

Korean Tidal Flats: The West Pacific Mirror of the European Wadden Sea

Introduction

The European Wadden Sea is not as unique in the world as we are used to believe. Along the entire West coast of Korea there is a long stretch of tidal flats up to 10 km in width. They are part of a mosaic of tidal flats along the banks of the south eastern part of the Yellow Sea. The South Korean Wadden Sea has a total area of 2850 km² and is exposed to a tidal range from 4 to up to 10 meters. Unlike its European counterpart, many small islands with rocky shores are scattered over the flats while mountains and hills of 150 to 800 meters height border its fringes. The tidal channels are up to 30 meters deep. Geologically, Korean tidal flats are young and were formed during the recent Holocene rise of the sea level less than 10,000 years ago. Their formation is supposed to be related with the large supply of sediments from the Hwanghe river. Salt marshes, which are common and typical in the European Wadden Sea, have mostly disappeared due to intensive land reclamation during the first decades of this century when the higher intertidal areas with their flourishing salt marshes were converted into agricultural land.

Life in and on the Tidal flats

Tidal flats in South Korea have the same general appearance as their European relatives. Due to the lower latitudes, air temperature is higher though, ranging usually between around - 8.3 °C in December and 38 °C in July. The occurrence of ice in winter is not unusual. Mud, mixed and sand flats are highly productive and are structured by their flora and fauna and by current and climate regimes. Up to about 100 invertebrate taxa may be found in a given area. These are mostly polychaets, bivalves, crustaceans and gastropods, but also holothurians and brachiopods are present. Diatoms are common with possibly more than 250 species. A striking similarity to the European Wadden Sea is the incredible amount of migrating and breeding birds on the Korean tidal flats. This area represents an important footstone for migrating birds along the East Asian-Australasian Migratory Bird Flyway between the Indonesian archipelago, Australia and New Zealand, and East Siberia and Alaska. Up to 85,000 resting waders have been observed in a given area in one day. No less than

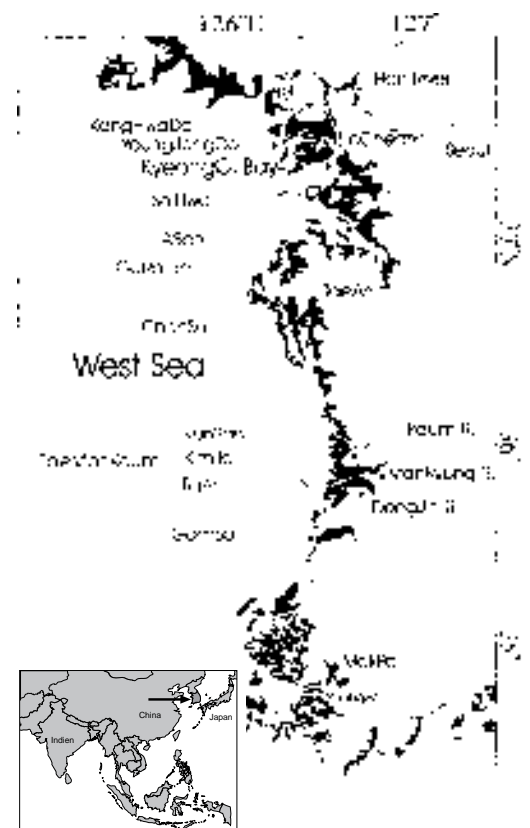
25 species of waterfowl were recorded in internationally important numbers in certain places, e.g., in the Saemankeum Bay which is amongst the highest number anywhere in East Asia. Among these birds, there are sibling species of common European Wadden Sea visitors or residents; Mongolian plover *Charadrius mongolus*, Nordmann's Greenshank *Tringa guttifer*, and Great Knot *Calidris tenuirostris*. But also some identical species such as Kentish plover *Charadrius alexandrinus*, Shelduck *Tadorna tadorna* or Dunlin *Calidris alpina* can be regularly observed.

Man and Korean Tidal Flats – Benefits and Threats

The tidal flats of South Korea support considerable artisanal fisheries on bivalves, e.g. the razor clam *Sinonovacula constricta*, the Manila clam *Ruditapes philippinarum* and *Macra veneriformis*, crustaceans and fish, e.g. Mullet *Mugil chelo*, are also the basis for aquaculture of shrimp and algae. Annual yields of clams and cockles may be in the order of several ten thousands of metric tons. The fishing is carried out mostly by small vessels but also by walking out with beach seines or hand collections. The coastal zone is mostly utilized by agriculture, that is predominantly rice fields. Tourism and recreation is centered in a few places near large urban areas and in many regions infrastructure is poorly developed. There is, however, a potential for attracting more visitors to the area due to the beauty of the tidal flats, their surroundings and the many villages that fit perfectly into the landscape because of

Adolf Kellermann,
National Park Office
Schleswig-Holstein
Wadden Sea, Tönning,
FRG &
Chul-Hwan Koh, Seoul
National University, Dept.
of Oceanography, Seoul,
Republic of Korea

Tidal flats at the west coast of South Korea.





Mangyung tidal flat, Korea
(Photo: Chul-Hwan Koh).

their architecture and appearance. The remoteness and aesthetic appeal of the tidal flats attract a growing number of enthusiasts who come to the area to watch birds and enjoy the tranquility of nature.

There are, however, increasing threats to the Korean tidal flats from land reclamation. Embankments of tidal areas were already started in the first decades of this century. Intensive reclamation went hand in hand with the unprecedented growth of the Korean economy in the sixties and seventies, when a total of 400 km² was embanked for agriculture and industrial plants. A second intensive phase was initiated in the nineties and is still in progress. The total area of reclamation proceeding today is 764 km². A massive land earning is in progress in the Saemankeum area, which involves 400 km² of tidal flat to be enclosed. Two great projects of about 100 km² enclosure have been launched; a new airport construction at Yongjong Do tidal flat and an embankment of Namyang bay for agricultural purpose. Given the ecological value of the area in its own right, but also considering the economic value for a long-term sustainable utilization, such reclamation projects are an unreasonable planning mistake and should be suspended.

Chances for the Future

Governmental nature conservation in South Korea has tradition. There are currently 20 National Parks and various nature reserves throughout the country. Most of the National Parks are mountain areas up to the alpine regions while four of them are maritime sites of minor size. The Korean Ministry for Fisheries and Maritime Affairs is currently considering an option to establish a National Park in smaller or larger parts of the Wadden Sea. In the Korean public, there appears to be growing awareness of the natural treasures of the

country which has peaked in the foundation of a citizen's initiative on the island of KangHwa in the North-west which supports the ministerial planning and which demands protection of the tidal flats. In 1998, there was a symposium held on the island entitled "The Preservation and Prudent Use of the Shoreline of KangHwa Island". The meeting was geared to involve participation of the local people. There, we were given the opportunity to introduce the ecology and sensitivity of Korean tidal flats and thereby draw the attention to its vulnerability and the threats imposed by human use. Also the chance was taken to outline the ways and means of protecting the Wadden Sea ecosystem by a National Park using the Schleswig-Holstein Wadden Sea as an example. In parallel, a society for Korean Wadden Sea research was founded under the realm of the Seoul National University which brings together various disciplines, e.g. ethnology, economy, social sciences and ecology, and which is also joined by policy makers and representatives of governmental authorities.

The existing contacts between the Seoul National University, the National Park Authority of Korea and the National Park Office Schleswig-Holstein Wadden Sea will be continued and will hopefully be intensified. The goal is to promote scientific exchange on common topics of Wadden Sea research and understanding of ecosystem dynamics and to elaborate the best suitable ways and means for efficient protection of the tidal flats in South Korea.

Further reading

Koh, C.-H., Shin, H.-C., 1988. Environmental characteristics and distribution of macrobenthos in a mudflat of the West coast of Korea (Yellow Sea). *Neth. J. Sea Res.*, 22 (3), 279-290.

Lee, Y.-H., Koh, C.-H., 1994. Biogenic sedimentary structures on a Korean mud Flat: Spring-neap variations. *Neth. J. Sea Res.*, 32 (1), 81-90.

Koh, C.-H., 1997. Korean megatidal environments and tidal power projects: Korean tidal flats - biology, ecology and land uses by reclamations and other feasibilities. *La Houille Blanche*, No. 3-1997, 66-78.

Koh, C.-H., 1999. The Korean tidal flat: a brief introduction to geomorphology, land earning and conservation. NGO Ramsar Report for Costa Rica, 1999, prepared by Getbol friends, Korea.

Dr. Adolf Kellermann
Landesamt für den Nationalpark
Schleswig-Holsteinisches Wattenmeer
Schloßgarten 1,
D-25832 Tönning
Adolf.Kellermann@gkss.de

Prof. Chul-Hwan Koh
Seoul National University,
Dpt. of Oceanography
Seoul
Republic of Korea