Holocene Geomorphic History of Alluvial Lowlands and Their Environmental Changes, along the Fukushima Coast, Northeast Japan.

A.B.M. Kamal Pasha[1]; Kyouko Kagohara[2]; Toshifumi Imaizumi[1]

[1] Geography Sci., Tohoku Univ.; [2] Graduate School of Sci, Tohoku Univ.

The present study discussed about three selected areas in Fukushima coastal region as Soma, Haramachi and Namie coastal plain with emphasize to alluvial sequences and sedimentary environments to demonstrate the link between the evolution of the coastal barrier and evolving nature of back barrier region as well as the geomorphic development of coastal lowlands. It also presented a model diagram of general sedimentation in the Holocene time from the example of Soma coastal plain and carried out the paleo-environments and geomorphic changes of the study areas.

The Japanese coasts are micro tidal and wave dominated except the coast of central Kyushu. Rivers and wave energy are major controlling factors on sediment facies and stacking patterns in the Japanese islands (Y. Saito, 1995). Coastal region is an aerial framework designed by geomorphic processes. Alluvial lowlands are on of the most important issues for geomorphic development of coastal environment. Alluvial plains in the coastal region of Japan are considered to have developed according to following processes: during the Last Glacial stage when the sea level was lowered, rivers dissected their valleys downward to the level. After then, inconsequence of Post-Glacial rise of the sea level these valleys were drowned and filled up with transgression deposits (Iseki, 1975). At about 10,000 to 9,500 yrs B.P. sea level was positioned 40 m below relative to its present level. After that period, sea level rose abruptly until about 8,000 yrs B.P. and 8,000 to 6,000 yrs B.P. when its rate was slowed, sea level reached nearly the present level or some meter higher then at present sea level. Since 5,500 yrs B.P. sea level has been rather stable with slight fluctuations up to the present (Kaizuka et al. 1977 and Matsumoto, 1985). Henceforth, the transgression barrier was located seawards on a protruding sector of a coast. This seaward positioned barrier has been matured at the end of the late Holocene period indicated as evolution of the lagoon and marsh deposits.

Stratigraphic surveys and sedimentological analyses of coastal sediments along the coastal plains revealed that during the middle Holocene these coasts were characterized by barrier spit, open lagoon and estuaries. These estuarine systems matured during the late Holocene stage with progressive sedimentation and inlet closure leading to the dominance of back barrier region development.

Back barrier sediments were deposited under brackish water to fresh water condition by wash over storm surges, inlet intrusion of marine sediments reworking by fluvial sediments while the barrier was positioned on protruding sector of a coast and grown up during the mid to late Holocene period. Thus back barrier region were developed as well as back marsh deposits were formed after termination of wash over and inlet intrusion of marine sediments while the barrier evolution was ceased.

Fukushima coasts in particular, the Haramachi and the Namie coast suffering from beach and coastal cliffs erosion from the ancient period that still going on. Data show the coastal cliffs erosion of recent days faster than that of ancient period. It might be the cause of the human activity is greater in extent in recent days than that of ancient period. Regarding this, the Haramachi and Namie plain are rapidly retreated landward and it said that since terrace building the southern area of Fukushima coast is uplifted compared with northern area. Moreover, due to dominant littoral drift directing north the eroded sediments volume transported towards the north continuously and accelerate to developed further north coastal lowlands as well as developed the Soma coastal plain. Thus, the Holocene barrier is existed and is well shown in Soma coastal plain by its narrow width but due to severe erosion activity, the Holocene barriers in Haramachi and Namie plain have been disappeared gradually.