Comparisons of surface sediment distributions and elevations on tidal flats for nearly 15 years had been used for understanding long-term changes of sedimentary environments at southern Kanghwa tidal flat, west coast of Korea. The mud sediments dominated in the eastern part and sandy mud sediments governed in the western part of the tidal flat in summer 1997. The distributed area of mud sediments had decreased, but that of sand-mud mixed sediments extended to eastward tidal flat in summer 2011. The long-term topographic changes showed that deposition occurred with net deposition of 0.70m and 0.16m at Tongmakri and Yeochari tidal flats, respectively and erosion occurred with net erosion of -0.99m at Changhwa tidal flat between April 1998 and March 2013. The calculated transport vectors with grain-size parameters showed that the sediments transported eastward and then deposited at Sunduri and Tonggomi tidal flats in 1997. However, the sediment transport vectors directed toward the middle part of Tongmakri tidal flat in 2011. These changes should be effected the local hydrodynamic changes by several constructions near the tidal flat since the 1990s.

The tidal flats are largely developed along the west coast of Korea. The importance of tidal flat has been newly recognized while the tidal flat has been seriously impacted due to coastal development and marine pollution. Recently, rapid expansion of developed coastal area consequently changes the coastal environments. Supplies of pollutants and changes of physical energy due to artificial structures have an effect on ecosystem and sedimentary environments in tidal flats. In order to reduce the damages and preserve tidal-flat environments, it is necessary to investigate of long-term impacts on sedimentary environment and ecology. The southern tidal flat of Kanghwa Island with an area of approximately 90 km² is one of the biggest estuarine tidal flats on the west coast of Korea. Tides are typically semidiurnal with maximum range about 10 m. Because of its location in the estuary of Han River system, the tidal flat receives a large amount of sediments and nutrients from land and contains diverse fauna and flora. Recently, constructions of artificial structures, including Incheon International Airport, island-connecting bridges, dikes, etc., near the tidal flat might change tidal current and river flow patterns. These have an effect on sedimentary environments and ecosystem on the tidal flat.

The digital elevation model (DEM) was constructed using six images between May 1999 and September 2002 (Lee et al., 2011). It showed that the elevation decreased to the outer tidal flat and toward the west. The tidal channels were more developed the east than west of Tongmakri. The tidal flat around Tonggom-do was at relatively higher elevation with dense pattern of channels.

This study is to compare distributions of surface sediments and elevations on tidal flats for nearly 15 years and then to understand long-term changes of sedimentary environments at southern Kanghwa tidal flat, west coast of Korea.

**Surface sediments for sedimentary analysis were sampled at 83 stations on September, 2011. The sand and mud fractions were separated by wet sieving through a 63 micron stainless-steel sieve. Grain-size distributions were determined using standard sieving and Sedigraph 5100. Inclusive graphic method was used to determine sediment type, mean, sorting, skewness and kurtosis (Folk and Ward, 1957). Geomorphic changes by sediment deposition/erosion were investigated along three transect lines on the tidal flat. The elevation was measured by using a Pentax Pal 25 Level in April 1998 and RTK-GPS in March 2013.**

The differences of sediment transport patterns between 1997 and 2011 caused to change flow patterns by the construction of artificial structures in adjacent areas.

A series of major constructions have been carried out near the Kanghwa tidal flat since 1990s. These have changes of tidal current and river flow patterns, and resulted in long-term impacts to sedimentation patterns in the tidal flat. In comparison sedimentary facies in 1997 with those in 2011, the area of mud sediments had decreased, but that of sand- mud mixed sediments extended to eastward tidal flat for 14 years. The long-term topographic changes showed that the deposition has been higher in the middle part and the erosion has been dominant in the western part of the tidal flat during 15 years. The differences of sediment transport patterns between 1997 and 2011 caused to change flow patterns by the construction of artificial structures in adjacent areas.

**References**