Quaternary International xxx (2017) 1–12

Contents lists available at ScienceDirect

Quaternary International

journal homepage: www.elsevier.com/locate/quaint

Done with fish? A diachronic study of fishing in the Holocene Nile basin of Sudan

Veerle Linseele [a, *], Andrea Zerboni [b]

[a] Laboratory of Biodiversity and Evolutionary Genomics, KU Leuven, Celestijnenlaan 200E - bus 2409, B-3001 Leuven, Belgium
[b] Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano, Via L. Mangiagalli 34, I-20133 Milano, Italy

ARTICLE INFO

Article history:
Received 19 January 2017
Received in revised form
20 March 2017
Accepted 25 April 2017
Available online xxx

Keywords:
Central Sudan
Upper Nubia
Fish
Archaeozoology
Palaeoenvironment

ABSTRACT

The Nile valley of northern and mainly Central Sudan is renowned for its Early and Middle Holocene archaeological sites, with plentiful remains of fish and other aquatic fauna. However, at younger sites, after the Neolithic (after ca. 3500/3000 cal BC), fish bones are not found in any significant numbers. A lack of fishing near a large water basin seems counter-intuitive. In this paper we investigate whether fish consumption really lost importance in Sudan through time, based on a synthesis of the available archaeozoological data, and referring also to modern fisheries data for the region. Taphonomy, research methods, as well as environmental, economic and socio-cultural factors are considered in order to explain trends that can be observed. We argue that, while all of these factors played a role, the end of the African Humid Period at ca. 3500 cal BC and the disappearance of wetlands as a consequence was the most important factor. The data presented include newly obtained results from archaeozoological studies at Mesolithic and Neolithic sites near Al Khiday, which cover a sequence between ca. 7000 and 4000 cal BC.

1. Introduction

This paper fits into a larger research framework, looking at the productivity and sustainability of fishing through time in the Holocene basin of the River Nile in Northeast Africa and of the River Niger in West Africa. The central hypothesis is that, in certain areas, fish were so plentiful that they could be exploited on a large scale, impacting the environment much less than hunting or stock keeping, and representing a less demanding activity in terms of time and effort than hunting. This ties in with a growing awareness that fish represented a fundamental constituent of human diet in prehistoric as well as historic periods, not only in Africa but worldwide, and that this was equally true for marine (e.g. Barrett et al., 2011; Zangrando and Tivoli, 2015 Rebolledo et al., 2016) and freshwater fish (e.g. Scharlotta et al., 2016; Choy et al., 2016; Mitchell, 2016). Here the focus is on the Nile basin of present northern and Central Sudan. The prehistory of this area, and particularly of Central Sudan, is known for the fact that, before the arrival of food production, there were hunters-gatherers-fishers with sedentary lifestyles. Their strongly reduced mobility can be deduced from the presence of pottery production and the extensive use of grinding equipment (Usai, 2014) as well as from reconstruction of the seasonal exploitation of resources (Peters, 1995). Sedentism was possible thanks to a rich natural environment in which people could exploit very diverse animal resources, including plentiful fish and other aquatic resources (e.g. Gautier, 1983). On the other end of the time scale, in the historical periods, hardly any fish remains seem to be present in the archaeological record, despite the vicinity of the Nile or one of its tributaries. The aim of this paper was to systematically investigate for the first time if there is indeed a drop in the importance of fish and fishing through time in Sudan, from when and why.

2. The Nile basin of Upper Nubia and Central Sudan during the Holocene

The specific part of the Nile basin under consideration stretches from Sai Island in the North, to Al Khiday in the South. Al Khiday is also the most western location and Abu Darbein is the most eastern one. This area corresponds with Upper Nubia (north) and Central Sudan (south) (Figs. 1 and 2), and includes parts of the valley of the actual Nile, the Atbara, the Blue and the White Nile. Chronologically

* Corresponding author.
E-mail addresses: Veerle.Linseele@arts.kuleuven.be (V. Linseele), Andrea.Zerboni@unimi.it (A. Zerboni).

http://dx.doi.org/10.1016/j.quaint.2017.04.024
1040-6182/

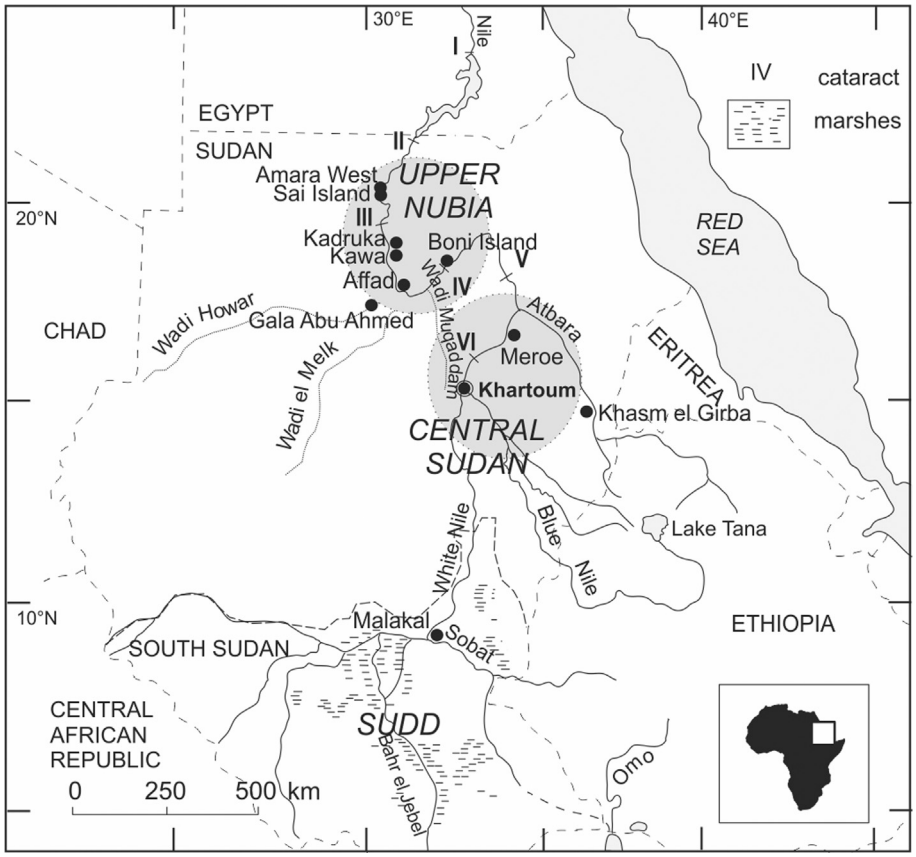

Fig. 1. Map of Sudan and adjacent areas, with indication of the localities mentioned in the text and not included in Fig. 2.

the focus is on the Holocene. The cultural periodisation and the absolute dates of each period are taken from Edwards (2004), with some updates for the prehistory (Usai, 2016).

The climate of present-day Northeast Africa depends on low pressure systems and winds over the whole continent and on the migration of the Intertropical Convergence Zone (ITCZ) in response to changes of maximum solar heating to the earth (Gasse, 2000; Nicholson, 2011; Williams, 2014; Gatto and Zerboni, 2015). ITCZ variations result in a belt of monsoonal climate with summer rains and winter droughts (Gasse, 2000). During the Quaternary, the migration northward/southward of the ITCZ ruled the expansion or withdrawal of the Southeast African Monsoon from the Indian Ocean, resulting in the alternation of phases of enhanced precipitation and arid phases (e.g. Gasse et al., 2008; Nicholson, 2011). Furthermore, the Nile River catchment was also sensitive to the El Niño Southern Oscillation (ENSO), the effects of which have varied at a sub-millennial timescale, especially during the Holocene (Marriner et al., 2012). Throughout the Holocene the climate of Northeast Africa changed considerably, with a general trend of increasing aridity, interrupted by short-time wetter events (Gasse, 2000). In the current literature, the Early Holocene is referred to as the African Humid Period (AHP); a phase that lasted up to 5 millennia (ca. 11–5.5 ka BP) marked by rainfall higher than today and able to sustain flourishing vegetation. The term AHP is used to point to a generalized and almost ubiquitous wet phase (deMenocal et al., 2000; Tierney and deMenocal, 2013). However, some parts of North Africa were not wetter than they are today (Gasse et al., 2008; Lezine, 2009; Cremaschi and Zerboni, 2009; Shanahan et al., 2015) and in fact, several lake records in eastern Africa show low instead of high levels during the AHP (e.g. Moernaut et al., 2010; Costa et al., 2014). Similar variability is also recorded through fluctuations in late Quaternary White Nile flood levels (e.g. Macklin et al., 2015; Williams et al., 2015a, 2015b), thus suggesting a considerable hydrologic variability during this phase (M.A.J. Williams, pers. comm.). The Mid-Holocene transition saw a strong decrease in the intensity of monsoonal precipitation, which after a few millennia led to the onset of present-day environmental conditions. The time and magnitude of this change is still debated but since ca. 2 ka BP the northern part of the Nile basin turned into a hyperarid desert, whereas the southern part became a dry savannah.

The Holocene climatic fluctuations naturally also had an impact on the dynamics and regime of the rivers in the Nile basin; in fact, monsoonal precipitations are the main water supply of the Nile catchment. At present each of these rivers has its particular regime and dynamics (Williams et al., 2015b). Today the Blue Nile is highly seasonal and has a ratio of peak to low flow of 40:1, compared to 5:2 for the White Nile. The White Nile provides ca. 10% of the peak flow of the main Nile, compared to ca. 68% for the Blue Nile and 22% for the Atbara. However, during the dry season it is the White Nile that provides the most water. At this time the Atbara dries up completely. Some palaeohydrological data suggest that, during the wetter phases of the Holocene, the discharge of each river belonging to the Sudanese Nile basin was proportionally higher than at present (e.g. Nicoll, 2004; Williams and Faure, 1980; Williams, 2009; Gatto and Zerboni, 2015). Williams (2009) reports on the main floods of the Blue, White and Main Nile, which are related to changes in precipitation regimes. The White Nile has a well preserved, 15 ka long depositional record of former floods, whereas in Egypt and along the Blue Nile phases of erosion have removed most of the sedimentary record. Radiocarbon ages indicate very high flood levels of the Blue Nile towards 13.9–13.2, 8.6,

Please cite this article in press as: Linseele, V., Zerboni, A., Done with fish? A diachronic study of fishing in the Holocene Nile basin of Sudan, Quaternary International (2017), http://dx.doi.org/10.1016/j.quaint.2017.04.024