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INVESTIGATION OF MARINE SEDIMENTS WITH A SUB-BOTTOM PROFILERS SYSTEM IN WEST COAST OF CAMAU, VIETNAM

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1. INTRODUCTION

By 254 km of coastline, enveloping Camau peninsula, adjacent to both the East and West Seas (Gulf of Thailand). Up to now, the coastal area along the west Camau sea area has not been studied in detail. The study in detail of the geological structure of the coastal floor of Camau western province is an urgent requirement, especially for the planning of development of coastal construction works in Camau. Therefore, our research area is limited to the west coast of Camau province with geographical coordinates as follows: 8° 38' 42.61" - 9° 31' 38.27" N and 104° 29' 52.72" - 104° 50' 3.14" E.

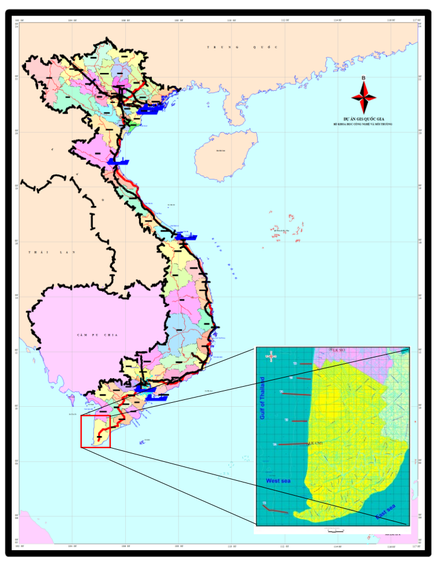


Fig 1. Research area

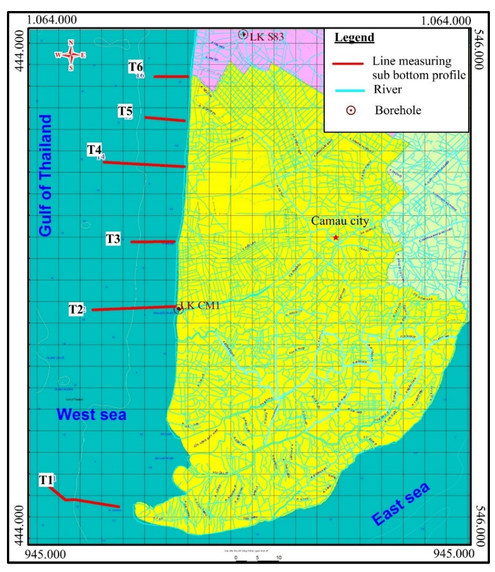


Fig 2. The location of sub-bottom profiler measurement lines

2. METHODOLOGY AND EQUIPMENT

Sub-bottom profiler system equipment

The principle of sub-bottom profiler detection is similar to that of multi-channel reflection seismic exploration. First, a longitudinal acoustic wave is excited artificially, which during propagation can generate a reflection echo at the lithological interface of a formation. The reflected signal is received and stored by an acoustic transducer or a single receiving cable, and then the structure and shape of the submarine formation can be displayed in real time (3200-xs sub-bottom system user hardware manual, 2005). As shown in Figure.

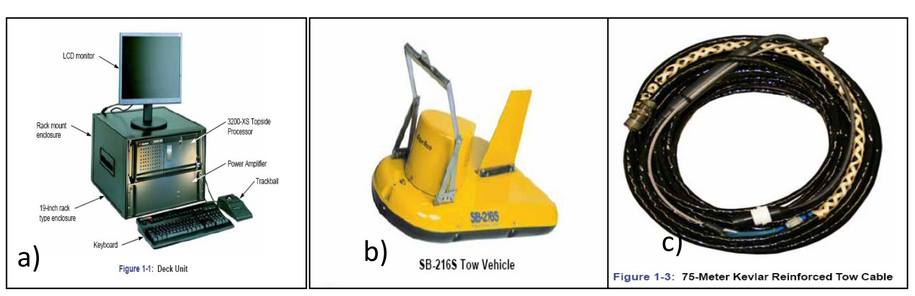
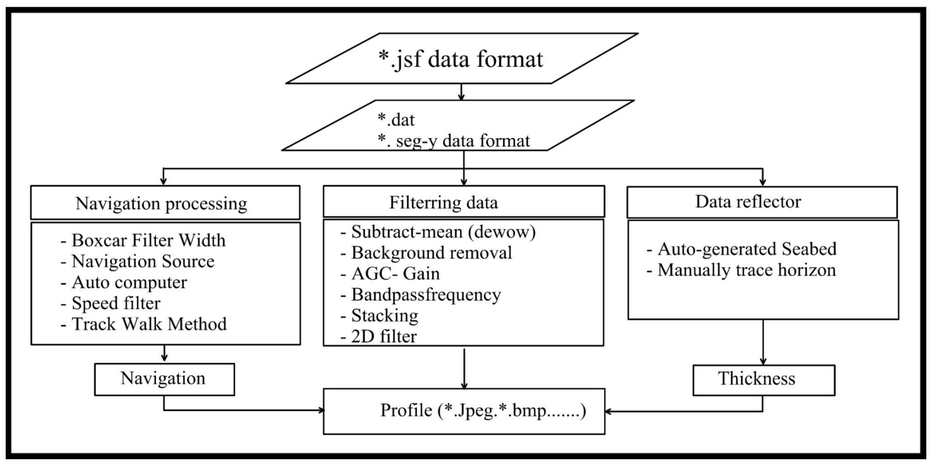


Fig 3. Components of the Sub-bottom profiler system:
a)3200-XS Processing System,
b) Towing device SB-216S, c) Kevlar Reinforced Tow Cable.

Flow-chart of data processing sub-bottom profiler was shown at Fig 4.

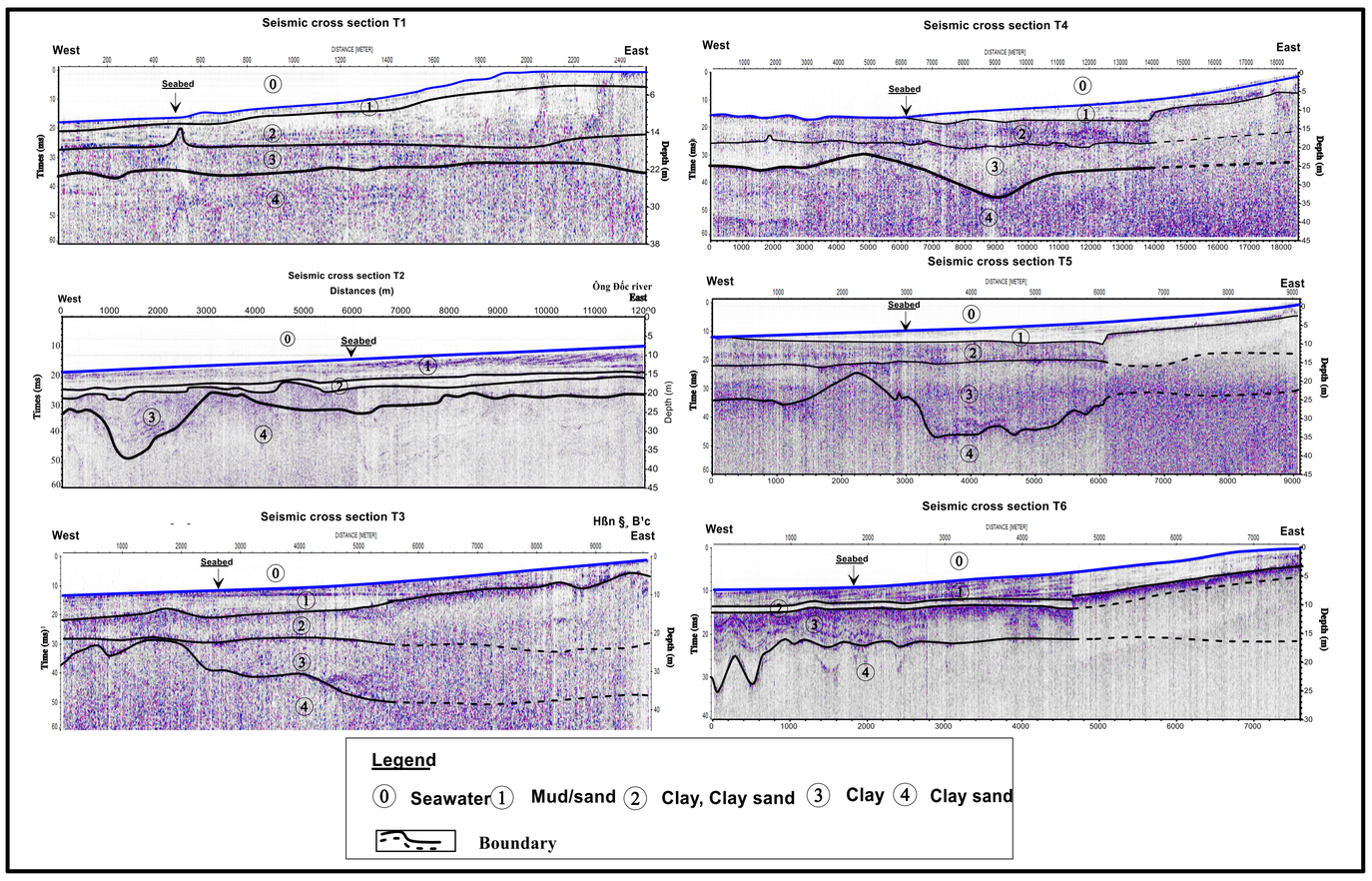


3. GEOLOGICAL CHARACTERISTICS OF THE STUDY AREA

The study area is located on the west coast of Camau province, at the intersection of the East Sea and the Gulf of Thailand. The province of Camau is the low-laying area, with a typical height of 0.5-1 m above sea level. In Camau province the Cenozoic deposits are 300 m thick on average. The subsidence of the Mekong Delta basin in the Neogene was caused by the uplift of the Himalaya orogenesis, which was accompanied by high erosion rates in the mountains which provided large amounts of material, that formed the Mekong Delta sediments. Repeated cycles of marine transgression and regression during the Neogene and Pleistocene lead to a sequence of marine and ter restrial/alluvial facies. Glacial and events in the Pleistocene caused particularly strong regression and erosion. The stratigraphy, lithology, and facies of the unconsolidated sediments, are briefly described from the oldest to the youngest in the sections on the base mainly on information from some boreholes with typical lithology and micro-paleontological evidence.

Tab.1.Characteristics of structural sections according to Sub-bottom profiler data

Seismic line	Layer 0	Layer 1	Layer 2	Layer 3	Layer 4
T1, length 2,6km T2, length 12 km T3, length 10 km T4, length 19 km T5, length 9,2 km T6, length 7,8 km	Seawater, and sea-level depths ranging from 2-14 m.	The thickness ranges from 1.8 to 4 m. The weak reflective boundary shows, that the sediments are mainly coarse particles. The lithology is mainly sand, silt, corresponding to Holocene sediments.	The thickness ranges from 4 to 14 m. The lithology is mainly clay mud, and soft clay, corresponding to the Holocene age sediments.	The thickness ranges from 4 to 10 m. There is a boundary of strongly reflected seismic waves. The lithology is mainly sandy, and clayey, corresponding to the Holocene sediments. The bottom is the boundary between the Holocene and Pleistocene sediments.	Starting from 20 m down, the seismic wave is completely absorbed. The lithology is sandy clay,and sand powder, corresponding to the Pleistocene sediments.



4. CONCLUSION

High-resolution shallow reflection seismic method by sub-bottom profiler instrument system has been used to study the geological structure and engineering geology in the coastal zone with shallow water level in the western sea of Camau. The main goal of the study – the geological structure of the sub-bottom formation determination was obtained. The relationship with materials such as silt, mud, clay sand, clay powder, sand powder, and sand with different grain size levels and bedrock surface has been determined quantitatively. Boundary interfaces in sedimentary structures with ages from the Pleistocene to Holocene have been determined on the basis of division of 4 structural layers from the seabed in the survey area. The boundary between the Holocene and Pleistocene sediments at an average depth of 25-35 m appear on all measurements lines in the study area. The clay layer has a semi-hard to hard state, corresponding to the ancient alluvial surface, at an average depth of 30 m, creating favorable conditions for the construction of coastal works.