博 士 論 文 の 内 容 の 要 旨
Abstract of Doctoral Dissertation

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学位名 Name of Degree	博士 Doctor of（理学／SCIENCE）
学位授与年月日 Date of The Degree Conferral	2022 年　3 月 20 日/March 20th
論文題目 Dissertation Title	**Influence of sea level fluctuations on depositional environment during last 1000 years and characteristics of modern storm deposits in southwestern Ganges–Brahmaputra–Meghna delta, Bangladesh** **（バングラデシュ，ガンジス-ブラマプトラ-メグナデルタ南西部における最近 1000 年間の海水準変動の堆積環境への影響と近年の嵐による堆積物の特徴）**

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The impacts of the rising global temperature, compaction of thick sediments, as well as hazards associated with relative sea level (RSL) in the low elevated deltaic zone of Bengal Basin, make the region vulnerable to subsidence, coastal erosion, and storms. Hence, the projection of sea level and way of sediment supply are very important to understand the paleoenvironment and sedimentation process in this area. Long-term sea level change and information of global temperature cannot be obtained by using short instrumental records or direct observation. Therefore, the variation of geological evidence may provide valuable data that can be used to assess the depositional environment, sedimentation and coastal morphology for the southwestern Ganges–Brahmaputra–Meghna (GBM) delta of the Bengal Basin that was influenced by sea level change.

This dissertation interprets the result of the effect of RSL on the vertical and lateral variation of depositional environment in the late Holocene, the consequence of the recent trend of sea level rise and storms on coastal morphology and sedimentation, and characteristics of storm overwash deposits in the southwestern GBM delta of Bangladesh. This dissertation is structured in three parts as follows:

The first part deals with the analyses of sedimentary facies, geochemical proxies that include total organic carbon, total nitrogen and $\delta^{13}C$ values, and diatom assemblages of deposits to reconstruct paleoenvironments that were influenced by RSL over time. Samples of eight litho-sections collected from the upper and lower delta plain by using a gauge sampler were analyzed for this study. The lateral and vertical changes of depositional environments and radiocarbon age of selected samples provide the effect of sea level on the sedimentation process in the last 1000 years of Holocene. During 850–1300 AD, the sea level was higher than the present level where tide-influenced bioturbated mud was

deposited at landward of the upper delta plain area. During 1300–1850 AD, the sea level started to drop, and organic rich bluish gray mud, mangrove peaty mud and terrestrial influenced yellowish gray mud were deposited successively at seaward of the lower delta plain area. The terrace was formed at landward due to lowering of the base level at the same time. After 1850 AD, the sea level started to rise which consequently created a new area of inundation and also increased sedimentation over the area. The sediment of terrestrial flood deposited over the erosional surface at landward and tidal sediment gradually onlap on it from seaward.

The second part of this dissertation presents the effect of recent trend of sea level rise, storm surge and sediment supply characteristics on coastal morphology and sedimentation along the southwestern GBM delta coast of Bangladesh. Satellite images for 43 years (1977–2020) and geological cores from the Haringhata coastal region were analyzed to explain the geological development of the area. The analyses of satellite images showed that the southern coastline lost its landmass permanently, consequently the eastern and western coastline advanced. The deeper part of the successions is composed mainly by mud and deposited in a marine influenced environment. The storm overwash silty sand overlies the mud. The coastal dynamics and sedimentation at the river mouth along the coast combined effects of increased marine influences due to sea level rise and decreased sediment supply from upstream. Rising sea level has influenced the change of the coastal morphology that shifted sediment accommodation space landward.

Characteristics, provenance, and depositional process of modern storm overwash deposits are examined in the third part that has been identified at the Kuakata coast of the GBM delta. Lithology, geochemical proxies, and diatom analyses were carried out to characterize the deposits. Three sedimentary units up to 70 cm thick have been identified within the successions. Massive or parallel laminated bluish gray mud that is deposited in a tide-influenced environment underlies the storm overwash deposits. Unimodal white to light gray sand unit found at the base of the storm deposits overlies the mud with sharp to erosional contact. The mean grain size and thickness of this sand unit decrease landward with increasing sorting value, where grain size distribution of sand is comparable with modern beach sand. The unimodal sand that dominated the base of the storm deposits grades into bimodal olive-gray sandy silt in the upper part of the storm overwash deposits. The grain size distribution implies that the sand was carried from the modern beach and the mud likely sourced from the suspended, nearshore deposits of the bay and the adjacent river. Storm overwash sand and sandy silt deposits contain both freshwater and marine-brackish diatoms. These sediments have likely been deposited by the storm surge from the bay and simultaneously overbank flooding due to heavy rainfall during cyclones. The low-lying GBM delta coast gets the influences of high-water levels from the bay and the adjacent river during the deposition of storm deposits.