

Preliminary report on progressing influences of rapid sea-level rise corresponding to mangrove communities in the mangrove peat depositional area and near future prediction

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Sea-level rise induced by global warming are surely progressing. IPCC (2013) reported that global mean of sea level already rose 17 to 21 cm between 1901 and 2010 and predicted that it will rise 26 to 82 cm by the end of this century from the global mean between 1986 and 2005. Sea level at Pohnpei Island in Micronesia, which is our study area, had risen at 1.8 mm/yr between 1974 and 2004, which is similar to global mean, but rapid sea-level rise at 16.9 mm/yr had been observed between 2002 and 2010 by Australian Bureau of Meteorology. Mangrove peat accumulation rate estimated by the numerous data on thickness of mangrove peat layer and its radiocarbon age is more than 2 mm/yr but less than 5 mm/yr. We will urgently report the progressing phenomena with rapid sea-level rise on main mangrove communities in mangrove peat depositional area and discuss the possible response in the near future. In the *Bruguiera gymnorhiza* dominant forest with few *Sonneratia alba*, *Xylocarpus granatum* and *Rhizophora apiculata* behind the seaward fringe *Rhizophora stylosa* forest about 20 m depth, roots which usually develop in the belowground have exposed on the ground surface. Average gap height between the base of *B. gymnorhiza* tree and ground surface, which is considered as an index of surface erosion, reached 42.8 cm. Surface erosion was also identified at the seaward fringe of the *S. alba* forest, whereas *R. stylosa* forest lack signs of surface erosion, even though both communities are seaward fringed forests. In the *R. apiculata* forest situated about 300 m inland, the old prop roots have been getting buried in mangrove peat.

These evidences suggest that the influences of sea-level rise appear first in climax forests located seaward side, whose standing tree density of *Rhizophora* sp. sufficiently decreased, and the *S. alba* forest. Dieback, fallen trees and decrease of growing rate possibly appear in the communities in the near future.

Keywords: Sea-level rise, Mangrove peat, Surface erosion, Pohnpei Island, Oceanic island