

The Archaeological Sites of  
Gadani and Phuari Headlands  
(Las Bela, Balochistan,  
Pakistan)

Paolo Biagi, Renato Nisbet  
and Alberto Girod

2013

# The Archaeological Sites of Gadani and Phuari Headlands (Las Bela, Balochistan, Pakistan)

— Paolo Biagi\*, Renato Nisbet\*  
and Alberto Girod\*\*

*Ras Gadani and Phuari were surveyed in the 2000s by the Italian Archaeological Mission in Las Bela and Lower Sindh. The discovery of a few sites on the two headlands has shown the importance of the Las Bela coast for the archaeology of the northern Arabian Sea. Both capes were already known for their complex geological history, the presence of Bela Ophiolite outcrops and Parh Limestone formations containing good quality red flint nodules, which were exploited at least since the beginning of the Holocene. The recent surveys have led to the discovery of a few shell scatters, whose characteristics, material culture remains and radiocarbon dating have contributed to improving our knowledge of the peopling of the coastal region during two main periods of prehistory and history.*

Ras Gadani is located some 50 km northwest of Karachi, in Las Bela district of Balochistan (Pakistan). It is a small promontory 87 m high, stretching towards the Arabian Sea, which is easy to distinguish from the other morphological features of the coast because of the pinkish colour of the Parh Limestone formations that characterise the area<sup>1</sup>. North of the cape, a well-sheltered, shallow bay opens at the end of a long sandy beach, delimited to the south by the course of the Marsada Dhora, in the interior of which the fishing village of Gadani is located<sup>2</sup>. The headland

is separated from Ra's Phuari, some 3.5 km to the south, by a strip that runs in a NNE-SSW direction, in the centre of which a small, seasonal stream called Kunari Dhora, which flows into the Arabian Sea. The Bela Ophiolites<sup>3</sup> outcrop runs along the coast, south of the mouth of the Kunari Dhora as far as Ras Phuari (Fig. 1).

The geology of the region is characterised by a complex sedimentary succession of deposits of different ages, one of which consists of Cretaceous Parh Limestones that abound at both Gadani and Phuari

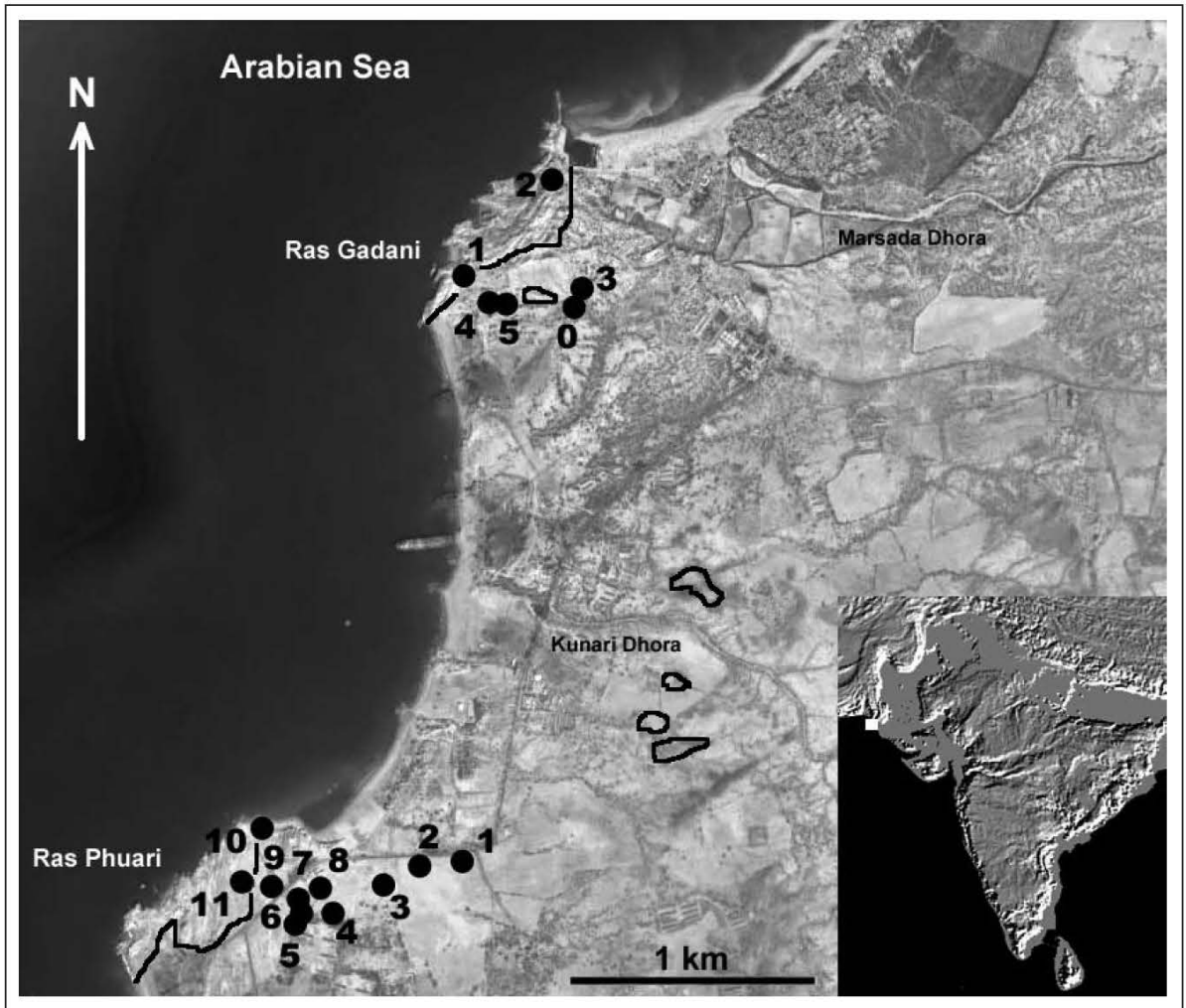
---

\* Department of Asian and North African Studies, Ca' Foscari University, Venice (Italy)

\*\* Italian Malacological Society, Sorengo (Switzerland)

1. Khan 1973, 19.
2. Belcher 1999.
3. Sarwar 1992.



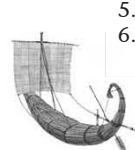


**Fig. 1:** Location of Ras Gadani and Phuari along the southeastern coast of Las Bela (Balochistan), with the location of the prehistoric sites discovered in 2000-2012 (dots), and the limit of the Parh Limestone formations containing flint nodules (line) (drawing by R. Nisbet and P. Biagi)

headlands, although another small outcrop of the same formation has been recorded along both sides of Kunari Dhora, some 1 km inland<sup>4</sup>. The Gadani Parh Limestones contain nodules of good-quality reddish-brown flint (2.5YR4/3)<sup>5</sup>. It is a foraminiferous planctonic wakestone of crypto-crystalline texture, homogeneous and without structures, up

to some 25 cm in diameter (Plate 1) that were exploited at least since the beginning of the Mesolithic<sup>6</sup> to the Chalcolithic period. According to the preliminary results of the research currently underway, the above raw material was traded over a wide territory that spans at least from the eastern periphery of Karachi (Mulri Hills), 40 kms in the

4. Khan 1973, Fig. 2; Naseem *et al.* 1996-1997, Fig. 1.  
 5. Khan 1973, 19.  
 6. Khan 1979, 12.



southeast<sup>7</sup>, to the southern shores of Lake Siranda, 60 kms in the north<sup>8</sup>.

## THE ARCHAEOLOGICAL SITES

### Cape Gadani

Ras Gadani was visited for the first time in February 2002 by one of the authors (P.B.) together with Professors A.R. Khan and S. Akhtar of the Department of Geography, Karachi University. On that occasion the southern slopes of the cape were briefly surveyed, and a sample of *Terebralia palustris* mangrove shells was collected for radiocarbon dating from an area rich in natural red flint flakes and small blocks (Plate 2), where a few animal bones were also noticed partly covered by a sandy alluvial deposit some 50 cm thick. The above sample gave a result of 4460±30 uncal BP, 2494-2329 cal BCE at 2σ (GrN-26369: GDN0) (Table 1).

During a visit paid to the cape in January 2011, a bladelet core rejuvenation flake of exogenous light grey flint (10YR7/2) (Fig. 2, n. 4: GDN3) was recovered from point 25°06'43.6N - 66°43'15.5E, a pre-core of local dark reddish brown flint (2.5YR3/4) was collected from 25°06'46.1N - 66°42'59.5E (Fig. 2, n. 5: GDN4), and a flakelet of the same variety, associated with two broken marine shells, from roughly the same point: 25°06'46.1N - 66°43'00.0E (GDN5).

The survey carried out along the westernmost terraces of the promontory yielded evidence of human activity consisting of two scatters of fragments of *Purpura panama* marine gastropods, some 5 m in diameter, at points 25°06'46.6N - 66°42'56.3E (GDN1) and 25°07'02.1N - 66°43'10.8E (GDN2) respectively (Plate 3; Fig. 3). A few small blocks of local red flint were observed on the surface of GDN2, from which one single specimen of *P. panama* was AMS dated to

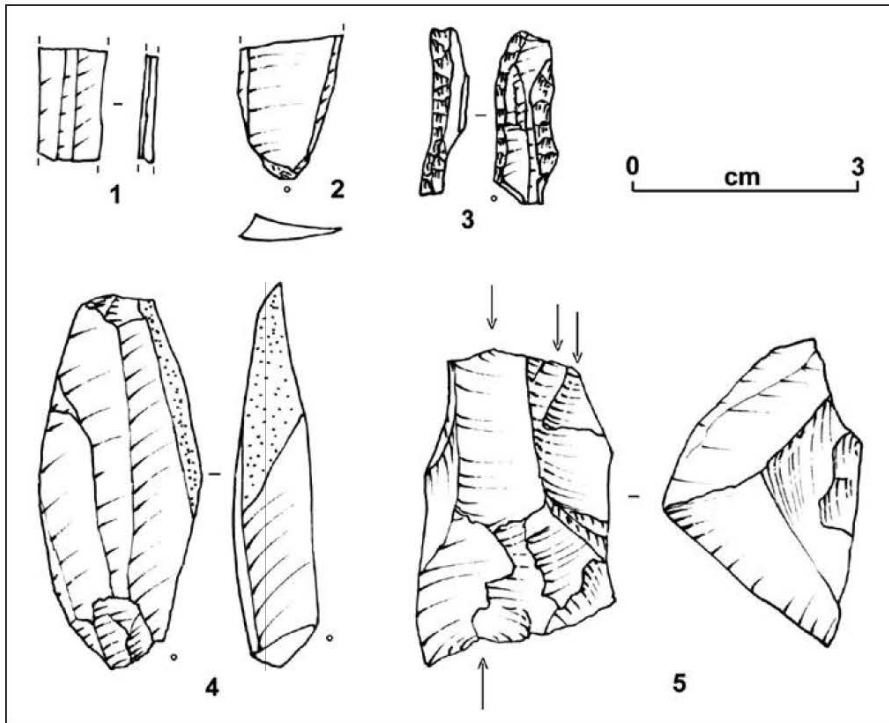
**Table 1:**

Site name	Coordinates	Altitude (m)	Lab. Number	Material	delta 13C	Age BP	Cal BC/AD 1s	Cal BC/AD 2s
GDN0	25°06'42.4N - 66°43'13.2E	24	GrN-26369	<i>T. palustris</i>	-4.99	4460±30	2452-2392	2494-2329
GDN2	25°06'46.6N - 66°42'56.3E	31	GrA-50328	<i>P. panama</i>	1.508	1130±35	1406-1474	1343-1520
PHR11	25°05'19.0N - 66°42'26.9E	19	GrA-55826	<i>T. palustris</i>	-5.09	4415±40	2418-2259	2462-2178
PHR4	25°05'14.4N - 66°42'38.3E	7	GrA-55824	<i>P. panama</i>	0.68	1115±35	1417-1481	1353-1520

7. Biagi 2003-2004.

8. Biagi 2003.





**Fig. 2:** Chipped stone artefacts from Ras Phuari: PHR3, n. 1; PHR9, n. 2; PHR11, n. 3, and Ras Gadani: GDN3, n. 4, GDD5, n. 5 (drawings by P. Biagi, inking by E. Starnini)



**Fig. 3:** Ras Gadani: GDN2, from the east and the surface of GDN1 covered with fragments of *Purpura panama* (photographs by P Biagi).



1130±35 uncal BP, 1343-1520 cal CE at 2σ (GrA-50328) (Fig. 3).

The above data suggest that Cape Gadani was visited, or briefly settled, just after the middle of the 3<sup>rd</sup> millennium cal BCE, probably by Bronze Age Indus people, who exploited the natural resources of a mangrove swamp located just north of the cape, where the Marsada Dhora watercourse flows into the sea. Remains indicate that during the 14<sup>th</sup> century CE, the site was revisited when the environmental coastal conditions had deeply changed, and the mangroves totally disappeared from the area.

Although at present it is impossible to locate precisely the red flint outcrop(s) exploited in prehistory, we know that this source started to be exploited at least since the Mesolithic. This means that Gadani flint had already attracted the attention of the last hunter-gatherers around the beginning of the Holocene. Gadani flint artefacts are known from many sites of both southwestern Sindh and Las Bela. Since the beginning of the Holocene this very distinctive raw material started to play an important cultural role that continued for a long period of prehistory. Its exploitation probably ceased at the onset of the Indus Civilisation, or immediately after, when other chert sources from Sindh, those from the Rohri Hills for example<sup>9</sup>, started to be

exploited on a much larger scale, and a complex trade network was established by Bronze Age Indus communities<sup>10</sup>.

The data from Ras Gadani provide us with an interesting, although fragmentary, picture of the activities carried out at the cape, indicating some of the environmental changes that took place in its surroundings in two well defined periods. The first is represented by *Terebralia palustris* and *Telescopium telescopium* fragments and chipped stone artefacts of both local and allochthonous sources, which indicate that some kind of activity took place at the cape, possibly related to the exploitation of a mangrove resources. The second shows that the environmental conditions of the Gadani-Phuari coastline had completely changed during the 14<sup>th</sup> century CE, as suggested by the absence of mangrove shellfish remains, and the recurrence of marine gastropods, most probably exploited for human consumption, as may be suggested by their fragmentary state.

### **Cape Phuari**

Ras Phuari was surveyed on January 21, 2012, during the search for the small Parh Limestone outcrop reported by Naseem *et al.*,<sup>11</sup> northeast of Qasim village. Although nothing was known of the archaeology of the area before 2012, several sites were discovered on that day, mainly located

9. Biagi and Starnini 2008; 2011.

10. Ajithprasad 2002, 144; Gadekar *et al.* 2003.

11. Naseem *et al.* 1996-1997, Fig. 1.





slightly in the interior of the cape. All sites were heavily damaged by recent industrial activities that compromised the archaeology of the area. A list of the sites and finds is given below together with their coordinates and altitude from present-day sea level (Plate 4).

PHR1 (25°05'20.8N - 66°42'55.6E, 13 m). From this spot, some 1 km east of the present coastline, comes one complete specimen of *Telescopium telescopium*.

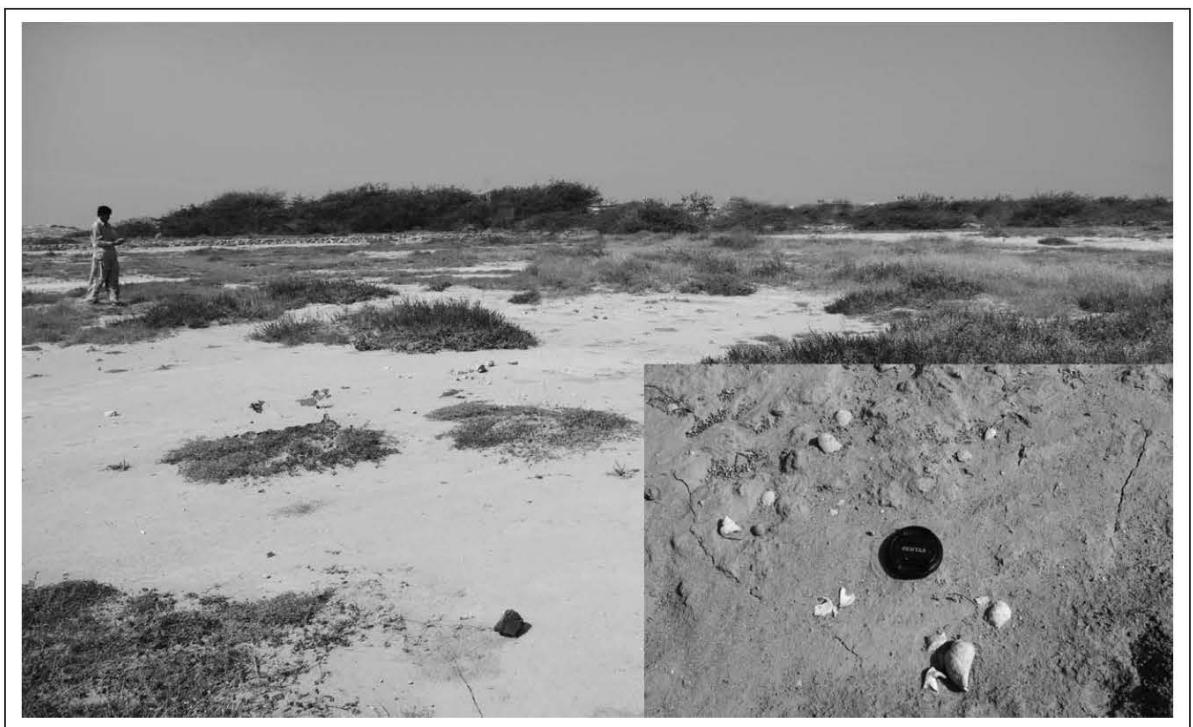
PHR2 (25°05'20.7N - 66°42'49.8E, 7 m), from which comes a retouched bladelet of exogenous pale yellow chert (2.5Y7/3).

PHR3 (25°05'18.1N - 66°42'44.9E, 8 m) where a medial fragment of an unretouched bladelet of exogenous pale yellow chert

(2.5Y7/3) was collected (Fig. 2, n. 1).

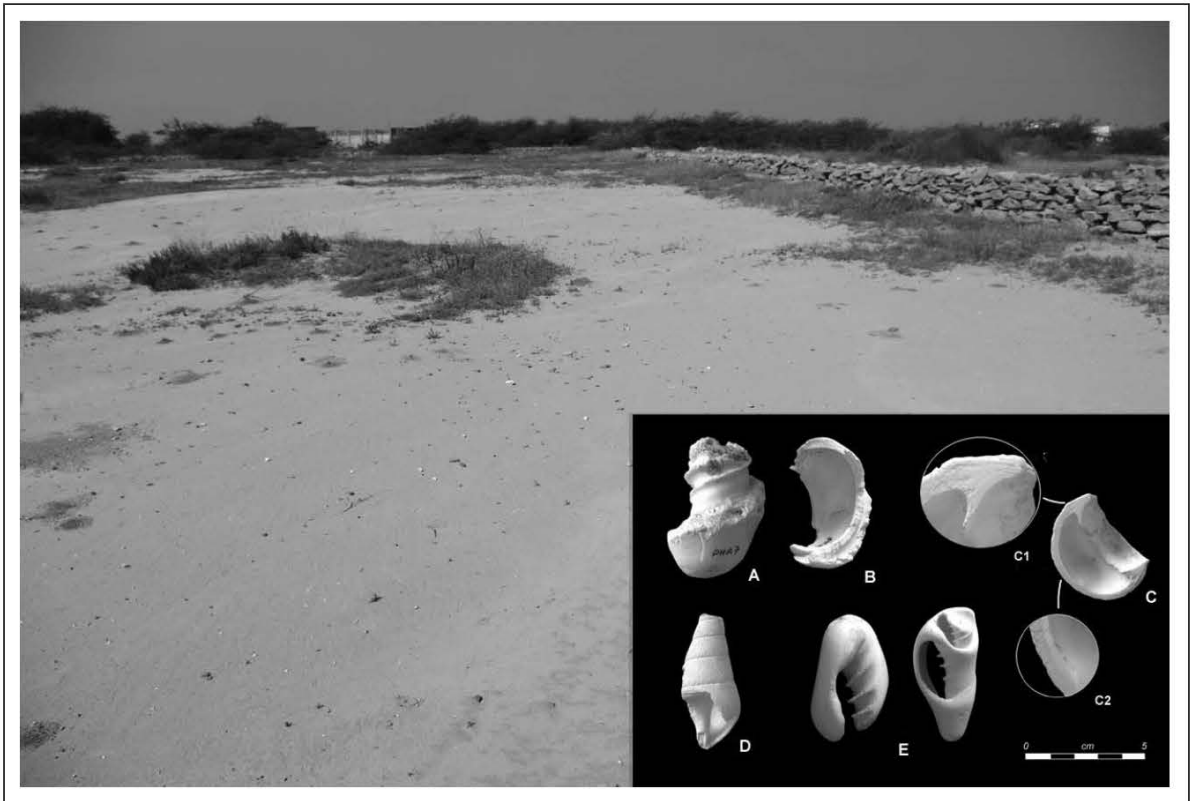
PHR4 (25°05'14.4N - 66°42'38.3E, 7 m) is a scatter of marine shells, mainly *Purpura panama*, a single specimen of which was AMS dated to 1115±35 uncal BP, 1353-1520 cal BCE at 2σ (GrA-55824). Specimens of *Architectonica perspectiva*, *Purpura bufo*, *Purpura panama*, *Anadara antiquata*, *A. rhombea*, and one single *Telescopium telescopium* were also recorded (Fig. 4).

PHR5 (25°05'15.8N - 66°42'36.4E, 7 m) is a scatter of marine gastropods (*Nerita textiles*, *Polinices mammilla*, *Purpura bufo* and *Purpura panama*) inside of which were noticed a few allochthonous small stone blocks, most probably employed for opening shells.



**Fig. 4:** Ras Phuari: PHR4 and PHR5, from the east, and the surface of PHR4 covered with fragments of *Purpura panama* (photographs by P Biagi)





**Fig. 5:** Ras Phuari: PHR8 site's surface scattered with potsherd and *Turbinella pyrum* drift fragment E) in the centre (photograph by P. Biagi). PHR 7: *Turbinella pyrum*. A, B) fragments of columella and whorl: C) cut whorl with evidence of sawn marks (C1, C2). PHR 8: D) upper part of *Tibia* cf. *insulaechorab curta*. E) drift fragments of *Turbinella pyrum* (photographs by A. Girod)

PHR6 (25°05'16.1N - 66°42'36.2E, 7 m) is a shell scatter, some 3 m in diameter, composed of the same species recorded from PHR5, with another group of allochthonous small stone blocks on its surface. This site is aligned with the preceding two.

PHR7 (25°05'16.3N - 66°42'36.0E, 8 m). From this site come specimens of *Lunella coronata*, *Polinices mammilla* and *Turbinella pyrum* with evident traces of cut marks (Fig. 5 and Plate 5). Sites PHR5, PHR6 and PHR7 are very close to each other, follow the same alignment, possibly indicate a single activity area. A few aligned stone blocks were

also recorded from this site.

PHR8 (25°05'17.0N - 66°42'37.6E, 7 m) is a scatter of marine shells and potsherds, some 8 m in diameter, located some 30 m east of PHR7. From this site come drift fragments of *Turbinella pyrum* and *Tibia* cf. *insulaechorab curta* (Fig. 5 and Plate 5) and a few specimens of *Erosaria* cf. *turdus* and *Nerita albicilla*.

PHR9 (25°05'18.2N - 66°42'28.8E, 6 m) yielded only one proximal fragment of a bladelet made from local reddish brown flint (Fig. 2, n. 2).





PHR10 (25°05'25.8N - 66°42'26.6E, 16 m) is located at the head of the cape, facing the sea. It consists of a small spot of *Terebralia palustris*, *Telescopium telescopium* and *Anadara* shells. This site did not yield any material culture remains.

PHR11 (25°05'19.0N - 66°42'26.9E, 19 m). Fragments of both *Terebralia palustris* and *Telescopium telescopium* mangrove shells were collected from a spot some 10 m in diameter, inside an area heavily damaged by recent industrial quarrying. One single specimen of *T. palustris* was AMS-dated to 4415±40 uncal BP; 2462-2178 cal BCE at 2σ (GrA-55286). The site also yielded a few chipped stone artefacts made from local reddish-brown flint, and one backed bladelet with bilateral abrupt retouch of greenish-black colour, exogenous flint (5GY2.5/1) (Fig. 2, n. 3).

## DISCUSSION

The archaeological sites discovered at Ras Gadani and Phuari contribute to the discussion of the peopling and environmental changes that took place along the eastern coast of Las Bela in two well-defined periods. Although we already knew that the important flint sources of Gadani Parh Limestone had been exploited at least since the beginning of the Holocene, no archaeological site had ever been recorded from this area, with the exception of a possible prehistoric occupation reported near

Kunari Nallah, between the two capes<sup>12</sup>.

The oldest finds so far recovered consist of chipped stone artefacts collected from GDN3, GDN4, GDN5, PHR2 and PHR3. Although their age cannot be precisely defined, nevertheless they are important because they show that the capes had been visited before the beginning of the Bronze Age by communities whose villages are most likely located in the interior region of Las Bela.

The radiocarbon dating of two single specimens of *T. palustris* from the two capes yielded almost identical results (GDN0: GrN-26369 and PHR11: GrA-55286), relevant to the exploitation of Bronze Age mangrove environments, which took place just after the development of the Mature Indus Civilisation. Very similar results have been obtained from *T. palustris* samples from eight shell middens discovered around the Bay of Daun, some 15 km south of Gadani, where concentrations of sites of different periods helped interpret the environmental changes that took place in that territory between the beginning of the 7<sup>th</sup> and the end of the 5<sup>th</sup> millennium BP<sup>13</sup>. At Daun, after a more intensive period of settlement around, and just after the middle of the 5<sup>th</sup> millennium BP, the exploitation of the mangrove resources seems to have ceased by the end of the same millennium, most probably because of the climatic deterioration that took place not only along the coast of Balochistan,

12. Khan 1979, 5.

13. Biagi *et al.* 2012



but also in other inner territories of the Indian Subcontinent<sup>14</sup>. This fact seems to be confirmed also by a *T. palustris* radiocarbon date obtained from the Indus site of Pir Shah Jurio, along the eastern bank of the Hab River, in Sindh, some 5 km from its present flow into the sea (GrN-26370: 4130±20 uncal BP)<sup>15</sup>.

The AMS dates obtained from single specimens of *P. panama* from two other shell middens discovered on the two capes produced almost identical historical results (GDN2: GrA-50328 and PHR4: GrA-55824 respectively) to be referred to episodic activities of marine shellfish consumption, most probably during the 14<sup>th</sup> century CE. It is important to point out that so far *P. panama* shells have never been recorded from the other shell middens of the Las Bela coast and the Indus delta, while this species is known from Rehri, along the terraces that face the homonymous creek, a few km east of Karachi, where a small scatter gave the result of 3225±40 uncal BP (GrA-50329: RHR1).

The presence of one sawn *Turbinella pyrum* fragment at Ras Phuari (PHR7 and PHR8) is of major importance. This species, often employed for making tools and ornaments in both Chalcolithic and Bronze

Age periods<sup>16</sup>, is known to have been used in the manufacture of beads and bangles at Early Historic<sup>17</sup>, Medieval<sup>18</sup> and Buddhist sites as well<sup>19</sup>.

To conclude, the discovery and radiocarbon dating of the archaeological sites of Ras Gadani and Phuari contribute to the knowledge of the exploitation of mangrove, marine and terrestrial resources in this part of the northern Arabian Sea coast in two different prehistoric and historic periods. Although we still know little of the exploitation of the red flint sources of Cape Gadani, the recent discoveries made in Lower Sindh and Las Bela show that this important raw material was used for a long period, as revealed by the chipped stone assemblages recovered from Lake Siranda shell middens<sup>20</sup>.

Furthermore they contribute to the interpretation of the environmental changes that took place along the coast of Balochistan. They show that prehistoric mangroves started to retreat just after their maximum expansion, around the middle of the 5<sup>th</sup> millennium BP, and probably ceased to exist by the end of the same millennium, similar to what is known from other regions of the western coast of the Indian Ocean<sup>21</sup>. In effect, with the exception of the classical

---

14. See for instance Staubwasser et al. 2003; Kajale et al. 2004.

15. Biagi 2013: Table 1.

16. Deshpande-Mukherjee 2005; Gaur et al. 2005.

17. Deshpande-Mukherjee 2008.

18. Deshpande-Mukherjee 2011-2012.

19. P.B. personal observation from Lower Sindh.

20. Biagi et al. 2013.

21. Berger et al. 2013.



narratives about Las Bela (Oritania) and Makran (Gedrosia)<sup>22</sup>, very little is known of the history of the mangrove forests along the northern coast of the Arabian Sea - for instance, those of Karachi Gulf, the Indus Delta<sup>23</sup> and Miani Hor<sup>24</sup> - after the retreat of the Macedonian army. At present the absence of archaeological evidence contrasts with the chronicles of the classical authors, according to which the northern Arabian Sea coast was settled by fish-eaters in both Hellenistic<sup>25</sup> and later historic periods<sup>26</sup>. In this respect the discovery of scatters of fragmented marine gastropods, AMS dated to the 14<sup>th</sup> century CE, when the Sammas ruled over Sindh and Las Bela<sup>27</sup>, is remarkable, given that so far all the surveys conducted along the northern coast of the Arabian Sea did not yield any evidence of historic shell middens<sup>28</sup>.

## ACKNOWLEDGEMENT

The authors are very grateful to Professors A.R. Khan and S. Akhtar of the Department of Geography, Karachi University, Professor M.K. Badini of the Department of Computer

Sciences, University of Balochistan (UOB), Quetta, Mr. I. Badini of Las Bela University of Agriculture, Water and Marine Sciences (LUAWMS) for their help during the survey of the sites, and to Dr. Monica Leonardi (Natural History Museum, Milan, Italy) for the identification of the marine shells. Special thanks are due Professor L. Flam (CUNY University, New York, USA) for the revision of the original English text and the useful suggestions, and to Dr. E. Starnini (Turin University, Italy) for rearranging Figs. 1-3 and Plate 1.

The research at Ras Gadani and Phuari was carried out thanks to the financial support of the Italian Ministry of Foreign Affairs (MAE, Rome) and the Archaeology Research Funds of Ca' Foscari University, Venice. The AMS dates were possible thanks to a grant from EURAL Gnutti (Rovato, Brescia, Italy).

---

22. See for instance Arrian: VI, 22: 6-8.

23. Qureshi 1990.

24. Saifullah and Rasool 2002.

25. See for instance Arrian, VI: 23: 3.

26. McCrindle 1973; Eggermont 1975.

27. Collinet 2008.

28. Stein 1943; Sanlaville et al. 1991.



## References

- Ajithprasad, P. 2002. The Pre-Harappan Cultures of Gujarat, in *Indian Archaeology in Retrospect. Protohistory Archaeology of the Harappan Civilization* 9S. Settar and R. Korisettar Eds.), Volume II: 129-158. ICHR Manohar, Delhi.
- Arrian. *Alexandrou Anabasis*. Biblioteca Universale Rizzoli, Milano. 1994.
- Belcher, W.R. 1999. The Ethnoarchaeology of Fishing in a Baluch Village, in *Archaeology of Seafaring. The Indian Ocean in the Ancient Period* (H.P. Ray Ed.). Indian Council of Historical Research Monograph Series 1: 22-50. Pragati Publications, Delhi.
- Berger, J.F., V. Charpentier, R. Crassard, C. Martin, G. Davtian and J.A. López-Sáez, 2013. The dynamics of mangrove ecosystems, changes in sea level and strategies of Neolithic settlements along the coast of Oman (6000-3000 cal. BCE), *Journal of Archaeological Science* 40: 3087-3104.
- Biagi, P. 2003-2004. The Mesolithic Settlement of Sindh (Pakistan): A Preliminary Assessment, *Præhistoria* 4-5: 195-220.
- Biagi, P. 2013. The shell middens of Las Bela coast and the Indus delta (Arabian Sea, Pakistan), *Arabian Archaeology and Epigraphy* 24: 9-14.
- Biagi, P., A. Girod, R. Nisbet and T. Fantuzzi 2013. The Middle Holocene mangrove shellfish gatherers of Las Bela coast (Balochistan, Pakistan): new AMS dates from Lake Siranda shell middens. *Antiquity Project Gallery* 87 (337). <http://Antiquity.ac.uk/projgall/biagi337>.
- Biagi, P., T. Fantuzzi and C. Franco 2012. The shell middens of the Bay of Daun: environmental changes and human impact along the coast of Las Bela (Balochistan, Pakistan) between the 8<sup>th</sup> and the 5<sup>th</sup> millennium BP, *Eurasian Prehistory* 9 (1-2): 29-49.
- Biagi, P. and E. Starnini 2008. The Bronze Age Indus Quarries of the Rohri Hills and Ongar in Sindh (Pakistan), in *Geoarchaeology and Archaeomineralogy, Proceedings of the International Conference* (R.I. Kostov, B. Gaydarska and M. Gurova Eds.), pp. 77-82. Sofia: St. Ivan Rilski.
- Biagi, P. and E. Starnini 2011. Technological choices and lithic production in the Indus period: Case studies from Sindh (Pakistan), *Iranian Archaeology* 2: 21-33.
- Collinet, A. 2008. Chronology of Sehwan Sharif through Ceramics (the Islamic period). In M. Boivin (ed.) *Sindh through History and Representations. French Contributions to Sindhi Studies*. Oxford University Press, Karachi: 3-21.
- Deshpande-Mukherjee, A. 2005. Marine shell utilisation by the Chalcolithic societies of the western Deccan region of India, in *Archaeomalacology: Molluscs in former environments and human behaviour* (D.E. Bar-Yosef Mayer Ed.), pp. 174-184. Oxford: Proceedings of the 9<sup>th</sup> ICAZ Conference, Durham 2002, Oxbow Books, Oxford.
- Deshpande-Mukherjee, A. 2008. Archaeomalacological Research in India with Special Reference to Early Historic Exploitation of the Sacred Conch Shell (*Turbinella pyrum*) in Western Deccan, in *Early Human Impact on Megamolluscs* (A. Antczak and R. Cipriani Eds.). Oxford : BAR International Series 1865: 209-222, Archaeopress.
- Deshpande-Mukherjee, A. 2011-2012. Medieval use of Oyster (*Crassostrea Gryphoides*) and Chank (*Turbinella Pyrum*) resources on the Indian west Coast: Evidence from Sanjan, *Journal of Indian Ocean Archaeology* 7 & 8: 8-21.
- 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.
- Gadekar, C., S.V. Rajesh and P. Ajithprasad, 2013. *Shikarpur Lithic Assemblage: New Questions Regarding Rohri Chert Blade Production*. Poster presented at ArheoInvest Symposium, Iasi, August 2013.
- Gaur, A.S., S. Patankar and V. Patankar, 2005. Ancient shell industry at Bed Dwarka Island, *Current Science* 89 (6): 941-946.
- Kajale, M.D., B.C. Deotare and S.H. Rajaguru, 2004. Palaeomonsoons and Palaeoclimatic Background to the Prehistoric Cultures of the Western and Central Thar Desert, Rajasthan, Northwestern India, in *Monsoon and Civilization* (Y. Yasuda and V. Shinde Eds.), pp. 83-98. Singapore : Lustre Press.
- Khan, A.R. 1973. *Geological Investigation of the Area Between Gadani and Cape Monze Pakistan*. Government of Pakistan, Geological Survey of Pakistan. Information Release No 66. Director General, Geological Survey of Pakistan, Quetta.



Khan, A.R. 1979. Ancient Settlements in Karachi Region, in *Studies in Geomorphology and Prehistory of Sind*. Grassroots, Special Issue, III (2) (A.R. Khan Ed.), pp. 1-24. Jamshoro.

McCrinkle, J.W. 1973. *The Commerce and Navigation of the Erythraean Sea; being a Translation of the Periplus Maris Erythraei by an Anonymous Writer and partly from Arrian's Account of the Voyage of Nearkhos*. Amsterdam: Philo Press (1<sup>st</sup> reprint).

Naseem, S., S.A. Sheikh and M. Qadeeruddin, 1996-1997. Geochemistry and Tectonic Setting of Gadani-Phuari Segment of Bela Ophiolites, Balochistan, Pakistan, *Journal of King Abdulaziz University. Earth Sciences* 9: 127-144.

Qureshi, M.T. 1990. *Experimental Plantation for Rehabilitation of Mangrove Forests in Pakistan. First Report*. UNDP/UNESCO Regional Project for Research and its Application to the Management of the Mangroves of Asia and the Pacific (RAS/86/120). Sind Forest Department. Government of Sind, Karachi, Pakistan.

Saifullah, S.M. and F. Rasool, 2002. Mangroves of Miani Hor Lagoon on the North Arabian Sea Coast of Pakistan, *Pakistan Journal of Botany* 34 (3): 303-310.

Sanlaville, P., R. Besenval R., J. Evin and A. Prieur, 1991. Évolution de la région littorale du Makran Pakistanais à l'Holocène, *Paléorient* 17 (1): 3-18.

Sarwar, G. 1992. Tectonic Setting of the Bela Ophiolites, Southern Pakistan, *Tectonophysics* 207: 359-381.

Staubwasser, M., F. Sirocko, P.M. Gootes and M. Segl, 2003. Climate change at the 4.2 ka BP termination of the Indus valley civilization and the Holocene south Asian monsoon variability, *Geophysical Research Letters* 30 (8): 1425-1428. doi:10.1029/GLO16822.

Stein, Sir A. 1943. On Alexander's Route into Gedrosia: An Archaeological Tour in Las Bela, *The Geographical Journal* CII (5-6): 193-227.







**Paolo Biagi, Renato Nisbet and Alberto Girod**, Plate 1: Ras Gadani: flint nodule inside the Parh Limestone deposits (photograph by P. Biagi).



**Paolo Biagi, Renato Nisbet and Alberto Girod**, Plate 2: Ras Gadani: small blocks and flakes of local red flint on the surface of the area of GDN0 in 2002 (photograph by P Biagi).



**Paolo Biagi, Renato Nisbet and Alberto Girod**, Plate 3: Ras Gadani: distribution map of the sites mentioned in the text (drawing by R. Nisbet and P. Biagi).





**Paolo Biagi, Renato Nisbet and Alberto Girod**, Plate 4: Ras Phuari: distribution map of the sites mentioned in the text (drawing by R. Nisbet and P. Biagi).



**Paolo Biagi, Renato Nisbet and Alberto Girod**, Plate 5: Ras Phuari: PHR8 site's surface scattered with potsherd and *Turbinella pyrum* drift fragment E) in the centre (photograph by P. Biagi). PHR 7: *Turbinella pyrum*. A, B) fragments of columella and whorl: C) cut whorl with evidence of sawn marks (C1, C2). PHR 8: D) upper part of *Tibia* cf. *insulaechorab curta*. E) drift fragments of *Turbinella pyrum* (photographs by A. Girod).