

論文内容の要旨

Development process of the sinuous river channel  
of the middle part of Mekong River, late Holocene  
メコン川中流域における完新世後期の屈曲河道の発達過程

氏 名 山本 (楠谷) 政一郎

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The purpose of this study is to assess the migration process of the sinuous channels of gigantic rivers for last thousands years. As a study area, I set the lower Mekong River in Cambodia. In this study area, it is also important to understand the formation processes of alluviums. Therefore, I also study there processes in this study. First, migration processes of the sinuous channels of the study area are assessed by interpreting riverine landforms. Second, I analyze the sediment structures of the reversal channels, the Tonle Sap River, in present which take a role to formation processes of the Mekong River delta. Third, I estimate the whole alluviums of the Mekong River and the different facies in the alluviums to help the process of the point bars in the study area. Fourth, the migration processes of the point bars of the sinuous channels are discussed for thousand years. Fifth, the migration rates of thousands years are compared with the decadal migration rates. Then I discuss the migration process of the sinuous channels of gigantic rivers for last thousands years.

The land classification on the lower Mekong River around Cambodia is done to understand the riverine morphology of the Mekong River and its tributaries by using the SRTM-3 data set and visual inspection of the aerial photographs. The riverine morphology are categorized into the four zones as the upper reach of the Mekong River, the lower reach of the Mekong River, the Bassac River and the Tonle Sap River. The upper reach of the Mekong River is sinuous river with several channel cutoff patterns

and natural levees. The lower reach of the Mekong River is braided with small sinuous and natural levees become less developed lower to its reach. The Bassac River is meander channels. Its progressing pattern is uniformity, on other words, channel cut off are not distinguishable. The Tonle Sap River is meandering, but natural levees become smaller to the upper reach of its channel. Finally, the channel shows deltaic characters in the top of its channel to Lake Tonle Sap.

The environment of sedimentation of the Tonle Sap Rivers is discussed. The Tonle Sap River is one of tributaries of the Mekong river which flows adverse seasonally. The Tonle Sap River is thought to impact to the sediment structures in this study area, especially linked to formation process of Lake Tonle Sap. They are key to understand their geomorphology. I analyzed the trend of grain size distribution of river sediment along the Tonle Sap River. Grain size of the sediment of its river becomes finer to the upper part of it. For several kms from the conjunction of the Mekong River at Phnom Penh, coarse sand deposit. But grain size becomes finer rapidly to silt with 6 to 40 km from its conjunction. The fact consistent with that natural levees develop well for 0 to 40 km from its conjunction. Then, 40 km or more to the mouth of Lake Tonle Sap, grain size of sediment become silt to clay. Furthermore, river structures such as channel width and river bed altitudes are compared. As a result, the Tonle Sap River is strongly impacted by the Mekong River.

The structures of the alluviums are discussed to comprehend the alluvial process which impacts to formation of floodplain land forms, because spatial structures of the study area are not clarified yet. In this chapter, existing boring log sheets for drilling wells of villages are used to reconstruct the alluviums of the Mekong River basin and the facies analysis of the alluviums of that. Two different plain steps of base rock layers are distinguished. The higher steps form terraces mainly, but also around the Tonle Sap River. The lower steps exist under 40 meters or more thick alluviums of the Mekong River. Alluviums can be divided coarse bottom of the gravel layers, upper sand layers and top layers of flood plain deposits.

Reconstruction of the former point bar ridges is done and clarifying of lateral migration process of the lower Mekong River in late Holocene are done. For this study, the sinuous section of the lower Mekong River is choose, because the section is suitable for understanding natural channel cut-off processes. Therefore, migration process is estimated by the geomorphological analysis of point bars, facies analysis and carbon dating. In these three sinuous arches, several cut off patterns are distinguishable. The developing patterns are consistent with the carbon datings for about 5,000 years. Cut off occurs about 1, 000 years interval. And the migration rates from the carbon dating

are calculated about 1.1 to 2.0 m/years.

Decadal channel migration process of the lower Mekong River is discussed as same area discussed to certify the lateral migration rates by another method of the chapter 7. Because the detailed lateral channel migration processes of the study area are still in uncertainty. Therefore, decadal channel migration magnitude is discussed by comparing the decadal changes of the channel of the Mekong River. Channel of the study area is moving obviously in sinuous curve peak points. The mean channel migration rate becomes 8.9 m/yr in average in the whole this study reach. And the peak erosion rates are 24.0, 14.4, 12.0 m/year at peak eroded point of sinuous archs along the eroded direction. The percentage of migration rate is 0.54 % / yr.

Then, the migration processes of the Mekong River are discussed from the results of the whole study. Migrated rates of the channel are consistent with the historical migrations for last 5,000 years and the present migrations for 25 year. The former channel distribution is estimated.