Progress Report on Landform Classification on the South China Coast

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INTRODUCTION

The most significant physical features along the coast of the South China Sea may be broadly classified in terms of tropical coastal landforms. This coast, regionally noted as a special type of mountainous coast with its own distinctive geological structure, is called the "Mountain Coast of the South China Type," or more simply the "South China Coast." Its distribution spreads up to the Shandong and Lianing Peninsula. This type of coast can also be found in Japan, Korea, and Southeastern Asia.

Coastal landforms along the South China Coast feature coral reefs and mangrove swamps. In the Pescadores, located on the northern boundary of the South China Sea, fringing reefs have developed to widths of more than 1,000 meters (Figure 1). In The south part of Taiwan Island, also situated on the northern boundary of the South China Sea, fringing reefs range along the coast with lengths of 60 km and widths of 300 meters. Fringing reefs are also found along the southern coast of Hainan Island (Figure 2). These kinds of features will be reflected in the 1:200,000 coastal geomorphic map now in preparation. Far inland from the coast there are uplifted reefs which developed since the Early Pleistocene.

Mangrove swamps (Figure 3) are distributed in the gulf of southern Taiwan. The mangrove swamps, occurring in association with gulf mudflats, are especially widespread in the Gulf of Sha-men and in the Taiwan Strait which lies to the north of the South China Sea. The mudflats are distinctive landforms in the gulf along the South China Sea. There are many long bridges across the gulf, such as Five-li bridge, Seven-li bridge, etc., which appeared as early as the Zong Dynasty.

From the point of view of regional characteristics, the coastline is chiefly a mountainous area that is dotted with gulfs. Thus, the distinguishing geomorphic forms make up a zigzag coastline with a lot of gulfs and islands, as reflected in a fishermen’s saying: "You can see islands and islands in Zhejiang, gulfs and gulfs in Guangdong, and both in Fujian." The main features of these mountain-girded gulfs were simultaneously influenced by folding and faulting. Therefore, this kind of coast can not be classified as a longitudinal coast or transversal coast, nor can it be called a Dalmatian coast or Ria.

Consideration of morphological characteristics indicates that there are both drowned valleys of the Ria coast type and gulf coast of the Dalmatian type, such as the Tolo Channel in Kowloon, Hongkong, a channel-like gulf. The South China Coast is characteristic of a longitudinal coast, which was controlled by the folding axis, and also of the transversal coast with many islands stretching into the sea. Therefore, the South China Coast may represent a special category, a zigzag coastline with numerous islands, the intersection of NW-SW dominant folding axes and the NW-SE faulting systems create this distinctive coastline.

Classification of Coastal Landforms

The morphological features along the South China Coast require a classification of coastal landforms that differs from other coasts. In classifying coastal landforms of South China, we have made use of the
research results of geomorphologists and geologists. Thus, the present level of geomorphic study in China will be demonstrated in the map.

In addition to the characteristics of the tropical coast and the distinctive structure of the South China Coast, there are also many common types of coastal landforms that can be divided into geomorphic units that feature erosional and depositional forms.

The system of geomorphic units along the South China Coast is listed as follows:

I. Abrasion landforms
   1. Sea cliffs (uplifted sea cliffs, ancient sea cliffs, or dead cliffs)
   2. Abrasion platforms (based on elevation)
   3. Rocks (rocks below sea level, abrasion pillars)
   4. Abrasion channels
   5. Abrasion monadnocks

II. Depositional landforms
   1. Coastal plains (alluvial plains, marine plains, reef plains)
   2. Marine terraces (based on elevation)
   3. Sand ridges (ancient sand ridges, shell ridges, coral debris ridges)
   4. Sand capes
   5. Sandy lands (stable, unstable)
   6. Pebble ridges
   7. Lagoons (including dried-up lagoons)
   8. Beaches (sandy beaches, mud flats, and debris beaches)
   9. Sand bars

III. Organic landforms
   1. Fringing reefs
   2. Barrier reefs
   3. Sandkeys (low islands on reefs)
   4. Mangrove swamps
   5. Grassy flats (including grassy marshes)

In this system, tropical characteristics are emphasized. On the terraces there are, for instance, always old red sand strata which are generally considered to be products of hot Pleistocene climates. The red-colored strata are composed of well sorted...
Figure 2. Fringing reef platforms along the southern coast of Hainan Island.

Figure 3. A mangrove swamp near the Luichow peninsula (west of Giangdeng).
sands held together by ferruginous cement. In addition to red sandstones, beach rock also occurs on sandy beaches as a distinguishing feature of the South China Coast. Ridges composed of large pebbles (0.2 to 0.5 m in diameter) formed by typhoons are also a typical feature in this region.

According to the above system, parts of the South China Coast may be classified as capes or described in terms of ridge and lagoon systems with abrasion landforms as the principal pattern. Where capes appear with sea cliffs, rocks, inselbergs, and abrasion channels as their main components, there are no beaches or sand ridges. After the capes were regressed by abrasion, the debris could have been reduced into gulfs and barrier deposits. On the other hand, the debris might have been deposited as spits, beginning at capes and truncating parts of gulfs to form lagoons. Thus, producing cape and sand ridge coasts, sand ridge and lagoon coasts, drowned valley and shoal coasts, etc. Where terraces are wide spread, the geomorphic units may form some common types such as straight coasts of terraces and ridges, drowned valley and terrace coasts, terraces and ridges with lagoons, etc. Included in the coastal plains are delta coasts, sand cape coasts, reef swamp coasts, and reed and mangrove swamp coasts. Coral reef coasts include fringing and barrier reefs.

According to geomorphic units, we may reduce the number of coastal types on the South China Coast to two main types: the South China Mountainous Coast and the Tropical Terrace Coast. Because coastal plains are areally limited and distributed only within the gulfs of mountainous coasts, they are not regarded as an individual coastal type. The mangrove and reef coasts to be shown on the map are also small in area. Their distribution is discontinuous and they can not be regarded as major coastal types. The mangrove swamps are always associated with mudflats in narrow areas of the gulfs. While the reefs are distributed along the coast within a narrow zone around the capes or in the outer part of the gulfs, they can not be regarded as a distinct main coastal type and are included with other units.

These two main coastal types are indicated on small-scale geomorphic maps. From the geomorphic point of view, this gives some basis for a coastal classification.

We hope that our efforts will contribute to the classification of world coastlines. Our coastal classification is not based on concepts of submergence and emergence (JOHNSON, 1919), primary and secondary coasts (SHEPARD, 1973), or advancing and retreating coasts (VALENTIN, 1970). Rather, we divide coastal types genetically and in accordance with the analysis of coastal geomorphic units. The results of our united efforts begin with the drawing of a geomorphic map.

LITERATURE CITED