

<< Previous Page Explore the Project Gallery *Antiquity* Volume 087 Issue 337 September 2013

# 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

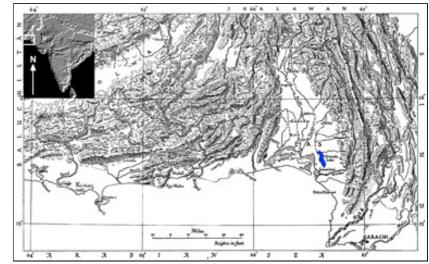


Figure 1. Location of Lake Siranda (blue spot) in Las Bela province of Balochistan, Pakistan (from Stein 1943: 195, with variations). Click to enlarge.

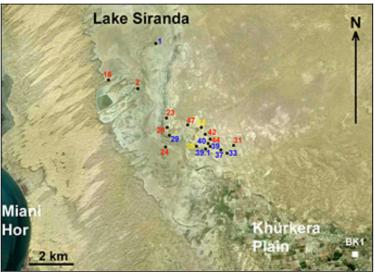
shells, both along the eastern shores of the lake and within its bed (Snead 1966: fig. 15), suggesting that the lake, formed by the recession of the sea (Minchin 1907: 10), "was lower and functioned as a tidal lagoon in the not-too-distant past" (Snead 1966: 60). Given these premises, research in the 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

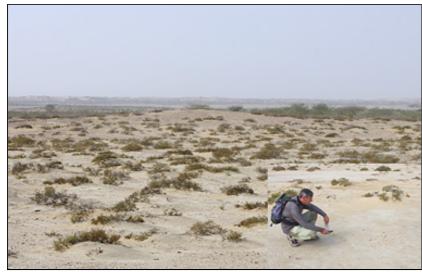
characterised by huge mounds, or small scatters or heaps, of fragmented mangrove gastropods (*Terebralia palustris* & *Telescopium telescopium*) (Figure 3), often found associated with other species of marine and mangrove shells, mainly bivalves. Very large middens were discovered mostly along the south-eastern 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). *Click to enlarge.* 



**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). *Click to enlarge*.



**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). *Click to enlarge*.

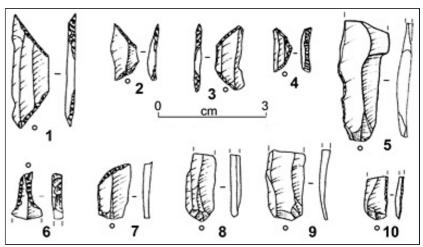
Apart from mangrove and marine shell fragments, the sites yielded characteristic items of material culture among which are chipped stone tools—often obtained from bladelets of Gadani reddish-brown flint (Naseem *et al.* 1996–1997)—represented by different types of microlithic geometrics, mainly isosceles 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 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). *Click to enlarge*.



**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.

Click to enlarge.

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

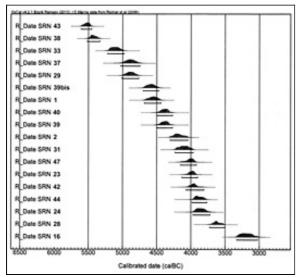
open in browser PRO version Are you a developer? Try out the HTML to PDF API

pdfcrowd.com

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

**Table 1.** Lake Siranda: list of the AMS-dated shell middens. Calibration applied  $\Delta R$  of 229±27 years according to Dutta *et al.* (2001) and<br/>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 (2831–2498 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). *Click to enlarge*.



**Figure 8.** Balakot: the prehistoric mound from the south-east (photograph by P. Biagi). *Click to enlarge.* 

## 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).

## Acknowledgements

The authors are very grateful to Professor M. Khalid Badini (University of Balochistan, Quetta) for organising their stay at Uthal Circuit House during the 2012 and 2013 fieldwork seasons at Lake Siranda, and to Professor M. Altaf Bouk, former director of the Department of Informatics at the University of Balochistan. Thanks are also due to Mr Iftikhar Badini, Haqdil Hakeem and Muhammad Qasim, students of Uthal Maritime and Agricultural University, who took part in the 2012 and 2013 surveys, and to Dr E. Starnini (Turin University, Italy) for the reassessment of Figures 3 and 4. Research at Las Bela was made possible thanks to contributions from the Italian Ministry of Foreign Affairs (MAE, Rome), and the Ca' Foscari University Archaeology Research Funds (Venice). Thanks are due also to EURAL Gnutti Ltd. (Rovato, Brescia) for financing some of the AMS dates.

#### References

- AKHTAR, S. 2011. The South Asiatic monsoon and flood hazards in the Indus River, Pakistan. Journal of Basic and Applied Sciences 7: 101–15.
- BERGER, J.-F., S. CLEUZIOU, G. DAVTIAN, M. CATTANI, F. CAVULLI, V. CHARPENTIER, M. CREMASCHI, J. GIRAUD, P. MARQUIS, C. MARTIN, S. MERY, J.-C., LLAZIAT & J.F. SALIÈGE. 2005. Évolution paléogéographique du Ja'alan (Oman) à l'Holocène moyen: impact sur l'évolution des paléomilieux littoraux et les stratégies d'adaptation des communautés humaines. *Paléorient* 31(1): 46– 63.
- BERGER J.-F., V. CHARPENTIER, R. CRASSARD, C. MARTIN, G. DAVTIAN & J.A. LÓPEZ-SÁEZ. 2013. The dynamics of mangrove ecosystems, changes in sea level and the strategies of Neolithic settlements along the coast of Oman (6000–3000 cal. BC). *Journal of Archaeological Science* 40: 3087–104.
- BIAGI, P. 2004. New radiocarbon dates for the prehistory of the Arabian Sea coasts of Lower Sindh and Las Bela in Balochistan. Rivista di Archeologia 28: 5–16.
  - 2009. Archaeological surveys in Lower Sindh: preliminary results of the 2009 season. *Journal of Asian Civilizations* 33: 1–42.

- 2011. Changing the prehistory of Sindh and Las Bela coast: twenty-five years of Italian contribution. *World Archaeology* 43: 523-37.

- 2013. The shell middens of Las Bela coast and the Indus delta (Arabian Sea, Pakistan). Arabian Archaeology and Epigraphy 24:
 9-14.

- BIAGI, P., T. FANTUZZI & C. FRANCO. 2013. The shell middens of the Bay of Daun: environmental changes and human impact along the coast of Las Bela (Balochistan, Pakistan) between the 8th and the 5th millennium BP. *Eurasian Prehistory* 9(1–2): 27–46.
- DALES, G.F. 1974. Excavations at Balakot, Pakistan, 1973. Journal of Field Archaeology 1: 3–22.
   1979. The Balakot Project: summary of four years excavations in Pakistan, in M. Taddei (ed.) South Asian archaeology 1977 (Seminario di Studi Asiatici, series minor VI): 241–74. Naples: Istituto Universitario Orientale.
- DUTTA, K., R. BHUSHAN, R. & B.L.K. SOMAYAJULU. 2001. ΔR correction values for the northern Indian Ocean. *Radiocarbon* 43(2A): 483–88.
- EGGERMONT, P.H.L. 1975. *Alexander's campaigns in Sind and Baluchistan and the siege of the Brahmin town of Harmatelia* (Orientalia Lovaniensia Analecta 3). Leuven: Leuven University Press.
- HASAN, M.U. 2002. *Baluchistan in retrospect*. Karachi: Royal Book Company.
- HOLDICH, T. 1910. *The gates of India, being an historical narrative*. London: Macmillan.
- KHAN, A.R. 1979a. New archaeological sites in Las Bela—a Neolithic settlement discovered, in A.R. Khan (ed.) Studies in geomorphology and prehistory of Sind (Grassroots III(2) special issue): 62–79. Jamshoro: University of Sind.
   1979b. Ancient settlements in Karachi region, in A.R. Khan (ed.), Studies in geomorphology and prehistory of Sind (Grassroots III(2) special issue): 1–24. Jamshoro: University of Sind.
- LAMBECK, K. 1996. Shoreline reconstructions of the Persian Gulf since the Last Glacial Maximum. Earth and Planetary Science Letters 142: 43–57.
- LÉZINE, A.-M., J.-F. SALIÈGE, R. MATHIEU, T.L. TAGLIATELA, S. MERY, V. CHARPENTIER & S. CLEUZIOU. 2002. Mangroves of Oman during the Late Holocene: climatic implications and impact of human settlements. *Vegetation History and Archaeobotany* 11: 221–32.
- MCCRINDLE, J.W. 1879. The commerce and navigation of the Erythræan Sea; being a translation of the Periplus Mari Erythræi, by an anonymous writer, and of Arrian's account of the voyage of Nearkhos, from the mouth of the Indus to the head of the Persian Gulf. With introductions, commentary, notes and index. Calcutta & London: Indian Antiquary.
- MINCHIN, C.F. 1907. Las Bela. Karachi: Ahmad Brothers.
- NASEEM, S., S.A. SHEIKH & M. QADEERUDDIN. 1996–1997. Geochemistry and tectonic setting of Gadani-Phuari segment of Bela Ophiolithes, Balochistan, Pakistan. *Journal of King Abdulaziz University, Earth Sciences* 9: 127–44.
- PITHAWALLA, M.B. 1952. The problem of Baluchistan. Development and conservation of water resources, sols and vegetation.
  Karachi: Ministry of Economic Affairs, Government of Pakistan.
- REIMER, P.J., M.G.L. BAILLIE, E. BARD, A. BAYLISS, J.W. BECK, P.G. BLACKWELL, C. BRONK RAMSEY, C.E. BUCK, G.S. BURR, R.L. EDWARDS, M. FRIEDRICH, P.M. GROOTES, T.P. GUILDERSON, I. HAJDAS, T.J., HEATON, A.G. HOGG, K.A. HUGHEN, K.F.

KAISER, B. KROMER, F.G. MCCORMAC, S.W. MANNING, R.W. REIMER, D.A. RICHARDS, J.R. SOUTHON, S. TALAMO, C.S.M. TURNEY & J. VAN DER PLICHT. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0–50,000 years cal BP. *Radiocarbon* 51: 1111–50.

SNEAD, R.E. 1966. Physical geography reconnaissance: Las Bela coastal plain, West Pakistan (Louisiana State University Studies Coastal Studies Series 13). Baton Rouge: Louisiana State University Press.
 – 1969. Physical geography reconnaissance: West Pakistan coastal zone (University of New Mexico Publications in Geography 1).

1969. Physical geography reconnaissance: West Pakistan coastal zone (University of New Mexico Publications in Geography 1).
 Albuquerque: Department of Geography, University of New Mexico.

- SNEAD, R.E. & S.A. FRISHMAN. 1968. Origin of sands on the east side of the Las Bela Valley, West Pakistan. Geological Society of America Bulletin 79: 1671–76.
- STEIN, A. 1943. On Alexander's route into Gedrosia: an archaeological tour in Las Bela. *The Geographical Journal* 102: 193–227.

## Authors

\*Author for correspondence

Paolo Biagi\* & Renato Nisbet

Department of Asian and North African Studies, Ca' Foscari University, Ca' Cappello, San Polo 2035, I-30125 Venezia, Italy (E-mail: **pavelius@unive.it**; **renatonisbet@gmail.com**)

Alberto Girod

Via Ponte Tresa 7, CH-69024 Sorengo, Switzerland (E-mail: fraberto.girod@gmail.com)

Tiziano Fantuzzi

Department of Humanities, Ca' Foscari University, Palazzo Malcanton Marcorà, Dorsoduro 3484D, I-30123 Venezia, Italy (E-mail: tiziano.fantuzzi@gmail.com)

- Home
- Current Issue
- Antiquity+
- Archive
- Contribute
- Subscribe

Terms and conditions

- Site mapPrivacy policy
- Cookies and accessibility
  - Administrator login

Antiquity, Department of Archaeology Durham University, South Road, Durham DH1 3LE, UK

assistant@antiquity.ac.uk | editor@antiquity.ac.uk Tel: +44 (0)191 3341125 | Fax: +44 (0)191 3341101