

An analysis of hydrological characteristics in the tidal zone of Bekanbeushi river basin

(別寒辺牛川感潮域の水文特性に関する分析)

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River discharge is one of the most important information in studying the connection between land and sea. Quantifying the freshwater discharge from river to estuary is very important to evaluate the functions of rivers on estuary ecosystems. This study focuses on the Bekanbeushi river system, which flows through the Bekanbeushi wetland in the eastern part of Hokkaido where human impacts on river basin have been moderate.

Due to its isolated position, most of the Bekanbeushi basin is covered by wetlands and forest, and the agricultural fields are limited. This situation makes the Bekanbeushi river basin one of the wildest areas in Hokkaido. The impact of such natural rivers on the estuary productivities has been investigated by several scholars, however, quite few studies dealt with tidal impact on river discharge in wetlands of Hokkaido. Therefore, it is important to quantify the discharges from the Bekanbeushi river system to its estuary area, the Akkeshi Lake, with special reference to the tidal effects.

A total of 11 field campaigns were conducted at five hydrological observation sites to investigate the hydrological characteristics in the tidal zone of Bekanbeushi river, from April 2018 to October 2019. Continuous monitoring of the water levels and electric conductivities made it possible to divide our five hydrological stations into two groups: upper estuary sites (RB1, RB2 and RC) and middle estuary sites (RO and RP). The upper estuary sites are subject to tidal influence while the lower ones to both tide and salt water intrusion. Although we failed to construct conventional water level and discharge relationship at the lower estuary sites, we succeeded in establishing the relationship between so-called “index velocity” and discharge at upper estuary site RB1 with the help of two sets of Acoustic Doppler Current Profilers (ADCPs). Since the index velocity was found to be a function of water level here during the period of no precipitation, we could estimate the discharge of Bekanbeushi River at RB1 by the observed data on the water levels during the dry period. The estimation of discharge during precipitation events, however, remains unsolved due to its complexities in such a vast wetland watershed.