

# Change in residual circulation due to 33km-long Saemangeum coastal dyke of Korea

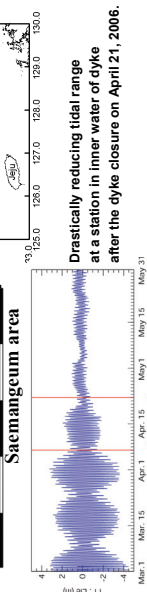
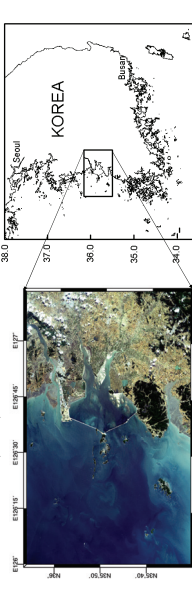
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One of the longest coastal dykes in the world has been constructed in Saemangeum area in the southwest of Korean Peninsula (center location at 126.5E and 35.8N). A 33km-long dyke system connecting a few islands separates the open ocean from the landward water of 401 km<sup>2</sup> area that is planned for reclamation for national coastal development.

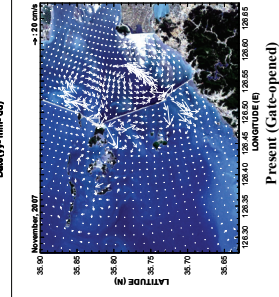
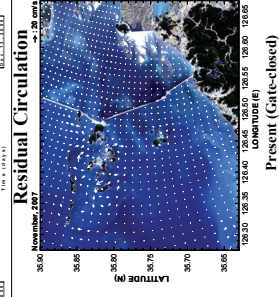
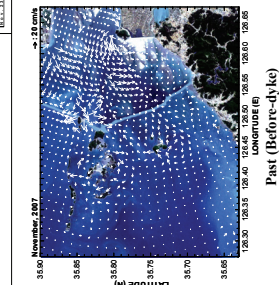
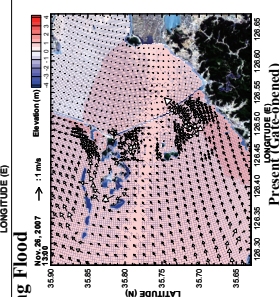
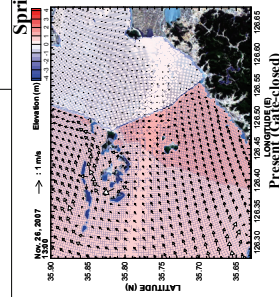
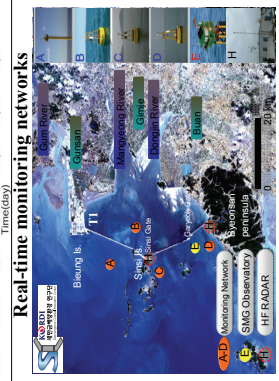
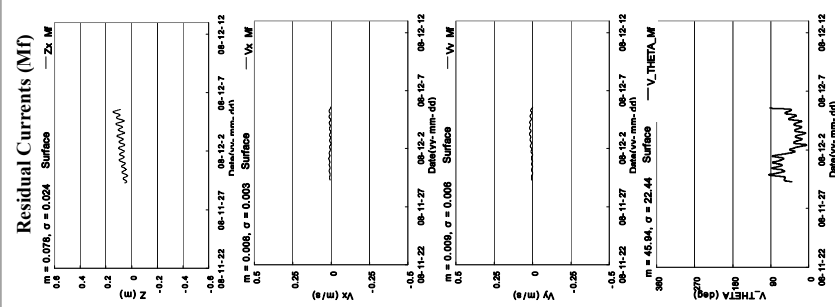
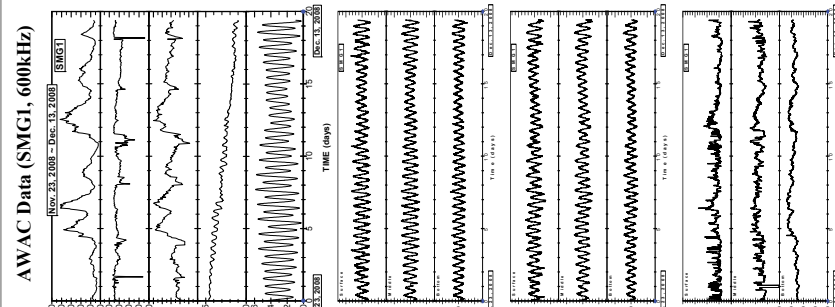
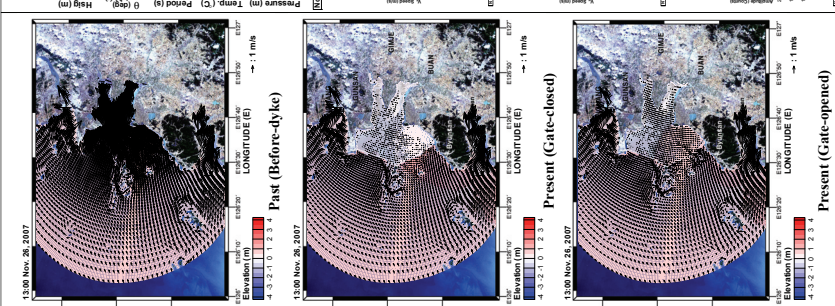
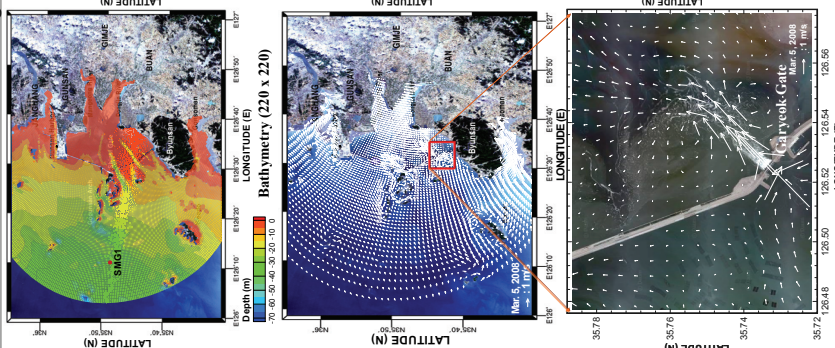
The construction of dyke has started in 1991 and finished closure in 2006. Until the final closure of dyke in 2006, the sea water has exchanged with the fresh waters discharging from Mangyeong and Dongjin rivers, preserving the meso-tidal (tidal range > 4m) estuarine dynamics. However the closure of dyke has changed the tidal dynamics significantly and associated residual flow system has changed dramatically, yielding new pattern of coastal erosion and deposition problems.

In this study, we investigate the change in residual circulation in the Saemangeum coastal water using field observation data and numerical simulation. For numerical simulation, a comprehensive three-dimensional model ROMS is used to simulate the circulation patterns of before-dyke and after-dyke environmental setting. The ROMS is allowing resolving the water movement on the tidal flat with accuracy of order of centimeter.

References  
 Kim C. S. and H. S. Lim (2009) Sediment dispersal and deposition due to sand mining in coastal waters of Korea. Continental Shelf Research, 29, 194-204.  
 Kim C. S. and H. S. Lim (2007) Safety criteria on water depth, offshore distance and dredging volume in sand mining operation in Kyunggi Bay, Korea. Journal of Coastal Research, S150, 507-510.



Drastically reducing tidal range at a station in inner water of dyke after the dyke closure on April 21, 2006.



**MCT 2-Way Coupling**

- Dwave
- Hwave
- Lwave
- Pwave\_bot
- Pwave\_top
- Wave\_break (%)
- Wave\_dissip.

**Saemangeum**

ROMS At : 8 sec, Coupling At : 4 min

