacred place of the culture of the *motillas* was conceived as a monumental and funerary place built in memory of the ancestors and in relation to the solar cycles of death and resurrection of the sun, being used for a millennium.

The construction of monumentalised wells of the Motilla Culture that reached the water table to access groundwater was a successful solution that lasted almost a millennium and was an important technological development that shaped the emergence of more complex and hierarchical societies in the region. At the moment, the existence of a monumental well has been verified by archaeological excavations in the *motilla* of El Azuer (Daimiel). Five other wells have been detected by geophysical surveys in each and every one of the *motillas* studied in this way: those of Vega and El Cura (Daimiel), El Acequión (Albacete), Santa María, and El Retamar (Argamasilla de Alba).

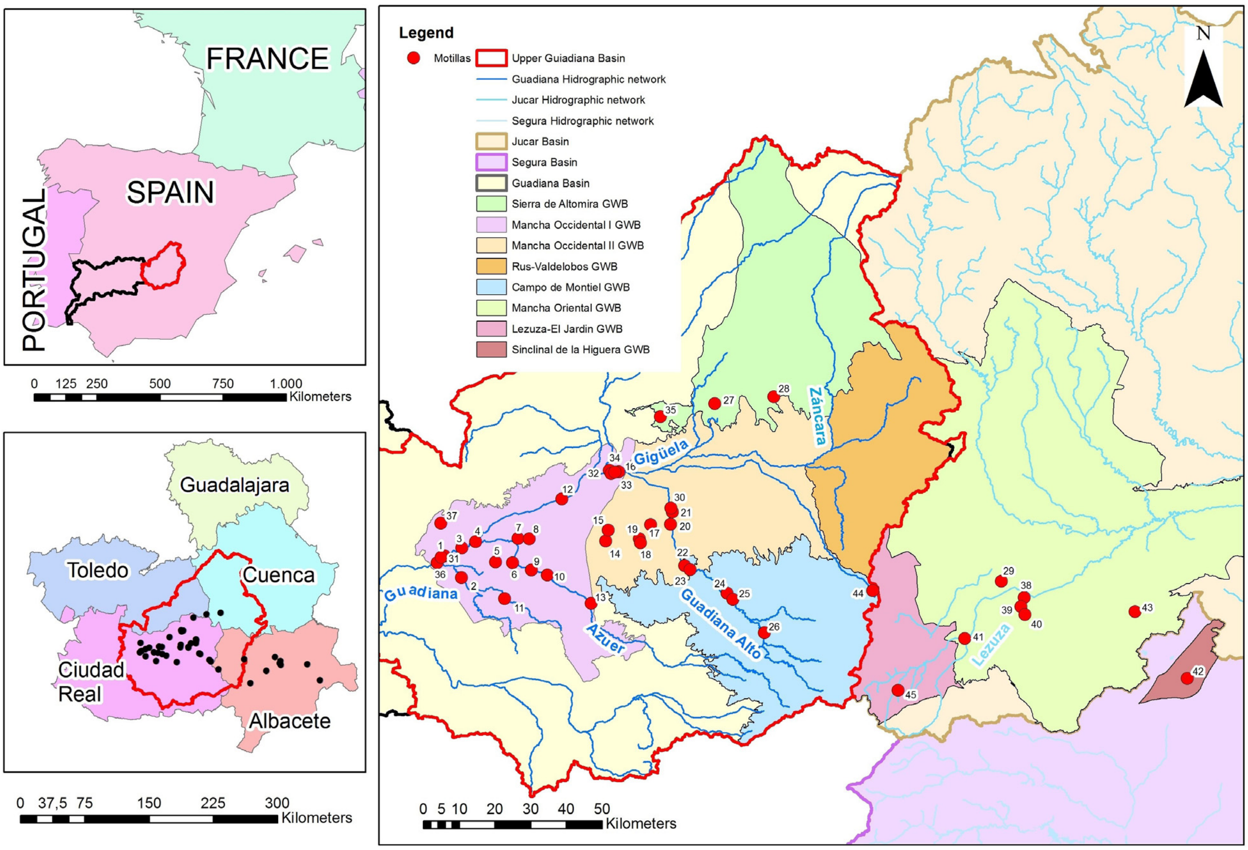

Fig. 1. Major river system in the plain of La Mancha and location of *motillas*. Distribution of the *motillas*: 1. El Quintillo, 2. Torralba, 3. El Cura, 4. Las Cañas, 5. La Albuera, 6. Daimiel, 7. La Máquina, 8. Zuacorta, 9. La Vega Media, 10. El Azuer, 11. Los Palacios, 12. La Vega, 13. El Espino, 14. Pedro Alonso, 15. Los Romeros, 16. Brocheros, 17. Casa de Mancha, 18. Barrios, 19. Perales, 20. La Membrilleja, 21. El Juez, 22. Santa María, 23. El Retamar, 24. La Moraleja, 25. Laguna de Cueva Morenilla, 26. La Jacidra, 27. El Morrión, 28. El Pedernoso, 29. El Acequión, 30. El Cuervo, 31. Malvecinos, 32. Pedregosas, 33. Camino de Herradero I, 34. Camino de Herradero II, 35. Huerta de Triviño, 36. Antonino, 37. Malagón, 38. Ojo de San Jorge, 39. Hoya Vacas, 40. Gorrineras, 41. Balazote, 42. Hoya Rasa, 43. Prado Viejo, 44. Chavillo, 45. Arquillo.

The Bronze Age Motilla Culture of La Mancha modelled the landscape and constitutes a unique adaptation of the inhabitants of the territory to this situation of climatic and social change.

Introduction

Motillas are a type of archaeological site only present in the region of La Mancha (Spain). La Mancha region is in the interior of Spain, in the southern part of the Spanish Meseta, also known as the Central Plateau. 45 *motillas* are known to date. *Motillas* represent locations where wells have been found, representing the oldest-known systems in Europe that were constructed to tap groundwater. The first inventory of the *motillas* was presented in 2010 and its update has been published in 2020. This is an investigation that has not been closed yet (Benítez de Lugo Enrich 2011; Benítez de Lugo Enrich et al. 2020) (*fig. 1*).

The *motillas* were built during the climatic event known as the 4.2 ka calBP climate event, in a time of environmental stress after a period of severe and prolonged world-scale megadrought, detected by many researchers in different parts of the planet (Arz et al. 2006; Bar-Mathews et al. 1997; Berglund 2001; 2003; Blanco González et al. 2018; Bond et al. 1997; Booth et al. 2005; Clare/Weninger 2010; Courty 1998; Cullen et al. 2000; Davis/Thompson 2006; Delibes et al. 2015; Drysdale et al. 2005; Fábregas et al. 2003; Fagan 2007; Gao et al. 2007; Gasse/van Campo 1994; Gibbons 1993; Huang et al. 2011; Kerr 1998; Lillios et al.

2016; Magny et al. 2009; Mayewski et al. 2004; Menotti 1999; Menounos et al. 2008; O'Brien et al. 1995; Parker et al. 2006; Peiser 1998; Roland et al. 2014; Stanley et al. 2003; Staubwasser et al. 2003; Thompson et al. 2002; Weiss et al. 1993; Wilkinson 1997; Wu/Liu 2004). For many years, it was assumed that the *motillas* had been surrounded by water at the time when they were in use, and that they were fortified villages where people from similar social classes used to live and control the strategic resources, such as cereals and water. In previous research, it has been argued that the *motillas* were built in a dry environment in order to find groundwater at a time of arid climate, when surface water had dried up. The aridity was progressive, although intermittently, as the pollen sequences of Castillejo del Bonete and the *motilla* of El Azuer have revealed (Benítez de Lugo Enrich et al. 2015; 2020; Mejías Moreno et al. 2020). These studies indicate a sharp drop in temperatures and an increase in annual rainfall around 1600 calBC. This change caused the recovery of the riverside forests, but also the fluvial floods, which had to flood the buildings located in the surroundings of the *motillas* and began to seriously endanger their habitability, as they were located in the middle of the river beds that progressively flowed again. The Chalcolithic communities that inhabited La Mancha suffered an environmental crisis due to water stress that led them to reorganise their settlements and water catchment systems. Water is a critical resource for human beings, and Bronze Age communities in La Mancha must have developed mechanisms to cope with its scarcity. At the end of the 3rd mill. calBC, they began to build the first European system of exploitation of an aquifer on a regional scale.

This work delves into this idea, which was previously presented through the study of a case: the *motilla* of El Retamar (Benítez de Lugo Enrich/Mejías Moreno 2014; 2015; 2016; 2017; 2020; Mejías Moreno et al. 2014; 2015; 2020).

Until geophysical surveys are developed and published – which verify the probable existence of a large clogged well inside this *motilla* – this study presents the results of the hydrogeological analysis aimed at assessing the possibility of accessing underground stable fresh water at this site at the beginning of the Bronze Age.

Fig. 2. Motilla del Azuer (Damiel) (Air Works Service, Geological Survey of Spain).

Archaeological Background

Some paleopalynological studies in areas of the Central Plateau of the Iberian Peninsula indicate that there was an especially prolonged dry and arid period in the second half of the 3rd mill. calBC (Benítez de Lugo Enrich et al. 2015; López-Sáez et al. 2014a; 2014b; 2015). In this context, wells reaching the phreatic level have been detected inside *motillas*, both through archaeological excavations in El Azuer (Aranda et al. 2008) and by geophysical prospecting in the *motillas* of El Acequión (Albacete), El Retamar and Santa María (Argamasilla de Alba, Ciudad Real), El Cura and La Vega (Daimiel, Ciudad Real) (Ibarra 2015; Teixidó et al. 2013). The *motilla* of El Azuer (Daimiel, Ciudad Real) is the most thoroughly studied from an archaeological point of view, although its relationship to the local hydrogeology was not considered in depth until the recent years (Mejías Moreno et al. 2014). It has been established that it was occupied for almost a millennium. The well of the *motilla* reaches the limestones of the Pliocene regional aquifer, located at about 20m deep (*fig. 2*).

Motillas are not the only kind of sites in the Bronze Age of La Mancha. There also exist settlements in height, sacred places monumentalised by burial mounds, burial caves, small villages in the plain and fields of silos dug in dry places, which were used to store food. All of them have their roots in Chalcolithic times, in a tradition in which continuity is observed from the middle of the 3rd to the beginning of the second half of the

Fig. 3. Castillejo del Bonete (Terrinches, Ciudad Real): A. Great Tumulus 1 (at the back of the image) once excavated, Corridor 1, more than 20m long; B. Great Tumulus 1 after the restitution of ¼ part of its surface to show its original shape.

2nd mill. calBC. For the sake of brevity of this article, it is not possible to delve into this question, which has been already dealt with in previous papers.

The beginning of the Bronze Age in La Mancha coincides with that abrupt climate event characterised by extreme aridity known as the 4.2 ka calBP climate event, dated to occur between 2350 and 1850 calBC, approximately. This climatic event was considered one of the most severe aridification events of the Holocene period in the Iberian Peninsula, and it seems likely that the impetus for the construction of *motillas* was this period of severe drought and aridity. For the inhabitants of *motillas*, the pernicious consequences of the climatic transformations could be aggravated by economic practices that, in the medium and long term, contributed to the disappearance of fertile soils, due to the proliferation of cereal crops highly demanding in nitrogen, such as dragging of the humus through erosive processes associated with few moments of torrential rains on a sparse vegetation cover. Massive deforestation of anthropic origin and high levels of grazing could further activate the tendency to aridity that climate change itself caused (Escacena Carrasco 2018). This is further supported by the fact that the abandonment of these sites coincides – around 1400 calBC – with the period when the climate returned to more humid and warmer conditions, after some time of suffering the increasingly frequent floods.

In recent years, these *motillas* have been associated to ceremonial places located in strategic sites of great visibility and territorial control. These enclaves were monumentalised by large burial mounds, in which solar rituals related to the death/resurrection cycle of the sun and the ancestors are detected. The archaeological site of Castillejo del Bonete (Terrinches, Ciudad Real) is one of these ceremonial sites (*fig. 3*). It is made up of burial mounds, the largest of which was built over a natural cave which contains stone structures and rock art. The mounds are connected by corridors, some of them with astronomical orientations to the winter solstice. Corridor 1 is over 20m long. These sacred monuments share some features with the *motillas*, as it is explained in previous works (Benítez de Lugo Enrich/Esteban 2018; Benítez de Lugo Enrich 2018; Benítez de Lugo Enrich et al. 2020).

At present, archaeological excavations are only being carried out in the *motilla* of El Retamar (Argamasilla de Alba, Ciudad Real), in a project involving the Geological Survey of Spain and promoted by the City Council of Argamasilla de Alba, the Regional Government of Castilla-La Mancha and the E2IN2 company. The project was funded with 25,700€ in 2019 and 23,982€ in 2021, and is entitled: 'Climate and social change in La Mancha at the end of the third millennium cal. BC: research in motilla de El Retamar (Argamasilla de Alba, Ciudad Real)' (*fig. 3*). The first phase of the archaeological excavations in this *motilla* took place between 1984 and 1991 and made it possible to detect a central tower surrounded by two walls and a wide space at the foot of the tower, in which a well similar to the one documented in the *motilla* of El Azuer was drilled. Characteristic objects of the Bronze Age of La Mancha were documented in the site, as well as diverse burials. An Argaric halberd was found during the 2019 research (Benítez de Lugo Enrich 2022). Two radiocarbon analyses on charcoal remains were performed during those archaeological research campaigns, providing this data: 3585±55 BP (CSIC-796) and 3520±55 BP (CSIC-797) (Idearq 2020). At that time, the well inside the *motilla* was probably clogged; the cause that had motivated its opening had disappeared, because the 4.2 ka calBP climate event had ended. Its fresh water from the aquifer mixed with the muddy and dirty water from the river becoming useless. The walls (dikes) built to prevent it could do nothing to avoid it, turning the well into a useless infrastructure. At that time, with the springs and surface waters running again, life in the *motilla* still persisted, but it was approaching its last moments, suffering in the middle of the Guadiana riverbed the onslaught of floods, more and more recurrent. The hypothesis is that this pattern was common and recurrent in the Motilla Culture. This study represents an advance to investigate it.

Methods

The geological and lithological characteristics of the study area have been obtained from geological maps at a scale of 1:50,000 of the Geological Survey of Spain (IGME) Magna series, which includes the whole territory of Spain. The climatological data comes from the State Meteorological Agency, and corresponds to the daily precipitation data from 1960 to 2019, completed by using regression methods and statistical analysis in spreadsheets. The data of the hydrogeological infrastructure came from the IGME Database Aguas XXI and the Database of the Official Groundwater Control Network of the Guadiana River Hydrographic Demarcation. Finally, the hydrogeological characteristics of the surroundings of the El Retamar *motilla* were summarised from the river basin management plan.

Results and Discussion

The *motilla* of El Retamar is located in the municipality of Argamasilla de Alba (Ciudad Real), on the flood plain of the Upper Guadiana River, on the left bank of the channel through which the river currently flows, and on Quaternary deposits at the bottom of the valley. From a hydrogeological point of view, it is in the groundwater body (GWB) 041.010, Campo de Montiel, in the upper basin of the Guadiana River. The GWB basement is made up of a base of quartzite and ordovician shales. In angular discordance, the Triassic is superimposed, which outcrops to the south and west of the GWB, and consists of red and green gypsiferous marls and clays in Keuper facies, which constitutes the low-permeability substrate. The regional aquifer is made up of limestone and dolomites from the Lower Lías (Jurassic), which have high permeability due to fractures and dissolution, with higher transmissivity in the central zone, upstream and around the Lagunas de Ruidera. Relatively less permeable are the oolitic limestones of the upper Lías that extend into the eastern zone of the aquifer, and which present the highest values of transmissivity to the southeast of the Campo de Montiel. There also are small hanging aquifers, of lower permeability, formed by the limestones and calcareous breccias of the Upper Tertiary, which emerge in the central-western part of the aquifer, and by the Plio-Quaternary deposits. Fig. 5 shows the position of two geological profiles (A–A' and B–B'), whose point of intersection is very close to the *motilla* of El Retamar (*fig. 4*). Fig. 6 and 7 represent the geological sections, in which the lithostratigraphic distribution can be seen vertically.

Fig. 4. Motilla de El Retamar (Argamasilla de Alba, Ciudad Real).

The Geological Survey of Spain carries out a systematic analysis of monthly rainfall at several

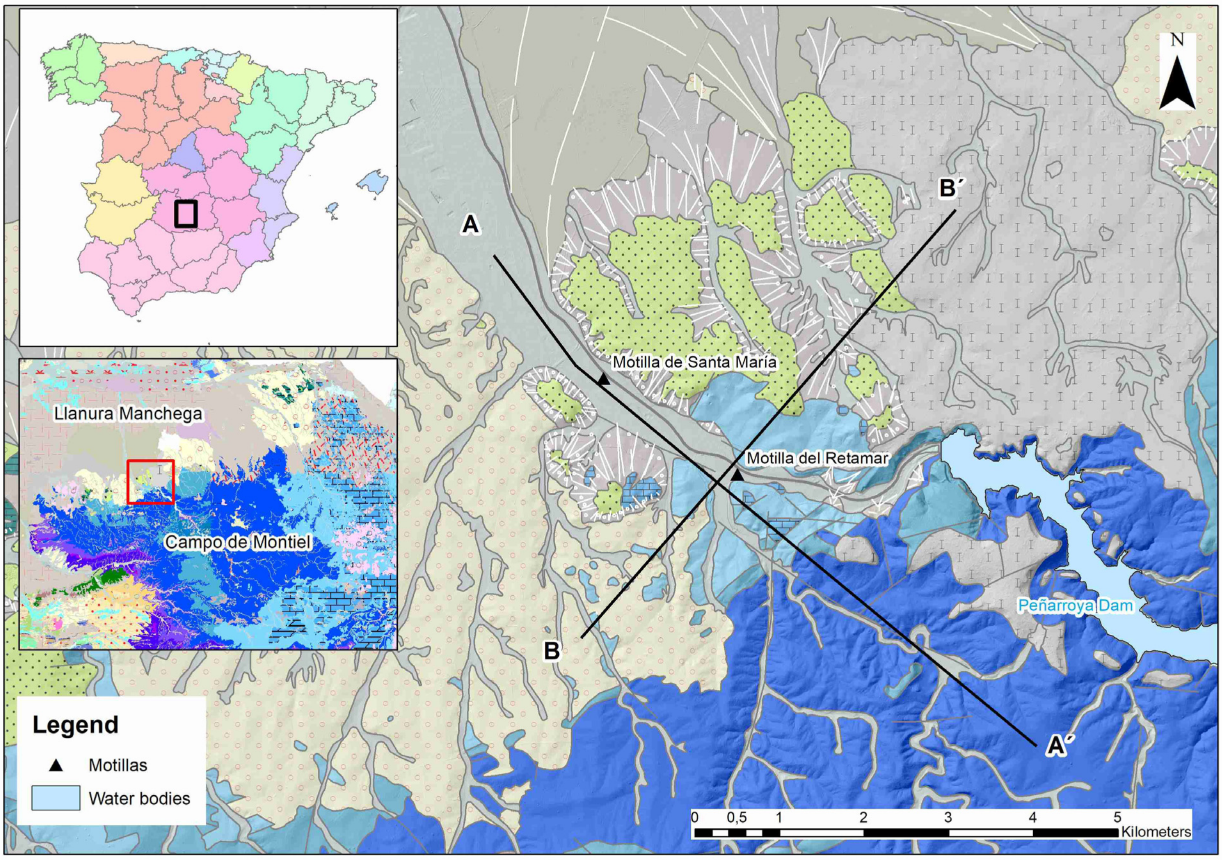

Fig. 5. Location of the geological profiles A–A' and B–B' near the motilla of El Retamar.

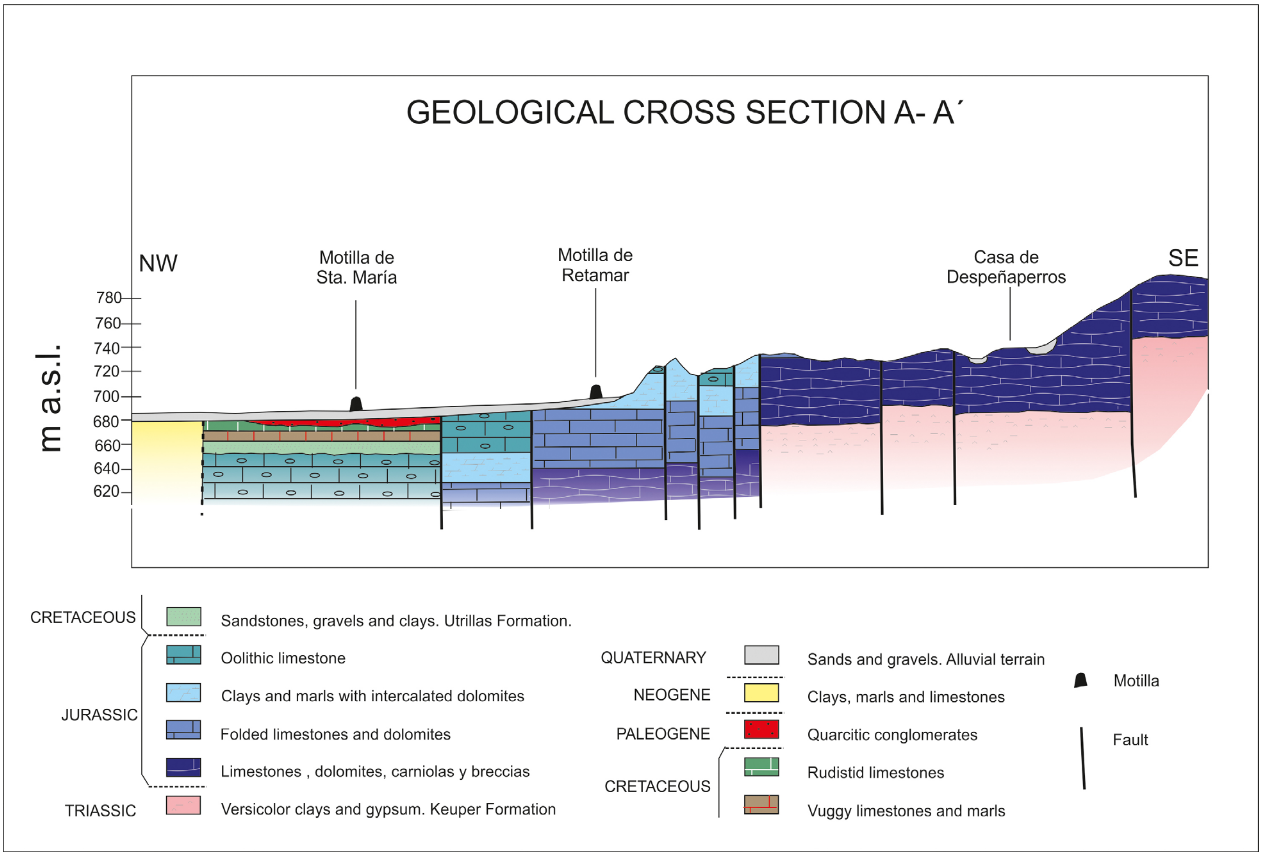

Fig. 6. Geological profile A–A'.

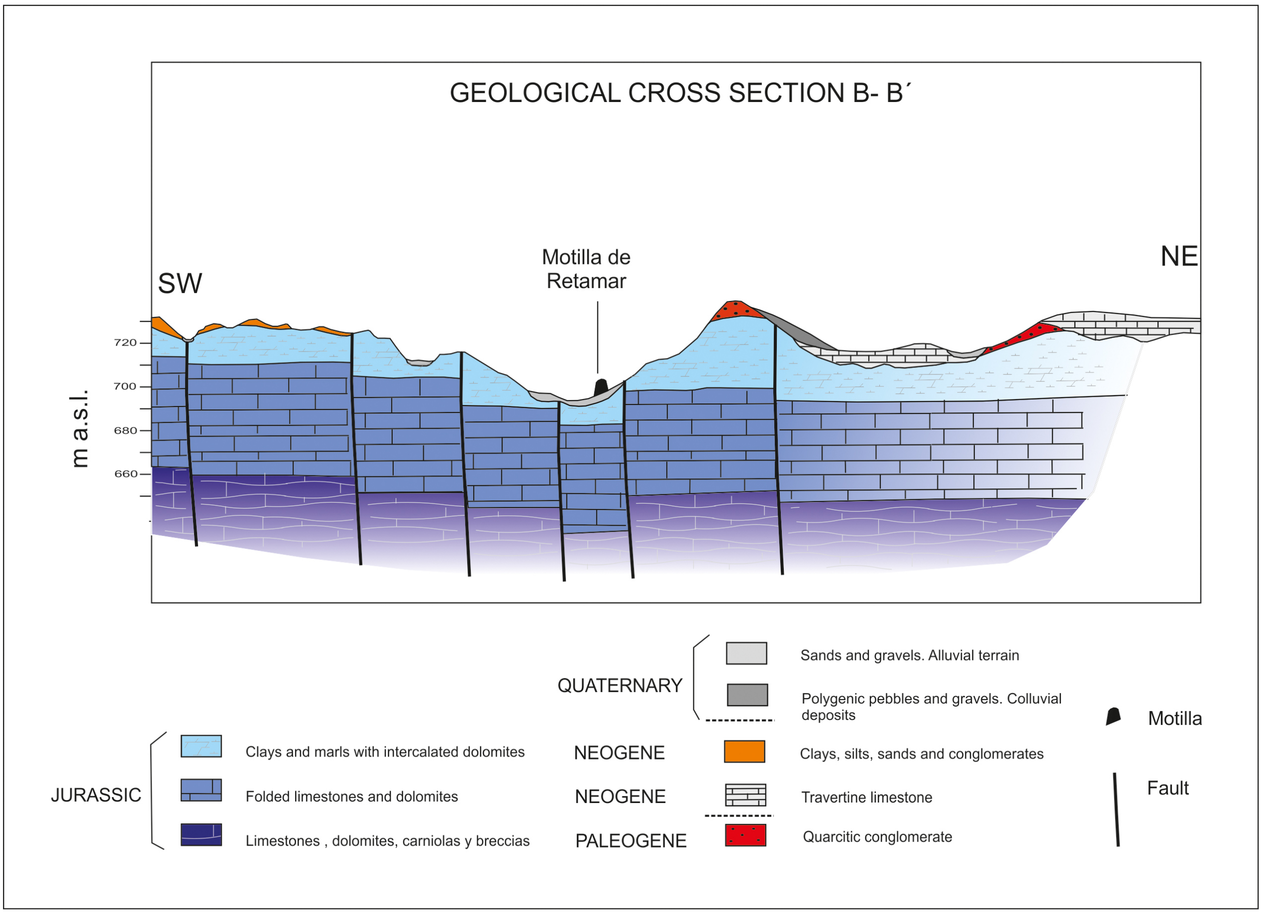

Fig. 7. Geological profile B–B'.

thermo-pluviometric stations that have updated records in the upper Guadiana basin. The period of data analysed starts from the hydrological year 1960/1961 to 2018/2019, reaching a total of 59 years with records, from which the historical pluviometric series is configured. For GWB Campo de Montiel, historical data from five stations are available: Carrizosa, Villanueva de la Fuente, La Solana (institute), Ruidera and Ossa de Montiel. The available precipitation values reach at least until 2019 in all the mentioned stations. The two thermo-pluviometric stations (with historical series) closest to El Retamar are: 4007–B Ossa de Montiel and 4012 Ruidera. The annual precipitation presents an average value of 515.1mm, and the minimum and maximum annual values are 232.5mm in the year 2004/2005 and 938.5mm in the year 2012/2013, respectively. The climatic sequence of the last six years could be classified as average, in contrast to the great majority of the stations of the upper Guadiana basin in which the last six years constitute a dry cycle interrupted punctually by the wet year 2017/2018. The annual precipitation values in Campo de Montiel, for the historical series from 1960 to 2019, show an average value of about 500mm.

The piezometric evolution of the aquifer of Campo de Montiel, the GWB of Campo de Montiel, is characterised by being a free karstic aquifer and the groundwater flow is very conditioned by the presence of fractures and/or karstification and their direction. The storage capacity is scarce and suffers important piezometric oscillations linked to precipitation events. Consequently, it is an aquifer with low water regulation capacity. Rain is the main source of recharge of the GWB, and visible discharge occurs through the springs and, mainly, towards Las Lagunas de Ruidera, as well as by underground transfer towards the northward GWB. The March 2019 isopiece reflects a flow direction of groundwater from south to north, in the northern two thirds of the mass surface. This direction of flow has not been significantly altered in recent decades

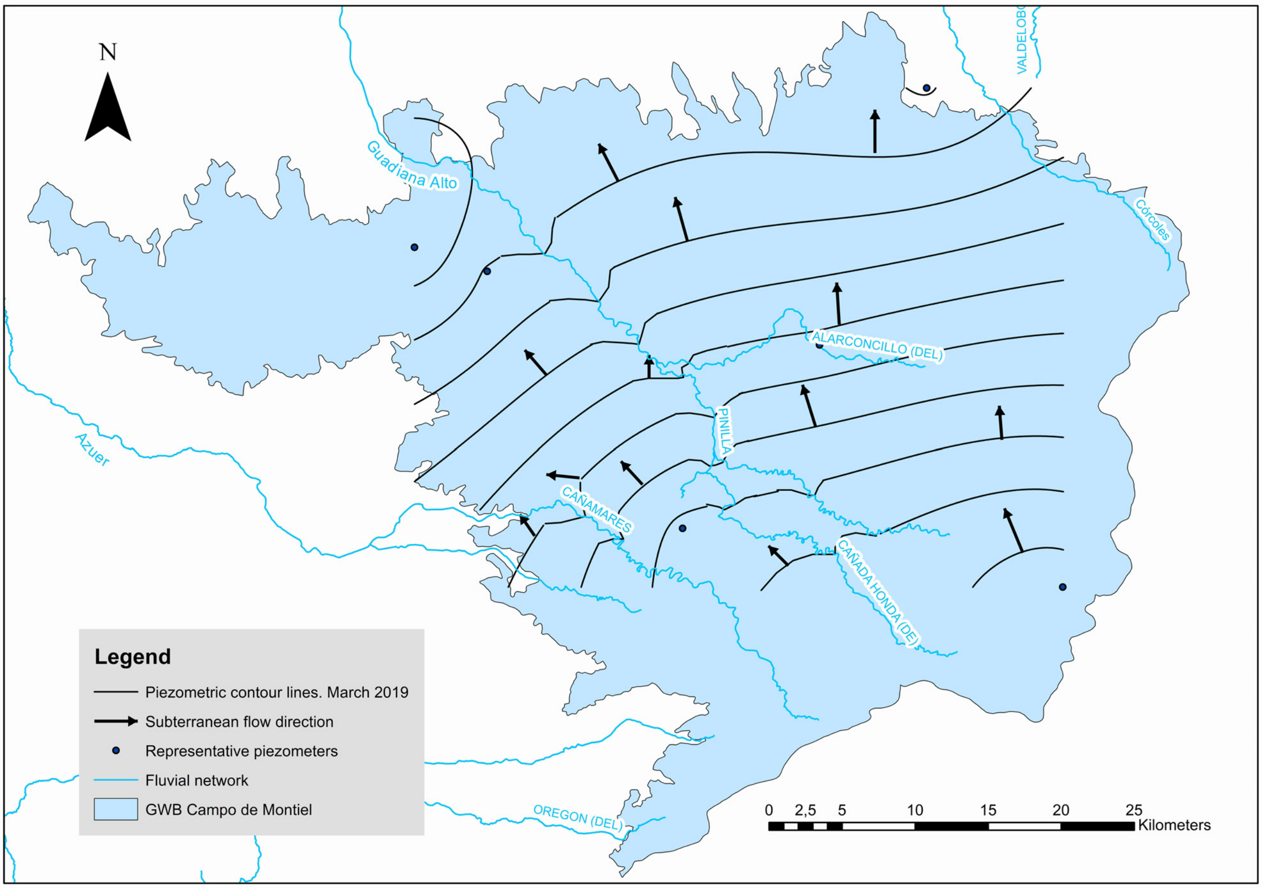

Fig. 8. Piezometric lines corresponding to the high-water period of 2019.

and is considered similar to that established for the natural regime of Campo de Montiel GWB. In the isopieces of fig. 8, the inflections typical of piezometry have been inferred towards the rivers and streams that cross the mass, since these constitute preferential points of discharge of the aquifer in favour of numerous springs. As already mentioned, the piezometric levels of the GWB Campo de Montiel fluctuate according to the succession of wet and dry periods, with rapid rises immediately after rainfall and equally intense falls shortly afterwards. The direction of the underground flow remains unchanged, from south to north, despite these alterations (*fig. 8*). From the point of view of its hydrological behaviour, the Campo de Montiel aquifer has not suffered drastic alterations with respect to its functioning in a natural regime, including prehistoric times. The oscillations of the piezometric levels are due more to the rainfall sequences than to the water extractions from the aquifer. The water table of the Mesozoic aquifer is located in an interval between 680–700m a.s.l., and the alluvial of the Guadiana river behaves, most of the time, as a hanging aquifer with a water table above the piezometric level of the Mesozoic aquifer, although in situations of maximum height of this level, it would recharge the alluvial aquifer.

Conclusions

The inhabitants of the *motilla* of El Retamar may have had to rely for their water supply at moments of severe drought – due to the decrease in rainfall derived from the 4.2 ka calBP climate event (López-Sáez et al. 2015) – on the regional aquifer. Due to the absence of regular water flow by the Guadiana river and considering that the piezometric level of the Mesozoic aquifer, given the scarcity of rainfall, could be found in the lower third of the interval of fluctuation, as determined for the *motilla* of El Azuer (Benítez de Lugo Enrich/Mejías Moreno 2017; 2016; Mejías Moreno et al. 2014), by drilling a relatively shallow well – around 4–15m from the surface – it would be possible to capture the groundwater existing in the alluvial of the Guadiana. A well of the mentioned depth (4–15m) would be viable to build with the technology of the time, as has been demonstrated by the dimensions of the well found in the *motilla* of El Azuer. In a prolonged situation of scarce rainfall, it would be nil or very scarce to obtaining groundwater from the alluvial levels of conglomerates, sand and silt. The safest and most stable water supply would be from the upper part of the limestones on the roof of the Mesozoic series, but the piezometric level would be too deep for reaching with a well built with the possibilities of the Bronze Age.

The geophysical and hydrogeological studies that are being developed agree that the big well documented in the *motilla* of El Azuer is no exception. The reason for building the *motillas* could be related to the exploitation of the aquifer at the regional level. How this water management influenced Bronze Age society is something that has yet to be studied and debated. Regional livestock – mainly sheep and goats – necessarily had to have a close relationship with the *motillas*, which became places of provisioning in natural communication routes and throughout the dry La Mancha plain. In summary, it has been found that the Motilla Culture might be the oldest evidence for large-scale water management in Europe, in relation to a water supply of people and livestock.

Motillas were built during the 4.2 ka calBP climate event, at a time of environmental stress. This event has been related to the collapse of diverse civilisations around the world. In the Iberian Peninsula, it occurred in the transition between the Copper Age and Bronze Age in La Mancha. The archaeological and paleoenvironmental data suggest a close relationship between the location of the *motillas* and the hydrogeological landscape. The timing of the 4.2 ka calBP climate event and the arrival of people with steppic ancestry coincides with the construction of the La Mancha *motillas*. For this reason, it seems reasonable to presume a relationship between all these events, although the precise nature of this relationship needs to be further investigated. The arrival of eastern Europeans, whose males could have completely replaced the males of the Iberian Peninsula in a short period of time between the Chalcolithic and the beginning of the Bronze Age, is a recently known historical fact that must be explained and embedded into this process in the future.

The construction of monumentalised wells that reached the local water table to access groundwater was a successful solution that lasted almost a millennium and was an important technological development that shaped the emergence of more complex and hierarchical societies in the region. Similarly, the end of the climatic event, when wetter conditions developed, coincides with the abandonment of *motillas*. The increase in precipitation and the progressive elevation of the phreatic level after 1800 calBC would have allowed for the recovery of rivers and humid zones that had nearly disappeared between 2000–1800 calBC, to point that some *motillas* could have been flooded, as this has been shown by archaeological records in the *motilla* of El Retamar.

From that moment on, after abandoning the *motillas*, the people of La Mancha redefined their relationship with the environment. At the end of the Bronze Age, they were involved in new forms of social and economic organisation and new models of settlement away from the wetter environments where *motillas* used to be.

The Bronze Age Motilla Culture of La Mancha modelled the landscape; it constitutes a unique adaptation of the inhabitants of the territory in a climate crisis situation and can be considered as the first hydraulic culture of Europe.

Luis Benítez de Lugo Enrich
Universidad Complutense de Madrid
Facultad de Geografía e Historia
Department of Prehistory, Ancient History and Archaeology
Edif. B 3ª, c/ Prof. Aranguren, s.n.
28040 Madrid, Spain
luis.benitezdelugo@ucm.es

Miguel Mejías Moreno
Geological Survey of Spain
C/Ríos Rosas 23
28003 Madrid, Spain
m.mejias@igme.es

Bibliography

Aranda et al. 2008: G. Aranda/S. Fernández/M. Haro/F. Molina/T. Nájera/M. Sánchez-Romero, Water Control and Cereal Management on the Broze Age Iberian Peninsula. La motilla del Azuer. Oxford Journal of Archaeology 27.3, 2008, 241–259.

Arz et al. 2006: H. W. Arz/F. Lamy/J. Patzold, A Pronounced Dry Event Recorded around 4.2 ka in Brine Sediments from the Northern Red Sea. Quaternary Research 66.3, 2006, 432–441.

Bar-Matthews et al. 1997: M. Bar-Matthews/A. Ayalon/A. Kaufman, Late Quaternary Paleoclimate in the Eastern Mediterranean Region from Stable Isotope Analysis of Speleothems at Soreq Cave, Israel. Quaternary Research 47.2, 1997, 155–168.

Benítez de Lugo Enrich 2011: L. Benítez de Lugo Enrich, Las motillas del Bronce de La Mancha. Treinta años de investigación arqueológica. In: P. Bueno/A. Gilman/C. Martín Morales/J. Sánchez-Palencia (eds.), Arqueología, sociedad, territorio y paisaje. Estudios sobre Prehistoria Reciente, Protohistoria y transición al mundo romano en homenaje a Mª Dolores Fernández Posse. Bibliotheca Praehistorica Hispana 28 (Madrid 2011) 141–162.

Benítez de Lugo Enrich 2018: L. Benítez de Lugo Enrich, Rituales funerarios neolíticos, calcolíticos y de la Edad del Bronce en la provincia de Ciudad Real. Cerro Ortega (Villanueva de la Fuente) y Castillejo del Bonete (Terrinches). Anejos Cuadernos de Prehistoria y Arqueología de la Universidad Autónoma de Madrid 3, 2018, 153–168.

Benítez de Lugo Enrich/Esteban 2018: L. Benítez de Lugo Enrich/C. Esteban, Arquitecturas simbólicas orientadas astronómicamente durante el Neolítico final, Calcolítico y la Edad del Bronce en el sur de la Meseta. Spal. Revista de Prehistoria y Arqueología 27.1, 2018, 61–87.

Benítez de Lugo Enrich/Mejías Moreno 2014: L. Benítez de Lugo Enrich/M. Mejías Moreno, Los primeros poblados prehistóricos en el entorno de Daimiel. Las motillas de la Mancha. In: M. Mejías (ed.), Las Tablas y los Ojos del Guadiana. Agua, paisaje y gente (Madrid 2014) 65–104.

Benítez de Lugo Enrich/Mejías Moreno 2015: L. Benítez de Lugo Enrich/M. Mejías Moreno, La prehistórica Cultura de las Motillas. Nuevas propuestas para un viejo problema. Veleia 32, 2015, 111–124.

Benítez de Lugo Enrich/Mejías Moreno 2016: L. Benítez de Lugo Enrich/M. Mejías Moreno, Hidrogeología y captación de aguas subterráneas en La Mancha durante la Prehistoria reciente. La gestión de los recursos hídricos en la Cultura de las Motillas. Archivo de Prehistoria Levantina 31, 2016, 137–168.

Benítez de Lugo Enrich/Mejías Moreno 2017: L. Benítez de Lugo Enrich/M. Mejías Moreno, The Hydrogeological and Paleoclimatic Factors in the Bronze Age Motillas Culture of La Mancha (Spain). The First Hydraulic Culture in Europe. Hydrogeology Journal 25.7, 2017, 1931–1950.

Benítez de Lugo Enrich et al. 2015: L. Benítez de Lugo Enrich/N. Palomares Zumajo/H. J. Álvarez García/R. Barroso Bermejo/M. Benito Sánchez/H.-A. Blain/P. Bueno Ramírez/R. De Balbín Behrmann/S. Fernández Martín/J. A. López-Sáez/M. A. Galindo Pellicena/M. A. Garrido Martínez/C. Laplana Conesa/E. Mata Trujillo/G. Menchén Herreros/I. Montero Ruiz/J. Moraleda Sierra/A. Morgado Rodríguez/C. Odriozola Lloret/E. Polo Martín/M. Ruiz-Alonso/P. Sevilla García/T. X. Schuhmacher/D. C. Salazar-García, Paleoecología y cultura material en el complejo tumular prehistórico de Castillejo del Bonete (Terrinches, Ciudad Real). Menga. Revista de Prehistoria de Andalucía 6, 2015, 112–140.

Benítez de Lugo Enrich et al. 2020a: L. Benítez de Lugo Enrich/M. Mejías Moreno/J. A. López-Sáez/C. Esteban, The Origins of Social Inequality in Prehistoric Europe. Rituals and Monuments to Control Wealth in the Bronze Age of La Mancha. In: K. Lillios/P. Díaz del Río (eds.), Political Matters in Prehistory. Papers in Honor of Antonio Gilman Guillén. Bibliotheca Praehistorica Hispana 35 (Madrid 2020) 249–260.

Benítez de Lugo Enrich et al. 2020b: L. Benítez de Lugo Enrich/M. A. Galindo Pellicena/C. Laplana Conesa/N. Palomares Zumajo/J. L. Fuentes Sánchez/A. Pérez Romero/D. C. Salazar García, Fauna e industria en materia dura de origen animal del lugar sagrado de la Cultura de las Motillas. Castillejo del Bonete (Terrinches, Ciudad Real). Cuadernos de Prehistoria y Arqueología de la Universidad Autónoma de Madrid 46, 2020, 45–77.

Benítez de Lugo Enrich et al. 2022: L. Benítez de Lugo Enrich/G. Aranda Jiménez/C. Gutiérrez Sáez/J. L. Fuentes Sánchez/A. M. Herranz Redondo/G. Menchén Herreros/I. Montero Ruiz/P. Muñoz Moro/L. Peña Chocarro/L. E. Vera Castellanos/A. Mederos Martín, Una alabarda argárica en la motilla de El Retamar (Argamasilla de Alba, Ciudad Real). Contexto, datación, procedencia e interpretación. Complutum 33.1, 2022.

Berglund 2001: B. E. Berglund, Cultural Landscapes in NW Europe. Is there a Link to Climate Changes? Terra Nostra 2001.3, 2001, 68–75.

Berglund 2003: B. E. Berglund, Human Impact and Climate Changes. Synchronous Events and a Causal Link? Quaternary International 105, 2003, 7–12.

Blanco González et al. 2018: A. Blanco González/K. Lillios/J. A. López-Sáez/B. L. Drake, Cultural, Demographic and Environmental Dynamics of the Copper and Early Bronze Age in Iberia (3300–1500 BC). Towards an Interregional Multiproxy Comparison at the Time of the 4.2 ky BP Event. Journal of World Prehistory 31, 2018, 1–79.

Bond et al. 1997: G. Bond/W. Showers/M. Cheseby/R. Lotti/P. Almasi/P. Demenecoal/P. Priore/H. Cullen/I. Hajdas/G. Bonani, A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates. Science 278, 1997, 1257–1266.

Booth et al. 2005: R. K. Booth/S. Jackson/S. L. Forman/J. E. Kutzbach/E. A. Bettis/J. Kreigs/D. K. Wright, A Severe Centennial-Scale Drought in Midcontinental North America 4200 Years Ago and Apparent Global Linkages. The Holocene 15.3, 2005, 321–328.

Clare/Weninger 2010: L. Clare/B. Weninger, Social and Biophysical Vulnerability of Prehistoric Societies to Rapid Climate Change. Documenta Praehistorica 37, 2010, 283–292.

Courty 1998: M. A. Courty, The Soil Record of an Exceptional Event at 4000 B.P. in the Middle East. British Archaeological Reports. International Series 728, 1998, 93–108.

Cullen et al. 2000: H. M. Cullen/P. B. De Menocal/S. Hemming/G. Hemming/F. H. Brown/T. Guilderson/F. Sirocko, Climate Change and the Collapse of the Akkadian Empire. Evidence from the Deep Sea. Geology 28, 2000, 379–382.

Davis/Thompson 2006: M. E. Davis/L. G. Thompson, An Andean Ice-Core Record of a Middle Holocene Mega-Drought in North Africa and Asia. Annals of Glaciology 43, 2006, 34–41.

Delibes et al. 2015: G. Delibes/F. J. Abarquero/M. Crespo/M. García/E. Guerra/J. A. López-Sáez/S. Pérez-Díaz/J. A. Rodríguez, The Archaeological and Palynological Record of the Northern Plateau of Spain during the Second Half of the 3rd Millennium BC. In: H. Meller/A. Wolfgang/R. Jung/R. Risch (eds.), 2200 BC. Ein Klimasturz als Ursache für den Zerfall der Alten Welt? 7. Mitteldeutscher Archäologentag vom 23. bis 26. Oktober 2014 in Halle (Saale). Tagungen des Landesmuseums für Vorgeschichte Halle 12 (Halle 2015) 429–448.

Drysdale et al. 2005: R. Drysdale/G. Zanchetta/J. Hellstrom/R. Maas/A. Fallick/M. Pickett/I. Cartwright/L. Piccini, Late Holocene Drought Responsible for the Collapse of Old World Civilizations is Recorded in an Italian Cave Flowstone. Geology 34.2, 2005, 101–104.

Escacena Carrasco 2018: J. L. Escacena Carrasco, Ad petendam pluviam. El petroglifo de Los Aulagares como respuesta religiosa al evento climático 4.2 ka cal. BP. Ilu. Revista de Ciencias de las Religiones 23, 2018, 81–110.

Fábregas et al. 2003: R. Fábregas/A. Martínez/R. Blanco/W. Chesworth, Environmental Change and Social Dynamics in the Second–Third Millennium BC in NW Iberia. Journal of Archaeological Science 30.7, 2003, 859–871.

Fagan 2007: B. Fagan, El largo verano. De la Era Glacial a nuestros días (Barcelona 2007).

Gao et al. 2007: H. Gao/C. Zhu/X. Weifeng, Environmental Change and Cultural Response around 4200 cal. yr BP in the Yishu River Basin, Shandong. Journal of Geographical Sciences 17.3, 2007, 285–292.

Gasse/van Campo 1994: F. Gasse/E. van Campo, Abrupt Post-Glacial Climate Events in West Asia and North Africa Monsoon Domains. Earth and Planetary Science Letters 126.4, 1994, 435–456.

Gibbons 1993: A. Gibbons, How the Akkadian Empire was Hung Out to Dry. Science 261, 1993, 985–998.

Huang et al. 2011: C. C. Huang/J. Pang/X. Zha/H. Su/Y. Jia, Extraordinary Floods Related to the Climatic Event at 4200 a BP on the Qishuihe River, Middle Reaches of the Yellow River, China. Quaternary Science Reviews 30.3–4, 2011, 460–468.

Ibarra 2015: P. Ibarra, Prospección geofísica aplicada al estudio de las motillas de la Edad del Bronce de La Mancha. In: M. Mejías/L. Benítez de Lugo Enrich/J. A. López-Sáez/C. Esteban (eds.), Arqueología, hidrogeología y medio ambiente en la Edad del Bronce de La Mancha. La Cultura de las Motillas (Madrid 2015) 45–50.

Idearq 2020: IDEArq. Infraestructura de Datos Espaciales de Investigación Arqueológica (Madrid 2020), <http://www.idearqueologia.org> (last access 05.10.2020).

Kerr 1998: R. A. Kerr, Sea-Floor Dust Shows Drought Felled Akkadian Empire. Science 279.5349, 1998, 325–326.

Lillios et al. 2016: K. Lillios/A. Blanco-González/B. Lee Drake/J. A. López-Sáez, Mid-Late Holocene Climate, Demography, and Cultural Dynamics in Iberia. A Multi-Proxy Approach. Quaternary Science Reviews 135, 2016, 138–153.

López-Sáez et al. 2014a: J. A. López-Sáez/A. Abel Schaad/S. Pérez Díaz/A. Blanco González/F. Alba Sánchez/M. Dorado/B. Ruiz Zapata/M. J. Gil García/C. Gómez González/F. Franco Múgica, Vegetation History, Climate and Human Impact in the Spanish Central System over the Last 9000 Years. Quaternary International 353, 2014, 98–122.

López-Sáez et al. 2014b: J. A. López-Sáez/S. Alba Sánchez/T. Nájera Colino/F. Molina González/S. Pérez Día/S. Sabariego Ruiz, Paleoambiente y sociedad en la Edad del Bronce de La Mancha. La Motilla del Azuer. Cuadernos de Prehistoria y Arqueología de la Universidad de Granada 24, 2014, 391–422.

López-Sáez et al. 2015: J. A. López-Sáez/S. Pérez Díaz/S. Alba Sánchez/S. Núñez de la Fuente, Paisaje cultural y paleoclimatología durante la Edad del Bronce de La Mancha. In: M. Mejías/L. Benítez de Lugo Enrich/J. A. López-Sáez/C. Esteban (eds.), Arqueología, hidrogeología y medio ambiente en la Edad del Bronce de La Mancha. La Cultura de las Motillas (Madrid 2015) 95–105.

Magny et al. 2009: M. Magny/B. Vannière/G. Zanchetta/E. Fouache/G. Touchais/L. Petrika/C. Coussot/A. V. Walter-Simonnet/F. Arnaud, Possible Complexity of the Climatic Event around 4300–3800 cal. BP in the Central and Western Mediterranean. The Holocene 19, 2009, 823–833.

Mayewsky et al. 2004: P. A. Mayewski/E. E. Rohling/J. Curt Stager/W. Karlén/K. A. Maasch/L. David Meeker/E. A. Meyerson/F. Gasse/S. Van Kreveld/K. Holmgren/J. Lee-Thorp/G. Rosqvist/F. Rack/M. Staubwasser/R. R. Schneider/E. J. Steig, Holocene Climate Variability. Quaternary Research 62, 2004, 243–255.

Mejías Moreno et al. 2014: M. Mejías Moreno/L. Benítez de Lugo Enrich/J. del Pozo/J. Moraleda, Los primeros aprovechamientos de aguas subterráneas en la Península Ibérica. Las motillas de Daimiel en la Edad del Bronce de La Mancha. Boletín Geológico y Minero 125.4, 2014, 455–474.

Mejías Moreno et al. 2015: M. Mejías Moreno/L. Benítez de Lugo Enrich/J. A. López-Sáez/C. Esteban López (eds.), Arqueología, hidrogeología y medio ambiente en la Edad del Bronce de La Mancha. La Cultura de las Motillas (Madrid 2015).

Mejías et al. 2020: M. Mejías Moreno/L. Benítez de Lugo Enrich/J. A. López Sáez/K. T. Lillios, La Cultura de las Motillas de La Mancha. Testigos del Evento Climático 4.2 ka cal BP. Boletín Geológico y Minero 131.1, 2020, 91–110.

Menotti 1999: F. Menotti, The Abandonment of the ZH-Mozartstrasse Early Bronze Age Lake Settlement. GIS Computer Simulations of the Lake Level Fluctuation Hypothesis. Oxford Journal of Archaeology 18.2, 1999, 143–155.

Menounos et al. 2008: B. Menounos/J. J. Clague/G. Osborn/B. H. Luckman/T. R. Lakerman/R. Minkus, Western Canadian Glaciers Advance in Concert with Climate Change c. 4.2 ka. Geophysical Research Letters 35.7, 2008, L07501.

O'Brien et al. 1995: S. R. O'Brien/P. A. Mayewski/L. D. Meeker/D. A. Meese/M. S. Twickler/S. I. Whitlow, Complexity of Holocene Climate as Reconstructed from Greenland Ice Core. Science 270, 1995, 1962–1969.

Olalde et al. 2019: I. Olalde/S. Mallick/N. Patterson/N. Rohland/V. Villalba-Mouco/M. Silva/K. Dulias/C. J. Edwards/F. Gandini/M. Pala/P. Soares/M. Ferrando-Bernal/N. Adamski/N. Broomandkhoshbacht/O. Cheronet/B. J. Culleton/D. Fernandes/A. M. Lawson/M. Mah/J. Oppenheimer/K. Stewardson/Z. Zhang/J. M. Jiménez Arenas/I. J. Toro Moyano/D. C. Salazar-García/P. Castanyer/M. Santos/J. Tremoleda/M. Lozano/P. García Borja/J. Fernández-Eraso/J. A. Mujika-Alustiza/C. Barroso/F. J. Bermúdez/E. Viguera Mínguez/J. Burch/N. Coromina/D. Vivó/A. Cebrià/J. M. Fullola/O. García-Puchol/J. I. Morales/F. X. Oms/T. Majó/J. M. Vergès/A. Díaz-Carvajal/I. Ollich-Castanyer/F. J. López-Cachero/A. M. Silva/C. Alonso/G. Delibes de Castro/J. Jiménez Echevarría/A. Moreno-Márquez/G. P. Berlanga/P. Ramos-García/J. Ramos Muñoz/E. Vijande Vila/G. Aguilella Arzo/Á. Esparza Arroyo/K. T. Lillios/J. Mack/J. Velasco-Vázquez/J. Waterman/L. Benítez de Lugo/M. Benito-Sánchez/B. Agustí/F. Codina/A. Esparza/G. de Prado/A. Estalrrich/A. Fernández Flores/C. Finlayson/G. Finlayson/S. Finlayson/F. Giles-Guzmán/A. Rosas/V. Barciela González/G. García Atiénzar/M. S. Hernández Pérez/A. Llanos/Y. Carrión Marco/I. Collado Beneyto/D. López-Serrano/M. Sanz Tormo/A. C. Valera/C. Blasco/C. Liesau/P. Ríos/J. Daura/M. J. de Pedro Michó/A. A. Diez-Castillo/R. Flores Fernández/J. Francès Farré/R. Garrido-Pena/V. S. Gonçalves/E. Guerra-Doce/A. M. Herrero-Corral/J. Juan-Cabanilles/D. López-Reyes/S. B. McClure/M. Merino Pérez/A. Oliver Foix/G. Pascual/M. Sanz Borràs/A. C. Sousa/J. M. Vidal Encincas/D. J. Kennett/M. B. Richards/K. W. Alt/W. Haak/R. Pinhasi/C. Lalueza-Fox/D. Reich, The Genetic History of the Iberian Peninsula over the Last 8000 Years. Science 363, 2019, 1230–1234. DOI: 10.1126/science.aav4040.

Parker et al. 2006: A. G. Parker/A. S. Goudie/S. Stokes/K. White/M. J. Hodson/M. Manning/D. Kennet, A Record of Holocene Climate Change from Lake Geochemical Analyses in Southeastern Arabia. Quaternary Research 66.3, 2006, 465–476.

Peiser 1998: B. J. Peiser, Comparative Analysis of Late Holocene Environmental and Social Upheaval. Evidence for a Global Disaster around 4000 BP. British Archaeological Reports, International Series 278, 1998, 117–139.

Roland et al. 2014: T. P. Roland/C. J. Caseldine/D. J. Charman/C. Turney/M. J. Amesbury, Was there a '4.2 ka Event' in Great Britain and Ireland? Evidence from the Peatland Record. Quaternary Science Reviews 83, 2014, 11–27.

Stanley et al. 2003: J. D. Stanley/M. D. Krom/R. A. Cliff/J. C. Woodward, Nile Flow Failure at the End of the Old Kingdom, Egypt. Strontium Isotopic and Petrologic Evidence. Geoarchaeology 18.3, 2003, 395–402.

Staubwasser et al. 2003: M. Staubwasser/F. Sirocko/P. M. Grootes/M. Segl, Climate Change at the 4.2 ka BP Termination of the Indus Valley Civilization and Holocene South Asian Monsoon Variability. Geophysical Research Letters 30.8, 2003, 1425.

Teixidó et al. 2013: T. Teixidó/E. G. Artigot/J. A. Peña/F. Molina/T. Nájera/F. Carrión, Geoarchaeological Context of the Motilla de la Vega Site (Spain) Based on Electrical Resistivity Tomography. Archaeological Prospection 20, 2013, 11–22.

Thompson et al. 2002: L. G. Thompson/E. Mosley-Thompson/M. E. Davis/K. A. Henderson/H. H. Brecher/V. S. Zagorodnov/T. A. Mashiotta/L. Ping-Nan/V. N. Mikhalenko/D. R. Hardy/J. Beer, Kilimanjaro Ice Core Records Evidence of Holocene Climate Change in Tropical Africa. Science 298, 2002, 589–593.

Villalba-Mouco et al. 2021: V. Villalba-Mouco/C. Oliart/C. Rihuete-Herrada/A. Childebayeva/A. B. Rohrlach/M. I. Fregeiro/E. Celdrán Beltrán/C. Velasco-Felipe/F. Aron/M. Himmel/C. Freund/K. W. Alt/D. C. Salazar-García/G. García Atiénzar/M. Paz de Miguel Ibáñez/M. S. Hernández Pérez/V. Barciela/A. Romero/J. Ponce/A. Martínez/J. Lomba/J. Soler/A. Pujante Martínez/A. Avilés Fernández/M. Haber-Uriarte/C. Roca de Togores Muñoz/I. Olalde/C. Lalueza-Fox/D. Reich/J. Krause/L. García Sanjuán/V. Lull/R. Micó/R. Risch/W. Haak, Genomic Transformation and Social Organization during the Copper Age–Bronze Age Transition in Southern Iberia. Science Advances 7.47, 2021, eabi7038. DOI: 10.1126/sciadv.abi7038.

Weiss et al. 1993: H. Weiss/M. A. Courty/W. Wetterstrom/F. Guichard/L. Senior/R. Meadow/A. Curnow, The Genesis and the Collapse of Third Millennium North Mesopotamian Civilization. Science 26, 1993, 995–1004.

Wilkinson 1997: T. J. Wilkinson, Environmental Fluctuations, Agricultural Production and Collapse. A View from Bronze Age Upper Mesopotamia. In: D. Nüzhet/G. Kukla/H. Weiss (eds.), Third Millennium B.C. Climate Change and Old World Collapse. NATO ASI Series 1.49 (Berlin 1997) 67–106.

Wu/Liu 2004: W. Wu/T. Liu, Possible Role of the ‘Holocene Event 3’ on the Collapse of Neolithic Cultures around the Central Plain of China. Quaternary International 117.1, 2004, 153–166.

RESSOURCENKULTUREN 17

LANDSCAPES AND RESOURCES IN THE BRONZE AGE OF SOUTHERN SPAIN

Resources form the basis of the existence of societies. They can be material and immaterial, and their character is culturally shaped. Resources are usually not used in isolation, but in combination with other resources – as ResourceAssemblages that can change over time as a result of complex relationships. Dealing with such Resource-Assemblages shapes cultural landscapes in which social groups have their base and organise, shape and control these landscapes in a specific, culturally formed way according to the existing circumstances.

This volume focuses on the current state of research on resource use in the Bronze Age in the south of the Iberian Peninsula with a temporal perspective up to the present time. Short-term and long-term trends of landscape design to facilitate the utilisation of resources will be discussed as well as the interrelation of social dynamics and resource use.

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