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Coastal Environmental Change
During Sea-Level Highstands:
A Global Synthesis with implications
for management of future coastal change

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Quaternary coastal morphology and sea level changes



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Late Holocene Landform Evolution of the Mekong River Delta, Vietnam

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Abstract

This paper aims to clarify the late Holocene landform evolution of the Mekong River Delta, especially the evolution of the Ca Mau Peninsula, the southern part of the delta.

Landforms of the Mekong River Delta are classified into two parts with different landform characteristics: the main part of the Mekong River delta and the Ca Mau Peninsula in the southern part of the delta. Large natural levees and several rows of former beach ridges are distributed in the central and eastern parts of the main delta. Tidal plain and lower deltaic lowland develop in the region of Ca Mau Peninsula, where mangrove forests exist in its coastal region.

Holocene sediments over the Pleistocene are very thin in the northern and northwestern regions of the delta, where the thickness of the Holocene sediments is mostly 2-3 m. Ages of the peat layer in the lowest horizon of the Holocene sediments in Don Thap Region are 6,000-6,500 yrBP. Furthermore, the age of the lower horizon of the Holocene sediments in the northwestern part of the delta is also measured c. 6,400 yr BP.

Pleistocene surface existed in the northeastern and northern parts of the present delta before the middle Holocene, and they drowned ca 6,500 yrBP. On the other hand, the thickness of the Holocene sediments in the western part of the delta is relatively thick. Most of the Holocene sediments of the region are intertidal or shallow marine silt and clay. Thickness of the Holocene sediments at GQ site, the southeast of Rach Gia is 13 m and the age of the lowest horizon of the Holocene sediments is c. 6,200 yrBP. Furthermore, the thickness of the Holocene sediments in the southern part of the delta near Ca Mau is about 20 m and the age of the lowest horizon of the Holocene sediments is c. 4,300 yrBP. The sediments of the site are also mostly shallow marine or brackish sediments

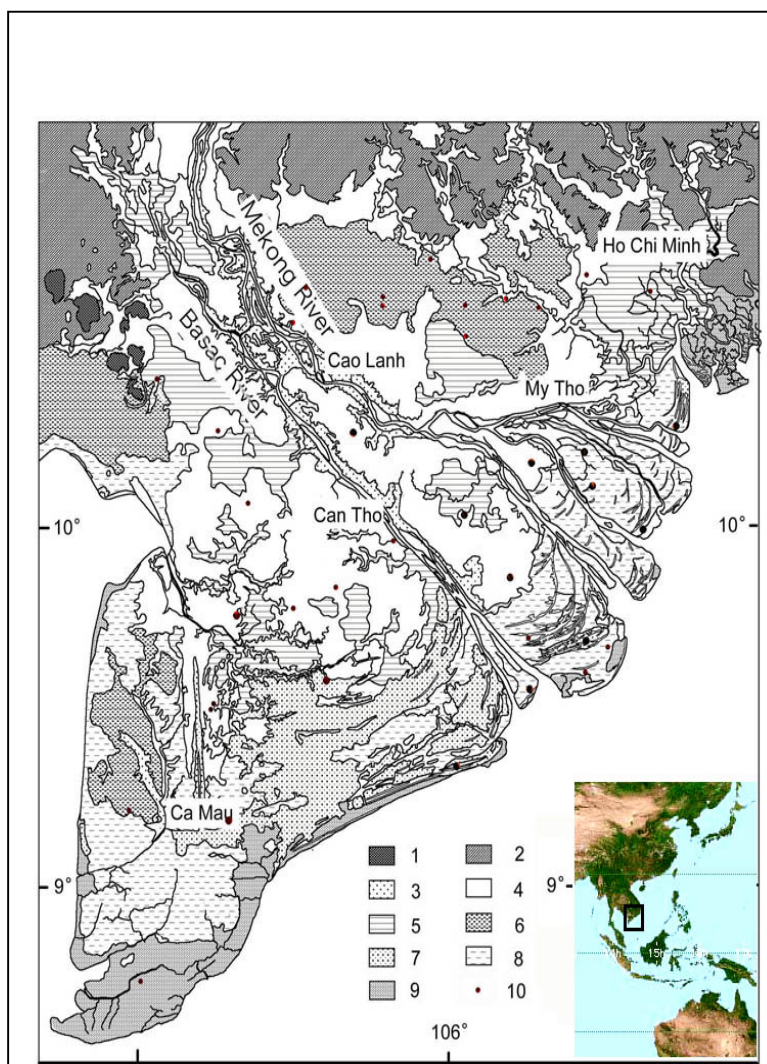


Figure 1. Landform Classification Map of the Mekong River Delta, Vietnam 1. Mountains and hills, 2. Pleistocene terraces, 3. Natural Levee, 4. Upper flood plain, 5. Lower flood plain, 6. Swampy lowland, 7. Beach ridge and beach ridge complex, 8. Coastal plain, 9. Tidal plain, 10. Boring site.

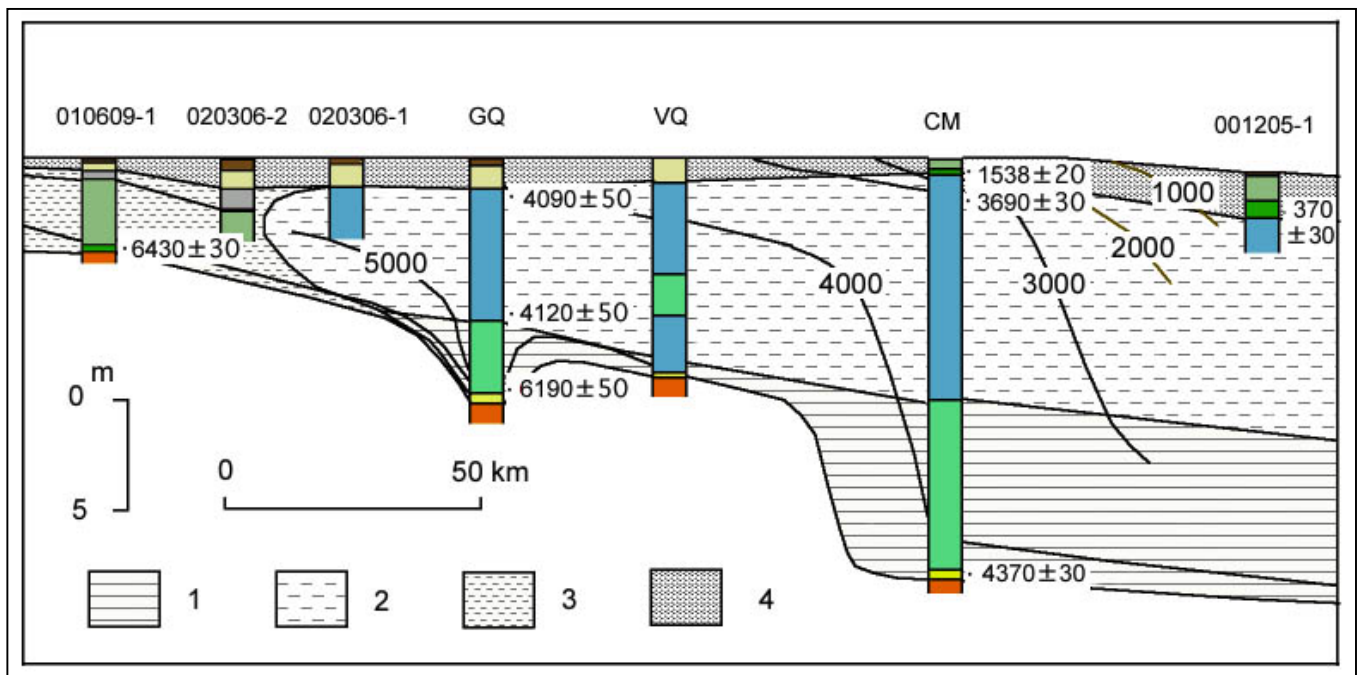


Figure 2. Geological Cross Section of the Western Mekong River Delta (N-S section)
1. Shallow marine, 2. Inter tidal, 3. Organic rich tidal/fluvial, 4. Deltaic terrestrial

except the uppermost peaty layer. The ages of the lower horizon of upper silty sediments in the western and southwestern part of the delta are measured from 4,100-3,600 yrBP, and the ages of the upper part of the peat layer are measured 1,000 yrBP or younger.

Based on the characteristics of the landforms, geological sequences and radiocarbon ages of the region, the landform evolution of the delta is considered as follows:

1. According to the Holocene transgression, Low Pleistocene surface developed in northwestern and northern parts of the Mekong River Delta submerged around 6,000-6,500 yr BP.
2. After the submergence of the Pleistocene surface, mangrove forest developed widely in northwestern and northern parts of the delta.
3. Progradation of the delta continued and main part of the Mekong River delta are considered to have extended towards the southeastern direction by 3,000 yrBP.
4. Sedimentation of the north and northwestern parts of the delta during the period, however, was less active since the thickness of the Holocene sediments of the regions is only 2-3 meters, and the region changed from tidal to terrestrial condition.
5. After 3,000 yrBP, distinct cheniers or beach ridges developed along the coastlines of the main part of the delta.
6. Southern and southwestern parts of the delta were shallow marine or inter tidal condition around 4,000 yrBP, and the sedimentation rate of the region became large.

7. The region changed to the shallow or intertidal condition, and the northern part of the Ca Mau Peninsula has been formed and developed since 4,000 yrBP.
8. Broad tidal plain in the southern part of the CaMau Peninsula was formed after 1,000 yrBP and western part of the CaMau Peninsula also developed after 1,000 yrBP.

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