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The Middle Holocene mangrove shellfish gatherers of Las Bela coast (Balochistan, Pakistan): new AMS dates from Lake Siranda shell middens

Paolo Biagi, Renato Nisbet, Alberto Girod & Tiziano Fantuzzi

Introduction

In the early 1970s, Professor A.R. Khan of Karachi University conducted the first geoarchaeological survey of the coast of Las Bela (Khan 1979a). The results (Khan 1979b) suggested that the coastal areas of Las Bela and southern Sindh have great archaeological potential because of their geographical location and morphological characteristics, as is also reported in the chronicles of the Classical authors, especially Arrian (see for example McCrindle 1879). In 2011, a joint programme of archaeological surveys was initiated by the universities of Ca' Foscari (Venice) and Balochistan (Quetta). Its principal scope was to locate prehistoric shell middens along the shores of Lake Siranda, to AMS-date samples of mangrove gastropods from any new sites, to contribute to the study of the Neolithic peopling of the region and their eventual seafaring along the northern coast of the Arabian Sea and, finally, to interpret the geomorphological variations that took place in the territory of Las Bela since the start of the Holocene.

Geographical setting

The first geological account of the landscape surrounding Lake Siranda was written by R.E. Snead (1966: 58): "a desert depression with no normal outlet to the sea". The lake stretches from north to south between the Holocene dunes of the Sonmiani Hills in the west, and the Pleistocene sand plain that extends to the east (Snead & Frishman 1968), while in the south it is delimited by the Khurkera plain, formed by the silting of the Winder River flowing from the Pab Range (Pithawalla 1952: 33).

Lake Siranda, some 14km long and 3km wide, and only 0.30–0.45m above the present sea level, is located in the southernmost part of Las Bela Valley (Figure 1) (Snead 1969). Although fed by summer monsoon rains draining into the basin mainly by the Watto River—an easternmost branch of the Porali River (Stein 1943: 198)—today the lake is often dry, depending on the seasonal precipitation (Akhtar 2011). According to data from the 1950s, its maximum depth was 1.5m in the winter and 3m in the summer (Pithawalla 1952: 33).

In one of his papers, Snead reports scatters of marine and mangrove shells, both along the eastern shores of the lake and within its bed (Snead 1966: fig. 15), suggesting that the lake, formed by the recession of the sea (Minchin 1907: 10), "was lower and functioned as a tidal lagoon in the not-too-distant past" (Snead 1966: 60). Given these premises, research in the area was resumed between 2011 and 2013 in order to verify the presence of shell middens along the lake shores, to establish a radiocarbon chronology of the sites, if any, and to contribute to the knowledge of the events that led to the present geographical situation.

The surveys

Sir Aurel Stein was the first archaeologist to visit Las Bela province during his journey in search of the route followed by Alexander the Great (Stein 1943: 198), although Siranda is also reported in other papers devoted to the same topic, mainly based on the chronicles of ancient Greek geographers (see for example Holdich 1910: 155; Eggermont 1975: 92; Hasan 2002: 20).

The only known prehistoric site in the territory before the new survey work was Balakot (Kot Bala), a stratified Chalcolithic/Bronze Age mound located in the northern part of the Khurkera plain, excavated by G. Dales in the 1970s (Dales 1974, 1979). The 2011–2013 surveys led to the discovery of 73 archaeological sites along the ancient shores of Siranda, 18 of which were AMS dated (Figure 2). They consist mainly of shell middens of different sizes and shapes, sometimes forming clusters within very restricted areas. They are

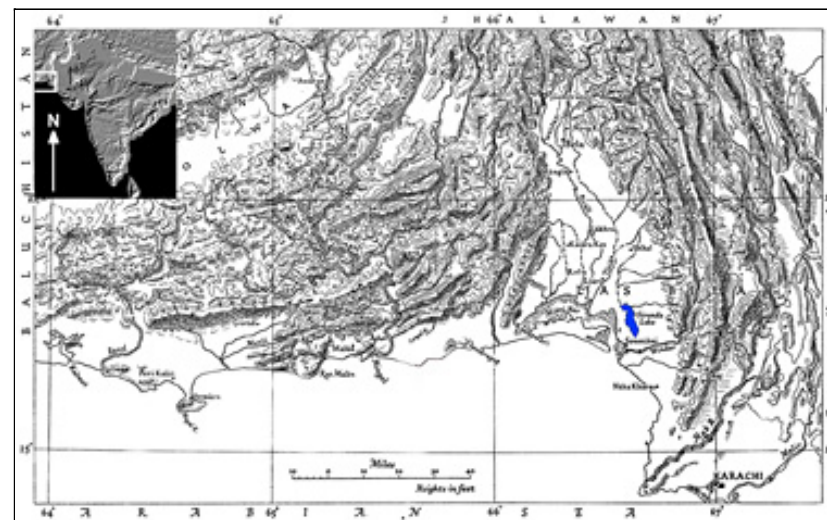


Figure 1. Location of Lake Siranda (blue spot) in Las Bela province of Balochistan, Pakistan (from Stein 1943: 195, with variations).
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characterised by huge mounds, or small scatters or heaps, of fragmented mangrove gastropods (*Terebralia palustris* & *Telescopium telescopium*) (Figure 3), often found associated with other species of marine and mangrove shells, mainly bivalves. Very large middens were discovered mostly along the south-eastern shores of the lake, where the basin begins to narrow (Figure 4), although another very large site, some 75m in diameter, was discovered along the south-western shore (Figure 5).

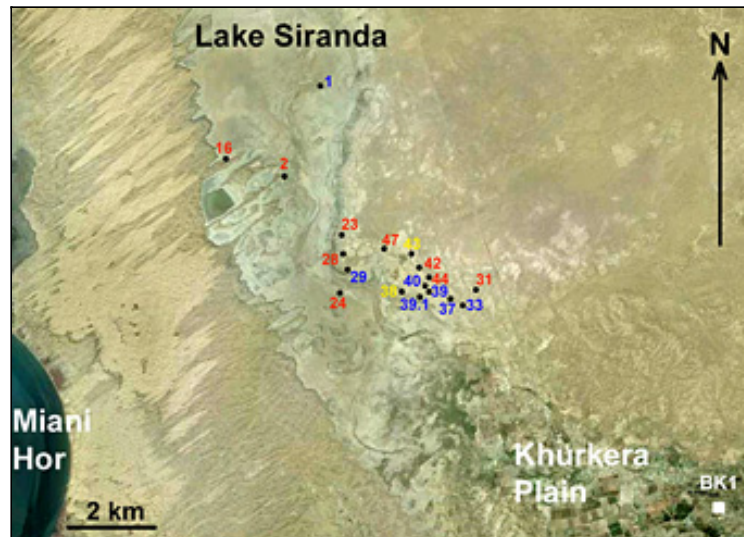


Figure 2. Lake Siranda: distribution map of the shell middens, AMS dated to the eighth millennium (yellow), seventh millennium (blue) and sixth millennium BP (red). BK1 is Balakot (drawing by R. Nisbet).
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Figure 3. Lake Siranda: site SRN 2 in the background, and scatters of *T. palustris*, *T. telescopium* and marine bivalves on the surface of SRN 1 in the lower right corner (photographs by P. Biagi).
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Figure 4. Lake Siranda: site SRN 29 in the background, and scatter of *T. telescopium* gastropods on the surface of SRN 30 in the lower right corner (photographs by P. Biagi).

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Figure 5. Lake Siranda: the white spot of site SRN 67, the largest shell midden so far discovered along the south-western shore of the basin (photograph by P. Biagi).

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Apart from mangrove and marine shell fragments, the sites yielded characteristic items of material culture among which are chipped stone tools—often obtained from bladelets of Gadani reddish-brown flint (Naseem *et al.* 1996–1997)—represented by different types of microlithic geometrics, mainly isosceles trapezes and lunates (Figure 6), as well as a few net weights, ground stones and pestles. Small fragments of pottery have also been recovered from a few sites.

The radiocarbon chronology

As mentioned above, 18 shell middens have been AMS dated from single, adult mangrove shell specimens, preferably *T. palustris*. The results obtained so far (Figure 7; Table 1) show that the Siranda shores were settled for a period of some 2000 years between the last two centuries of the eighth and the second half of the sixth millennia uncal BP, that is, during the Neolithic and part of the Chalcolithic periods, when the Arabian Sea level was some 3m higher than present (Lambeck 1996) and the lake

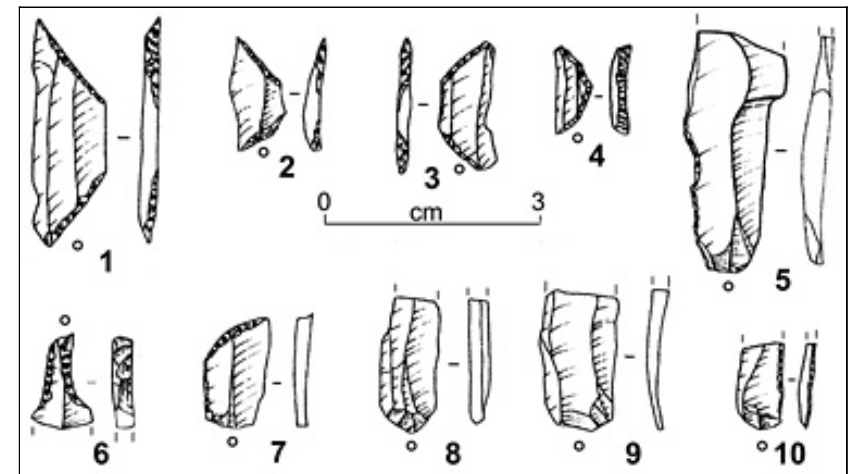


Figure 6. Lake Siranda: chipped stone tools of Gadani reddish-brown flint from shell midden SRN 29: trapezoidal geometrics (nos. 1–3), lunate (no. 4), backed bladelets (nos. 5 & 10), micro-drill (no. 6), truncation (no. 7) and unretouched bladelets (nos. 8 & 9) (drawings by P. Biagi, inking by E. Starnini).

was a tidal lagoon of the Arabian Sea partly surrounded by a mangrove environment.

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Site name	Coordinates	Metres asl	Material	Lab. number	Delta 13C	Age BP	Cal BC 2s	Reference
SRN 43	25°30'25"N-66°38'32"E	8	<i>T. palustris</i>	GrA-54290	-3.55	7200±35	5611–5454	Biagi 2013: 11
SRN 38	25°30'07"N-66°38'45"E	9	<i>T. palustris</i>	GrA-54303	-6.58	7095±35	5519–5333	Biagi 2013: 11
SRN 33	25°29'58"N-66°39'16"E	12	<i>T. palustris</i>	GrA-54291	-6.16	6770±35	5223–4977	Biagi 2013: 11
SRN 37	25°29'59"N-66°38'57"E	7	<i>T. palustris</i>	GrA-55821	-5.78	6595±45	5028–4747	Unpublished
SRN 29	25°30'27"N-66°37'35"E	10	<i>T. palustris</i>	GrA-54299	-5.57	6595±35	5010–4765	Biagi 2013: 11
SRN 39bis	25°30'08"N-66°38'41"E	9	<i>T. telescopium</i>	GrA-54298	-4.53	6336±35	4698–4468	Biagi 2013: 11
SRN 1	25°32'31"N-66°37'09"E	5	<i>T. palustris</i>	GrA-50323	-4.638	6305±40	4682–4437	Biagi 2013: 11
SRN 40	25°30'10"N-66°38'40"E	4	<i>T. palustris</i>	GrA-55823	-3.86	6145±45	4496–4271	Unpublished
SRN 39	25°30'08"N-66°38'41"E	9	<i>T. palustris</i>	GrA-55822	-4.33	6145±45	4496–4271	Unpublished
SRN 2	25°31'31"N-66°36'49"E	2	<i>T. palustris</i>	GrA-50325	-6.213	5950±40	4306–4046	Unpublished
SRN 31	25°30'01"N-66°39'19"E	4	<i>T. palustris</i>	GrA-55820	-5.03	5875±45	4230–3967	Unpublished
SRN 47	25°30'40"N-66°38'06"E	10	<i>T. palustris</i>	GrA-54296	-3.46	5800±35	4155–3920	Unpublished
SRN 23	25°30'48"N-66°37'39"E	7	<i>T. palustris</i>	GrA-54294	-5.05	5780±30	4133–3901	Unpublished
SRN 42	25°30'25"N-66°30'32"E	11	<i>T. palustris</i>	GrA-54292	-5.79	5755±35	4072–3810	Unpublished
SRN 44	25°30'22"N-	2	<i>T. palustris</i>	GrA-54301	-7.20	5690±35	3982–3766	Unpublished

	66°38'38"E							
SRN 24	25°30'48"N- 66°37'37"E	5	<i>T. telescopium</i>	GrA-55818	-6.12	5665±45	3971–3719	Unpublished
SRN 28	25°30'32"N- 66°37'36"E	9	<i>T. palustris</i>	GrA-55819	-2.55	5440±40	3727–3510	Unpublished
SRN 16	25°31'39"N- 66°35'54"E	7	<i>T. palustris</i>	GrA-55817	-3.86	5065±40	3330–3023	Unpublished

Table 1. Lake Siranda: list of the AMS-dated shell middens. Calibration applied ΔR of 229 ± 27 years according to Dutta *et al.* (2001) and Reimer *et al.* (2009).

Following the retreat of the ocean, after the middle of the sixth millennium BP, and the consequent disappearance of the mangrove forests, the territory dried up and, as the surveys have shown, was never settled again—even in historical times. Nevertheless, it is important to point out that one specimen of *T. palustris*, collected from the surface of Balakot mound (BLK 1; Figure 8) was AMS dated to 4660 ± 40 BP ($2831\text{--}2498$ cal BC at 2s: GrA-55828). This assay, which is some 500 years later than the most recent results obtained from the Siranda sites, shows that Balakot inhabitants exploited another mangrove environment, possibly located along the shores of Miani Hor.

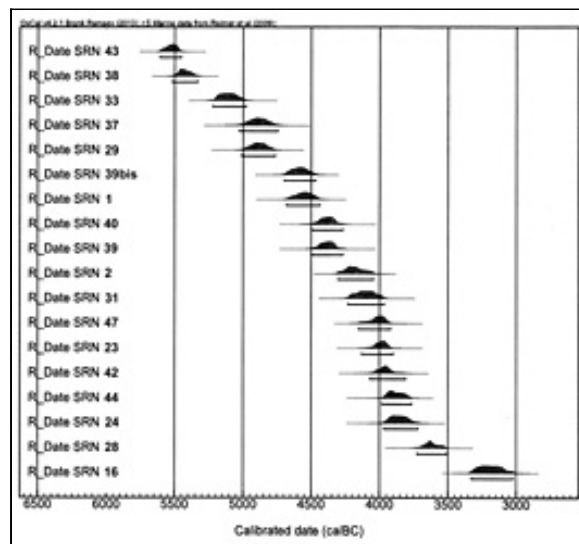


Figure 7. Lake Siranda: chronological distribution of the calibrated dates from the different sites. Data from Table 1 (scatterplot by T. Fantuzzi).
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Figure 8. Balakot: the prehistoric mound from the south-east (photograph by P. Biagi).
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Conclusion

The AMS dates obtained from the Siranda shell middens contribute to the definition of the Holocene peopling of the northern coast of the Arabian Sea, of which very little was known as recently as 10 years ago. The discovery of shell middens around the Bay of Daun, along the coast of Las Bela (Biagi 2004, 2011; Biagi *et al.* 2013), and on the limestone outcrops rising from the Indus delta (Biagi 2009, 2013), have radically changed our view of the Neolithic peopling of this part of the Arabian Sea. Indeed, the research at present underway along the southern coast of the Sultanate of Oman has revealed a very similar pattern of mid Holocene human exploitation, with groups of fisher-gatherers settled along the shores of former tidal lagoons, in a period of maximum expansion of the mangrove environments (Lézine *et al.* 2002; Berger *et al.* 2005, 2013).

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