

Marine Archaeological Explorations on the Southwestern Coast of Saurashtra, India

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Marine archaeological investigations brought to light a large number of antiquities suggesting active maritime practices along the Saurashtra coast dating back to the Indus Valley Civilization. Recent underwater explorations between Miyani and Madhavpur on the Saurashtra coast yielded the remains of jetties along the Porbandar creek, stone anchors at Srinagar, Ghumli and Tukda. Stone anchors were also reported off Miyani (Harshad Mata) and Kindari creek. The discovery of these stone anchors also indicate that the mouth of creeks had been extensively used as anchoring points by ancient mariners. This is one parameter to explain anchoring points and existence of ancient ports on the coast of India.

Creeks and the banks of tidal rivers had provided sheltered harbours for ancient settlers on the Saurashtra coast. This coast has been a focal point for marine archaeological research in India. A large number of archaeological sites of different periods have been discovered and a few of them have been extensively excavated. The antiquities of these sites indicate active maritime practices in this part of the Indian subcontinent. Important coastal sites that have been excavated so far are Lothal (Rao 1979), Padri (Shinde 1992), Somnath (Sankalia 1974), Hathab (Pramanik 2004), Bet Dwarka (Gaur *et al* 2006), Porbandar (Gaur *et al* 2004), Bet Dwarka (Sundaresh *et al.* 2002) and Somnath (Rao *et al* 2000).

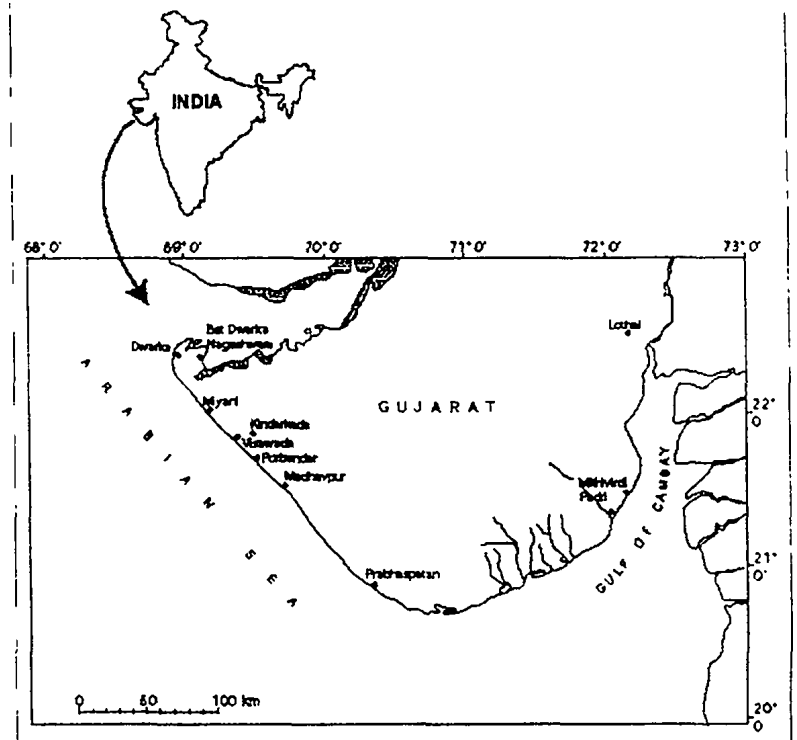


Fig.1. Location of archaeological sites on the Saurashtra coast

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According to ancient literature, Saurashtra was variously known as *Surasta* (in Sanskrit), *Suratta* (in Pali), *Su-la-cha* (in Chinese) and *Syrastrone* (in Greek). Several ports and coastal towns on the Saurashtra coast have been mentioned in foreign literature: Barake (Dwarka/Bet Dwarka), Bardaxema (Srinagar near Porbandar), Ariake (estuarine area of Mahi, Narmada and Tapi), Astakapra (Hathab), Papike (Goga) and Barygaza (Bharuch) (McCrinkle 1885),

This paper deals with marine archaeological explorations carried out between Miyani (Harshad Mata) on the west and Madhavpur on the east on the Saurashtra coast during two seasons (2003-05 and 2005-06). The paper also discusses the identification of ancient ports and anchoring points on the coast (Fig.1).

The southwest coast of Saurashtra faces the Arabian Sea. From Dwarka to Veraval, the coast has a characteristically straight NW-SE trend marked by well developed sandy beaches. The beach sands are unusual in the sense that they are calcareous and dominated by bio-clasts. The consolidated ancient equivalents of these biogenic sands are the famous miliolite rocks. The miliolites underlie the beach sands and occur as cliffs, wave-cut platforms and submerged dunes all along the shoreline indicating quarternary sea-level fluctuations. The shoreline features between Veraval and Diu (E-W) generally are identical to those occurring along the Dwarka and Veraval coast. The coastal segment to the east of Diu to Bhavnagar

shows a transition from open sea to gulf environment. The abundance of tidal mud to the east of Diu points to the influence of the Gulf of Khambat. The eastern coast of Saurashtra extends upto Bhavnagar, beyond which it becomes part of the Gulf of Khambat. The river Shetrunji, which meets the Gulf near Gopnath, forms a prominent estuarine delta at Saltanpur. From Gopnath to Ghogha the coastline is rocky with small narrow non-calcareous sandy beaches.

METHODOLOGY

Initially, onshore explorations have been conducted between Miyani and Madhavpur and the artifacts were recorded with the help of photography and drawings. Offshore explorations have been initiated off the creeks of Porbandar, Miyani and Kindari and located artifacts were recorded with photography and drawings. Positions *at sea* were obtained using Global Positioning System (GPS) and were plotted subsequently on the map.

RESULTS

A brief description of the findings is given below:

Onshore Explorations

A late Harappan site was discovered along the Porbandar creek. The pottery types, fabric and paintings are similar to those reported from Rangpur (Rao 1962-63), Bet Dwarka (Gaur and Sundaresh 2003) and Rojdi (Possehl 1989).



Stone Anchors

Different types of 5 stone anchors have been noticed at Miyani, Srinagar, Kindar Kheda, Ghumli and Tukda. A brief description of the anchors is given below:

1. The stone anchor from Miyani is lying near the temple complex (Fig.2). It is single holed, irregular in shape and made of limestone. The hole is well preserved and suggests comparatively less use.
2. Triangular in shape. Only one hole on the upper side is noticed and lying near the village of Srinagar. Presently used to tie goats and other animals. It is made of conglomeratic rock, which is yellow in colour.
3. A single holed stone anchor is lying in an agriculture land near a late Harappan settlement at Kindar Kheda. It is made of limestone.
4. Grapnel anchor lying in intertidal zone of Tukda. Upper portion of it is broken while lower two square holes are well preserved. It is made of conglomeratic rock.
5. Ring stone lying near the temple complex of Ghumli (Fig.3). It is of circular shape and pierced in the middle. It is made of basalt rock.

Offshore Explorations

Underwater explorations have been carried out at three locations between Porbandar on the east and Miyani (Harshad Mata) on the west. These locations are off Porbandar, off Kindari Creek (Visvada) and off Miyani (Harshad Mata). The detailed description of

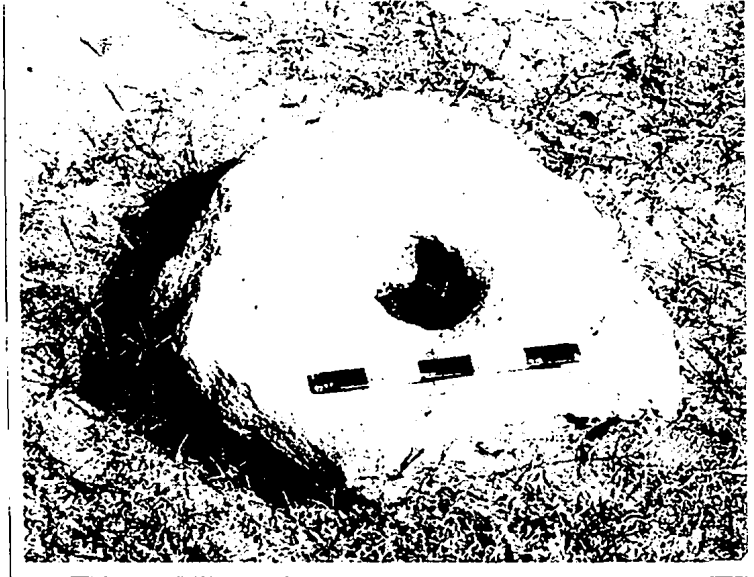


Fig.2. Single-holed anchor lying in a temple complex at Miyani

the explorations and findings from each location are given below.

Miyani (Harshad Mata)

The exploration has been concentrated about



Fig.3. Ring stone was noticed in a temple complex at Ghumli



1 km southeast of the Harshad Mata temple (Fig.4). The seabed consists of rocky formations and clayey sand patches. Vegetation growth was also observed, consisting mainly of a variety of seaweed. The water depth varies between 5 to 7 metres.

type have been reported from this area and 4 of them have complete shape while the remaining 2 are fragments. Most of the anchors lack upper circular holes except anchor 4 and 6. Anchor numbers 2 and 3 were found partially buried in sediment and others were noticed exposed on the rocky seabed. Anchor numbers 1 and 2 are made of sandstone and basalt rocks respectively and the remaining anchors are made of limestone. The heaviest anchor weighs over 200 kg (estimated).

Ring Stone Anchor: There are 4 ring stone anchors noticed off Miyani and one of them is lying exposed in a channel. It has an uneven and porous surface. A wide middle hole suggests extensive use of this anchor.

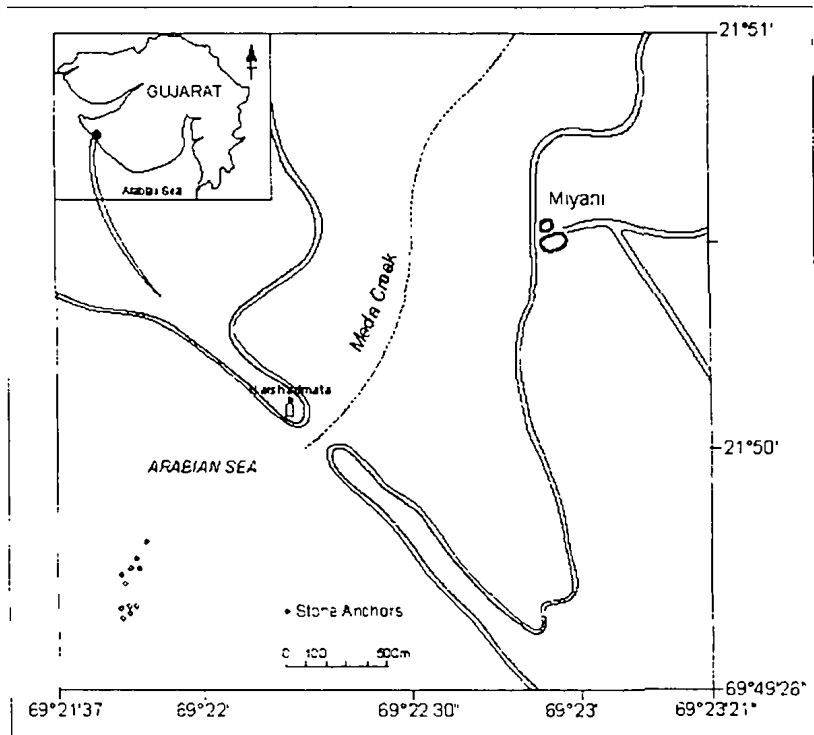


Fig.4. Location of stone anchors off Miyani

Visibility is poor. Twelve stone anchors were found from this location. The brief description of a few anchors is as follows:

Composite Type Anchors: There are two composite anchors found from Miyani waters. Anchor number 7 has only one hole and is irregular in shape whereas anchor number 8 has perfect triangular shape with all holes circular (Fig.5). Both anchors are made of limestone.

Grapple Anchors: Six anchors of grapple

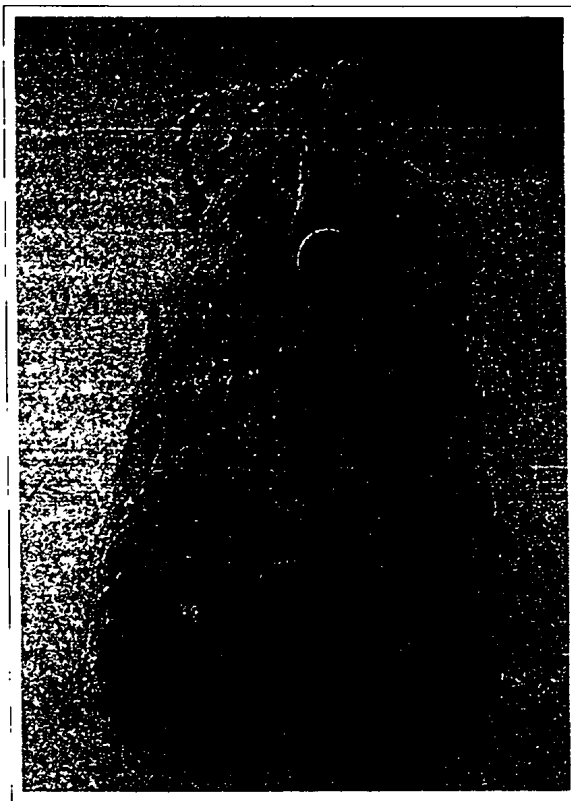


Fig.5. Composite stone anchor from Miyani



The second anchor, heavily eroded, lay partially exposed. The hole has been widened on the upper side while on the lower side the same is preserved. Another small size with uneven shape has been noticed exposed on the sandy seabed. All artifacts are made of limestone.

Kindari Creek

The area of expansion is located about 1 km off the mouth of Kindari creek (Fig.6). The seabed consists of rock boulders and a uniform formation with several channels. Also, fine sand deposits were noticed in patches. Vegetation growth was also observed which mainly comprises of seaweeds and grass. At places coral growth was noticed. Visibility is excellent. Fourteen artifacts were noticed during the exploration. A brief description of some of the anchors is given below.

Grapnel Anchors: Two huge grapnel or Indo-Arab type of stone anchors were discovered from here: One anchor is broken on its lower side and has an upper circular hole while one broken lower hole was noticed. It is lying exposed on a rocky seabed in 7-8 m water depth. The anchor has smooth and even surface, and blunt edges. The other anchor is perfectly shaped with an upper circular hole and two lower rectangular holes (Fig.7). This anchor lies partially buried in a sandy channel. The anchor is made of basalt and chisel marks are noticeable on the surface as well as in the holes.

Composite Anchors: There are ten composite stone anchors of different sizes.

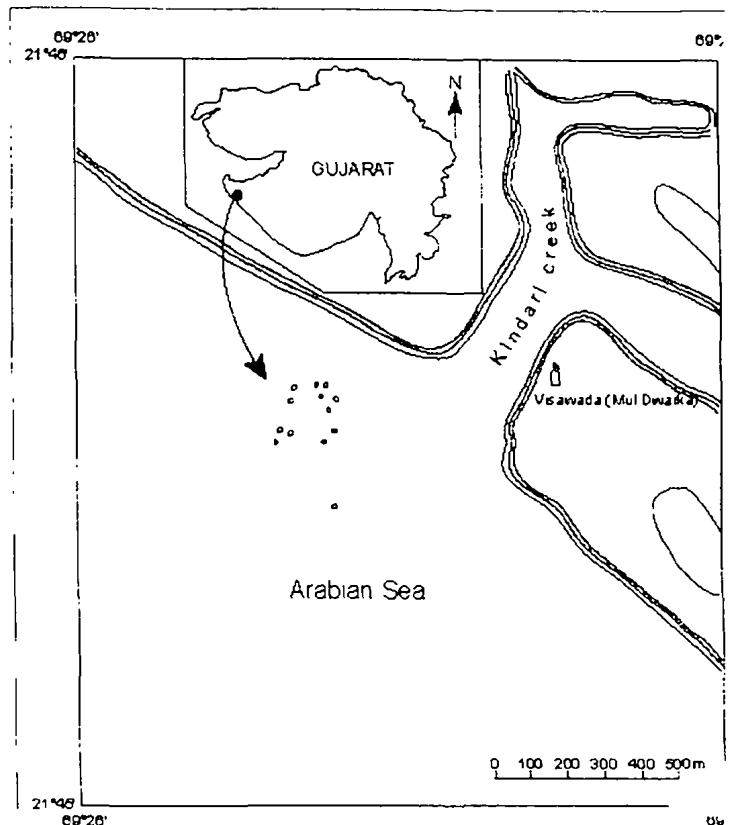


Fig.6. Location of stone anchors off Visawada

On the basis of shape, they can be divided into 3 main groups (1) triangular shape, (2) trapezoidal shape and (3) upper portion with semicircular shape. Anchor number 1 falls in the first category. It lies in a sandy channel and is very small in size. It has a perfect triangular shape with an upper circular hole and has two lower square holes. Anchor number 6 represents the second group. It has a larger dimension at a lower level relative to the upper surface. However, other features are same as the triangular shaped anchors. Anchor number 5 falls in the third category with a semicircular top and rest of the features are similar to other





Fig.7. Indo-Arab type stone anchor from Visawada

type of anchors (Fig.8). The remaining anchors have some or other parts broken, and therefore, categorization is not possible. One of the heaviest anchors (number 4) is lying at 5 m water depth and its estimated weight is 340 kg. Another anchor (number 9) has all three holes of square shape. Entire group of anchors are made of locally available limestone.

Ring Stone Anchor: There are two anchors in this group. One is half broken found lying in a sandy channel. It is small in size and has a circular hole in the middle. The other

anchor is complete in shape. However, it has a rough surface. A circular hole in the middle of the stone makes it ring type. Both anchors are made of limestone.

Porbandar

The offshore explorations were carried out southeast of the present creek and off Indra Deva temple. The water depths vary between 5 and 8 m. A dense growth of corals was also observed. The seabed consisted of high rock patches with fine sand and clay. There are 3 stone sculptures, a stone anchor (?), the remains of a shipwreck and two iron anchors.



Fig.8. Composite stone anchor from Visawada



A brief description of these findings is given below.

Remains of a wreck: A number of scattered pieces of the iron hulled wreck are lying in a channel and are partially buried in sediment. They are covered with a layer of genuine marine growth. An iron sheet could be noticed and a few iron angles are lying near this place. The major portion of the wreck has been washed away.

Iron Anchors: Two iron anchors have been discovered in the Porbandar waters. One anchor is lying close to the wreck area. It is located below the rocky cliff and partially buried in sediments. It has 5 prongs and its shaft is buried under sediment. Another anchor is lying in a channel and a major portion of the anchor is below the sediment. This two-pronged anchor appears to be of the British admiralty type (Fig.9).

DISCUSSION

The onshore and offshore explorations in this area have been very successful in the sense of antiquities observed and has opened up a new horizon for future underwater exploration in this area. The history of Porbandar area has been pushed back to the 2nd millennium BCE on the basis of the discovery of a late Harappan site along the Porbandar creek.

Saurashtra continues to be an important area for the reconstruction of maritime history of the country. Offshore and onshore exploration on this coast yielded a large number of antiquities suggesting active maritime activity in the past. The

findings of 26 stone anchors similar to those from Dwarka (Gaur *et al.* 2001), Bet Dwarka (Gaur *et al.* 2005) and Somnath (Gaur *et al.* 2002) suggest that Miyani (Harshad Mata) and Visawada (Mul Dwarka) were also contemporary ports in the historical and medieval periods. The discovery of similar types of anchors also indicates an ancient route and anchorage along the Saurashtra coast. An anchor discovered from Kindar Kheda may be dated to the 2nd millennium BCE, as there is a settlement of the Harappan period in the area (Gaur and Sundaresh 2005).

One of the most important aspects of the Saurashtra coast exploration is the identification of ports and anchoring points on the basis of discoveries of jetties and stone anchors along the coastal area. The present study indicates that the creeks and the tidal

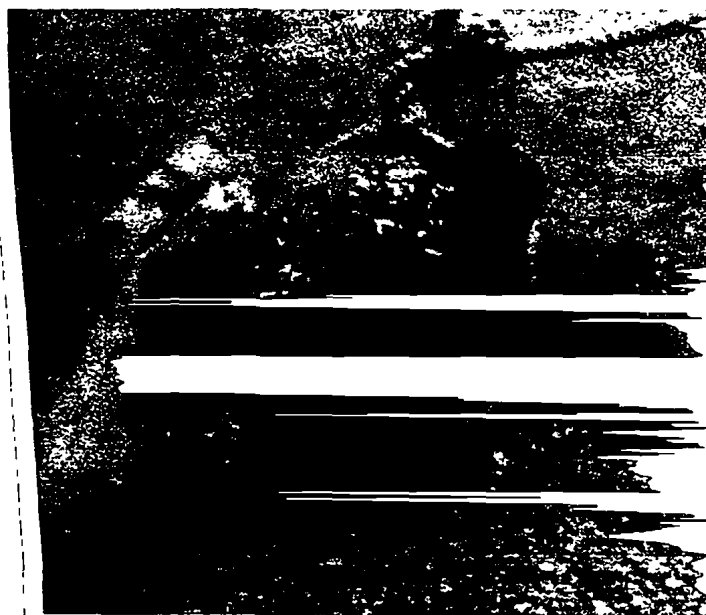


Fig.9. Partially buried British Period Iron Anchor from Porbandar



rivers on the Saurashtra coast have been used as navigational channels connecting with the open sea and this has been proven with the discovery of jetties along Porabandar and Miyani creeks while Kindari creek has been silted up and hardly any remains could be noticed on the land. Offshore explorations have yielded antiquities suggesting that mouths of creeks were usually used as anchoring points for large-sized boats. Thus the anchoring points on the Saurashtra coast have been between 5 to 15 m water depths. This is stated on the basis of finding of stone anchors from respective regions.

Underwater investigation off Miyani (Harshad Mata) has provided evidence for the establishment of an ancient port and its ancient anchoring point. Presence of Indo-Arab type of anchors suggests that this was an active port during the early medieval period. As per the information from a local historian, Miyani was a very active port during the medieval period and boats like Arab dhows could enter the Miyani creek. Miyani village is famous for its beautiful temples of the Solanki period.

Similarly, the discovery of stone anchors from Kindari Creek (Mul Dwarka) suggests that this was a small port during historical times. The discovery of often composite type of anchors suggests that this port might have been older than Miyani port. Archaeological findings from onshore area of Kindari creek is dated to the historical period (Rao 1990). Therefore, there is a strong possibility that this might have been an active port during the early historical period. These two sites

have provided additional data on the ancient port installation and anchoring points on the Saurashtra coast during the historical and medieval periods.

CONCLUSION

Marine archaeological investigations on the Saurashtra coast have provided much needed scope of marine archaeological research in this area. The archaeological findings from the onshore and offshore explorations suggest that Miyani and Mul Dwarka were active ports during the historical and medieval periods besides Dwarka and Bet Dwarka on the Saurashtra coast. However, an anchor discovered from Kindar Kheda may be dated to the Harappan period as there was a settlement dating back to the early 2nd millennium BCE in this area. The most important aspect of this study is the identification of the ancient ports on the basis of geographical information. The most potential places would be the creeks and river mouths and this parameter could be used for marine archaeological research along the other coastal areas of the Indian subcontinent.

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