[JJ] Evening Poster | H (Human Geosciences) | H-CG Complex & General

[H-CG28]Coastal wetlands: geomorphologic, biologic and anthropogenic processes

convener:Kiyoshi Fujimoto(Nanzan University)

Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Coastal wetlands are very fragile environment against external environmental changes such as sea-level rise and anthropogenic impacts. On the other hand, coastal wetlands have a significant role as a place for carbon sequestration in the belowground as well as the aboveground. This session will discuss the geomorphologic, biologic and anthropogenic processes on the coastal wetlands in the various climate zones during the Holocene. For example, coastal wetlands in the tropics have evolved with the development of wetland forests such as mangrove forest, peat swamp forest and fresh water swamp forest. The most significant process for habitat formation and maintenance of the former two forests are peat production and decomposition, which are also significant processes on the coastal lowlands in the temperate and subarctic zones, though the mechanism of the processes might be different. Geomorphological processes such as sedimentation and erosion by fluvial and marine processes are also important for all of coastal wetlands. However, the environment of coastal wetlands has been destroyed by various human activities such as deforestation, agriculture land development, peat mining, and shrimp firming in and around mangrove forests in recent years. We would like to invite the wide discipline of research papers on not only the natural processes but also the anthropogenic processes in order to offer the scientific basis for creating sustainable management systems on the coastal wetlands in the future.

[HCG28-P01]Forest structure and site environments of a mangrove community in the surface erosion area possibly caused by rapid sea-level rise on Pohnpei Island, Micronesia.

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Keywords:Mangrove community, Surface erosion, Sea-level rise, Mangrove peat

In the western Pacific low-latitude region between the Philippines and Micronesia, the sea level is rising at over 10 mm/yr (IPCC 2013). At Pohnpei Island in Micronesia, rapid sea-level rise at 16.9 mm/yr had been observed between 2002 and 2010 (Australian Bureau of Meteorology 2010). It is decided by the relative relation between possible accumulation rate and sea-level rise rate there whether the mangrove forest survive or die. Possible accumulation rate at the site situated in the sediment inflow area is calculated by the sum of sedimentation rate by inflow and mangrove peat accumulation rate, while the site situated in the no inflow area is decided by the mangrove peat accumulation rate only. In the no sediment inflow area, *Rhizophora* pure forest is formed as a pioneer community and mangrove peat is created. The mangrove peat accumulation rate is considered to decrease with the vegetation succession because of the decrease of tree density of *Rhizophora* sp. In Pohnpei, the surface erosion is not recognized in the *Rhizophora stylosa* and *apiculata* communities, but it is recognized in the communities dominated by other species. We set up a permanent plot with 20 m wide and 130 m depth in the significant surface erosion area in the south part of the island in September 2017 to observe the forest and habitat dynamics. This presentation will report the present status of forest structure and surface erosion in the plot.

The plot is situated behind a *R. stylosa* community with about 30 m depth. Four species, *Bruguiera gymnorrhiza*, *R. apiculata*, *Xylocarpus granatum* and *Sonneratia alba*, were identified in the plot. Number of each species were 116, 40, 17 and 13, respectively. Tree density was calculated at 715 trees/ha. 90 % of *R. apiculata* trees were shrub with smaller than 5 cm in diameter. Diameter of *B. gymnorrhiza* and *X. granatum* show unimodal distribution whose mode is 20.0 to 29.9 cm and 30.0 to 39.9 cm, respectively, while *S. alba* shows inhomogeneous distribution between 20 and 90 cm in diameter. Aboveground biomasses were calculated at 256 t/ha for *B. gymnorrhiz*a, 173 t/ha for *S. alba*, 94 t/ha for *X. granatum* and 25 t/ha for *R. apiculata*. Substrata consists of mangrove peat, which shows that former dominant species was *Rhizophora* sp. Ground elevation in the plot was between -57 and +19 cm. Area above mean sea level sparsely distributed around 100 m line, which indicates that surface erosion is surely progressing. At the base of *B. gymnorrhiza* trees, the buttress roots and the like of prop roots under the buttress roots were exposed by the surface erosion and the gaps between ground surface and its buttress root appeared. The average gap height reached 43 cm between 0 and 20 m line, 31 cm between 110 and 130 m line, which suggest that the amount of erosion possibly decrease with distance from seaward forest edge.