

GEOARCHAEOLOGY OF THE MARITIME REGION IN NORTHEAST VIETNAM

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ABSTRACT

The northeast maritime region of Vietnam, consisting of Quang Ninh Province and Hai Phong city, covers approximately 7500 km² and incorporates over 3000 islands. The prehistory of the region reflects fluctuations in sea level and exchanges between cultural regions, especially during the Hoabinhian and Bacsonian periods. This research uses radiocarbon, geological and archaeological data to describe a five stage model for the region's geoarchaeological evolution.

SEA LEVEL FLUCTUATIONS AND GEOARCHAEOLOGICAL EVOLUTION

In the late 19th century, French geologists paid close attention to the geology and archaeology of the study region (Fig. 1). Since then, several archaeological and geological investigations have been published (Anderson 1939; Ha Van Tan 1997; Ha Huu Nga 2002; Tran et al. 2004; Doan and Boyd 2001; Haruyama *et al.* 2001; Ngo and Tran 2004; Fontaine 2004; Department 2004). In particular, ancient marine terraces and sediments have been radiocarbon dated (Table 1). These radiocarbon dates are used here in uncalibrated form to create a geoarchaeological picture of the maritime northeast region. This reconstruction is divided into several time periods.

The late Pleistocene, to 20,000 BP

During the last glaciation, regional sea-level was decreasing, but not regularly. From 33,000 to 20,000 BP, the rate of sea level fall accelerated. Regional climate changed from wet and warm to cold and dry.

20,000 to 7000 BP

In the early part of this period the regional sea level was at its lowest, 120 m lower than present. The ancient marine shoreline lay in places hundreds of kilometers east of its current position. The modern maritime areas and the islands of Ha Long Bay formed the surface of a large, low-lying plateau, across which palaeo-rivers flowed.

The even and flat terrain, abundant freshwater and a wetter and warmer coastal climate encouraged transport and mobility. Emigration of people from the mountains

eastward towards the low-lying coastal plains probably occurred, where there were abundant natural resources and it was warmer. These movements contributed to create the Soi Nhu culture. Based on radiocarbon dates from freshwater shells, the age of the Soi Nhu occupation during this period is between 16,000 and 10,000 BP (Table 1).

After reaching its lowest stage, the regional sea level began to rise slowly. This was associated with a change in climate from cold and dry to wet and warm. The Soi Nhu inhabitants gathered in small groups and settled in limestone caves, collected freshwater molluscs, hunted and conducted cultural exchanges between groups, particularly with the Hoabinhian and Bacsonian inhabitants of the mountainous areas. Such exchanges are demonstrated by the edge-ground axes (Bacsonian typology) collected from the Soi Nhu cultural region. Marine shells are also found in Bacsonian sites inland, and kitchen deposits with *Melania* sp. shells occur in both regions (Ha and Nguyen 2002: 45-46; Colani 1938).

Around 10,000 BP, sea level was still about 30 m lower than present, and was rising slowly. The hot and wet weather caused the expansion of maritime salt-marsh forests. Traces of these forests are observed as thick peat sediments that extend as far inland as Hanoi. The more productive environment and the abundant nutrient supply resulted in increasing sizes of the fresh water molluscs found in the cultural layers. One of the largest recorded shell mounds is that in Tien Ong cave. In contrast to the Hoabinh-Bacsonian sites, Soi Nhu sites rarely produce pebble tools and flakes. Although fishing equipment is not found, Nguyen Khac Su (2005) suggests that the Soi Nhu inhabitants began limited exploitation of marine products at this time.

7000 BP to 5000 BP

In this period, regional sea level increased to its mid-Holocene high (Nguyen and Le 2000; Doan and Boyd 2001; Nguyen and Bui 2003). The ¹⁴C dates for ancient marine traces in limestone caves in Ha Long Bay and Ninh Binh Province have shown that the sea reached its present level about 6200 BP. After that, marine transgression took place more quickly, so that by 5500 BP it reached 3 m higher than present. Thus, in comparison to the Hoabinh and Bacson cultures, the Soi Nhu culture had to move in an opposite direction, from the drowning

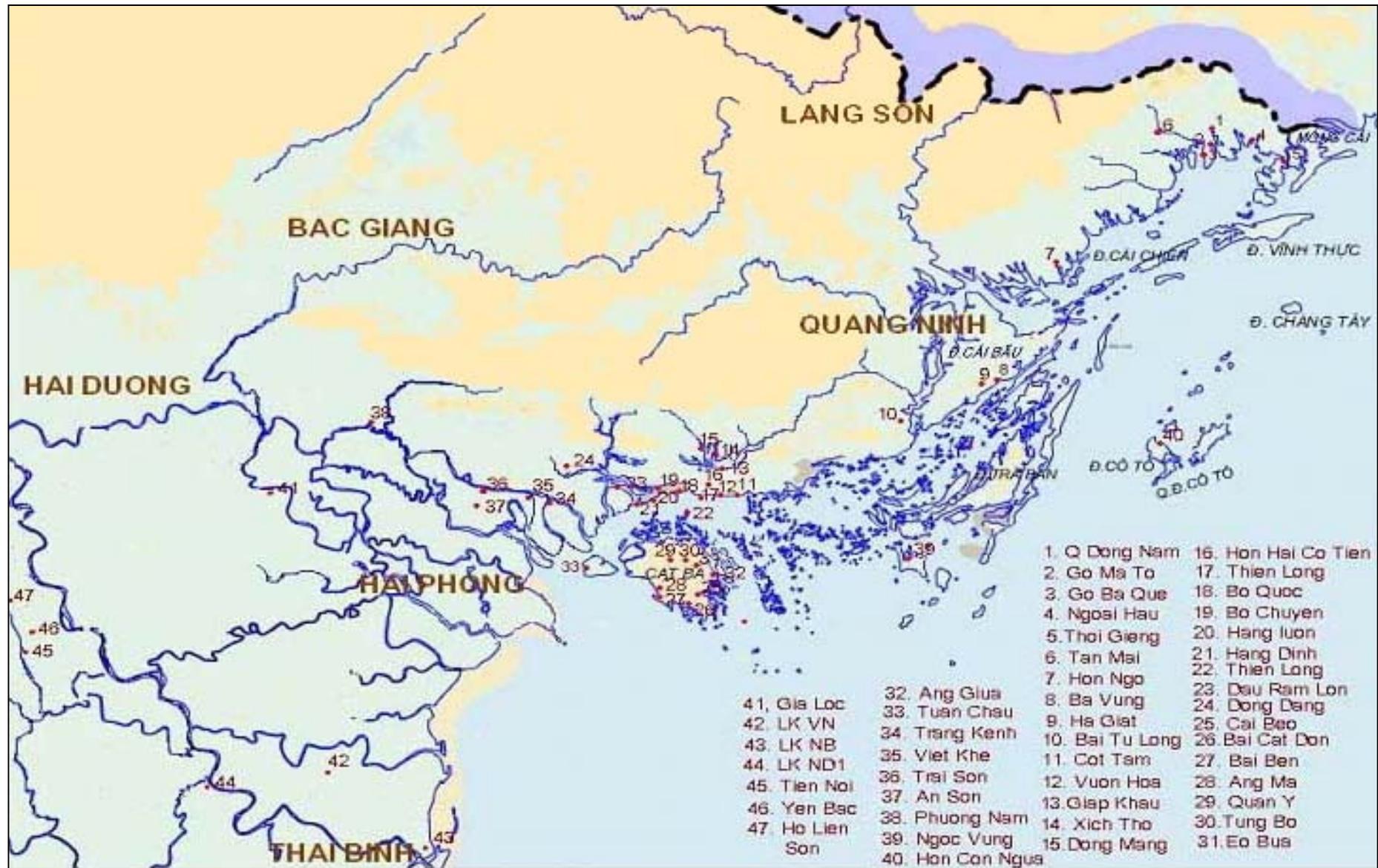


Figure 1. Distribution of maritime sites in northeast Vietnam

coastline back inland in order to avoid the marine transgression.

5000 to 3000 BP

This period spans the formation and development of the Ha Long culture (Danh Do La culture), named first by Anderson (1939). In the Ha Long culture, fishing was a traditional occupation and new techniques in making stone tools were developed. This is demonstrated by the shouldered axes that were usually made by sawing and polishing (Ha Van Tan 1997: 418-419).

In this period, the sea level was at its maximum during the middle Holocene transgression. The coastal landscape at this time contained the following features:

1. *Coastal intertidal flats*, usually extensive and spanning Yen Mo and Thuy Nguyen districts and also along the seacoast in Quang Yen, Hai Ninh and Quang Ha. They were usually advantageous areas for cultivation and fish farming and were, therefore, often cleared and settled by Ha Long culture inhabitants. In the tidal flats of Ha Long Bay there are still small hills that are several hundred square meters in area and about 2-4 m high. These were also advantageous places for residence for many ancient Ha Long cultures.
2. *Maritime sand terraces* consisting of sand ridge complexes and sand dunes, distributed amongst islands in Ha Long Bay, Cat Ba Island and Thuy Nguyen district. Within these sediments are marine molluscs and numerous Ha Long artifacts. The typical sites of this period include Cai Beo, Ngoc Vung, Bai Ben and Bai Cat Don. The prehistoric inhabitants living at the shore during maximum sea level became marine fishermen who resided in the sand dunes, next to productive fishing grounds.

3000 to 2000 BP

During this period the sea level was falling, causing exposure of former tidal flats. Agriculture, and particularly wet-rice, became strongly developed, and until 2000 BP there were populous villages on many former tidal flats, such as Trai Son, Viet Khe, Dong Xa and Chau Can. Handcrafts had also grown with the appearance of workshops to craft jade and fine arts, in Trang Kenh, Bai Ben and Bai Tu. Trade expanded to the Red River delta, southern China and the surrounding islands.

CONCLUSIONS

The geoarchaeology of northeast maritime region of Vietnam was associated closely with the sea level changes and cultural exchanges of the ancient inhabitants (Fig. 2). Relationships between the Hoabinhian and Bacsonian inhabitants were particularly well established. Human traces are present from the late Palaeolithic until now, and may be divided into the following stages:

1. The marine regression stage, corresponding to the regional Palaeolithic to 20,000 BP;
2. A period of slowly falling and then rising sea level, corresponding to the Soi Nhu culture, from 20,000 to 7000 BP;

3. A period of rapid sea level rise, corresponding to the Cai Beo culture, from 7000 to 5000 BP;
4. The stage of maximum sea level from 5000 to 3000 BP, corresponding to the Ha Long culture;
5. The marine regression corresponding to formation and development of the Dong Dau and Dong Son cultures, from 3000 to 2000 BP.

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Table 1. Uncalibrated C14 dates for the northeast maritime region of Vietnam. Abbreviations: AA University of Arizona; ANU Australian National University, HNK Hanoi; Bln Berlin, BA Beijing. ZK: Chinese Institute of Archaeology, Beijing.

Site	Lab. code	BP	Notes
Ang Ma	ANU-11116	25,510±220	<i>Cyclophus sp.</i> in Hien Hao Cave (Cat Ba, Hai Phong).
Hang Quan Y	HNK-220/1	19,470±255	freshwater molluscs
Hang Cao	HNK-220/2	4600±105	marine molluscs
Hang Luon	HNK-220/3	16,170±250	freshwater molluscs
Dau Ram Lon	HNK-159	7440±95	<i>Cyclophus sp.</i> in limestone clay at Hoang Tan commune (Quang Yen, Quang Ninh)
Ha Lung	Bln (???)	6485±60	<i>Melania sp.</i> in limestone clay at Son Duong commune (Hoanh Bo, Quang Ninh)
	Bln (???)	6301±60	
Soi Nhu	Bln-1975/I	4125±180	<i>Melania sp.</i> in limestone cave sediment at Thach Ha commune (Cam Pha, Quang Ninh)
	Bln-1975/II	5560±180	
	Bln-3333/I	4,460±160	
	Bln-3333/II	4300±400	
	HNK-300	3050±145	freshwater molluscs (<i>Cyclophus</i> and <i>Melania</i>)
Cai Beo	ZK-328	5645±115	charcoal in a cultural layer 1.8m deep in a marine sand terrace at Cat Hai (Cat Ba, Hai Phong).
Thien Long	HNK-295	13,310±130	<i>Cyclophus sp.</i>
Hang Trong	HNK-294	12,030±110	freshwater molluscs
Nha Tro	HNK-296	2,950±120	freshwater molluscs (<i>Melania sp.</i>).
Bai Tu Long	HNK-297	4370±95	bone
Bai Ben	HNK-87	3030±50	marine molluscs in a marine sand terrace, Hien Hao (Cat Ba, Hai Phong).
	HNK-91	3180±50	
	HNK-92	3640±50	
	HNK-86	3000±50	
	HNK- L1	3450±120	plant fragments in pottery
	HNK- L2	3590±140	
Trang Kenh	AA-2772	3280±55	charcoal in layer L8, 160 cm
	AA-2773	3340±70	charcoal in layer L8, 160 cm
	Bln-3710	3260±150	charcoal in layer L8
	Bln- 891	3405±100	charcoal 190 to 210 cm
	ZK-307	3005±90	charcoal at 140 cm
	Bln-891	3405±100	charcoal 190 to 200 cm
	ANU-10884	3440±60	charcoal 175 to 190 cm
	BA-97005	2390±60	charcoal in layer L2
	BA-97006	3330±90	charcoal in layer L2
	BA-97007	3910±60	charcoal in layer L2
	BA-97008	3080±60	charcoal in layer L3
	BA-97009	3190±60	charcoal in layer L3
	BA-97010	3000±60	charcoal in layer L3
	BA-97011	3390±60	charcoal in layer L4
	BA-97012	3440±60	charcoal in layer L4
	BA-97013	3530±70	charcoal in layer L5
	BA-97014	3220±60	charcoal in layer L5
	HNK-1/1	3035±160	charcoal 140 to 160 cm
	HNK-KT3L1	2970±115	plant fragments in pottery
HNK-KT3L2	3120±135		
Trai Son	HNK-6/1	2320±60	coffin wood
	HNK-6/2	2330±60	
Viet Khe	Bln-950	2480±100	
	Bln-1227	2415±100	
	Bln-1249	2330±100	
Hang Dinh	ASCU VCD-20	33,960±680	freshwater molluscs in ancient terrace at 7.8 m a.s.l
	ASCU VCD-23	>40,000	freshwater molluscs in ancient terrace at 9.6 m a.s.l.
Tien Noi	HNK-163	6240±90	plants in marine sediment
Gia Loc	Bln (???)	7190±85	wood at 5 m depth
	Bln (???)	4145±60	wood at 2 m depth



Figure 2. Changing directions of ancient population migration and exchange in northeast Vietnam.