BioOne COMPLETE

# Coastal Wetlands: Coupling between Ocean and Land Systems

Author: Bao, Kunshan

Source: Journal of Coastal Research, 31(3)

Published By: Coastal Education and Research Foundation

URL: https://doi.org/10.2112/JCOASTRES-D-14-00190.1

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://complete.bioone.org/journals/Journal-of-Coastal-Research on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

| Journal of Coastal Research | 31 | 3 | iv | Coconut Creek, Florida | May 2015 |
|---|---|---|---|---|---|

# LETTERS TO THE EDITOR

www.cerf-jcr.org

Letters to the Editor in the *Journal of Coastal Research* are opinion pieces written by coastal researchers or laypersons that usually deal with topics that are important to the research community. Although these contributions state opinions or give perspectives on topical issues of concern, they must be based on facts and evidence. Even though Letters to the Editor may contain personal bias, the commentary should reflect a stance, concern, warning, or opinion with some basis in fact regardless of how it is interpreted. Letters to the Editor are an independent part of the JCR where opinions and positionalities are not vetted in peer review as are professional papers and technical communications. Letters to the Editor are opinion pieces that reflect authors positions and are not necessarily a part of the journal's position on any topic.

## Coastal Wetlands: Coupling between Ocean and Land Systems

**Kunshan Bao**

State Key Laboratory of Lake Science and Environment
Nanjing Institute of Geography and Limnology
Chinese Academy of Sciences
Nanjing 210008, China
ksbao@niglas.ac.cn

In the wake of the ambitious initiative of ocean research in China (Tollefson, 2014), we believe it is urgent for the country to pair coastal wetlands study with the "Deep Dive" and "Deep Exploration" programs (the SinoProbe). The coastal wetlands are the transitional zone between terrestrial and aquatic systems and could be linking the ocean data to conditions in the uplands.

As one of the most significant ecosystems in the world, coastal wetlands have many intrinsic values, including high resilience against extreme weather (Fagherazzi, 2014), wide varieties of plant and animal species, significant socioeconomic benefits to fisheries, and substantial carbon storage (Bauer *et al*., 2013). However, they are vulnerable to climate change and direct anthropogenic disturbance. As a result of continued population growth and increasing global food demand, around 25–50% of the world's coastal wetlands have been converted into farmland and aquafarms. Recent 20–45% loss of coastal wetlands is attributed to their conversion to open water as a result of sea-level rise associated with global warming (Kirwan and Megonigal, 2013). The numerous benefits gradually diminish with the disappearing coastal wetlands.

Meeting future global food and energy demands while mitigating the potential detrimental environmental impacts has emerged as one of the greatest challenges in exploitation and conservation of coastal wetlands in China. For example, the tidal flats in northeast Jiangsu Province ($\sim 5.1 \times 10^5$ ha) are the largest coastal wetlands in China and the world-renowned habitats for many rare and endangered species (Gao *et al*., 2012). Although two wetland reserves of international importance have been established, the Dafeng National Nature Reserve (DNNR, Ramsar site no. 1145) and the Yancheng National Nature Reserve (YNNR, no. 1156), the outlook of protection is not optimistic. From 1988 to 2006, the decrease rate of the grass flat in YNNR was $\sim 900$ ha $y^{-1}$, but the increase rates of the farmland and pond areas are $\sim 600$ ha $y^{-1}$ and 1400 ha $y^{-1}$ (Ke *et al*., 2011). This is not an individual case in China. It was reported that 57% of China's coastal wetlands have disappeared due to land reclamation since the 1950s (Qiu, 2011).

We think the main reason for decreasing coastal wetlands at the same time as protection efforts are increasing is the lack of a national long-term strategic plan such as the one developed for ocean research. Therefore, multidisciplinary research on the coastal environment and a broader perspective of wetland management at the national level are required for optimizing the trade-offs between exploitation and conservation in China.

### ACKNOWLEDGMENTS

This research was supported by the Natural Science Foundation of Jiangsu Province, China (no. BK20131058) and the National Natural Science Foundation of China (no. 41301215).

### LITERATURE CITED

Bauer, J.E.; Cai, W.J.; Raymond, P.A.; Bianchi, T.S.; Hopkinson, C.S., and Regnier, P.A.G., 2013. The changing carbon cycle of the coastal ocean. *Nature*, 504(7478), 61–70.

Fagherazzi, S., 2014. Coastal processes: Storm-proofing with marshes. *Nature Geoscience*, 7(10), 701–702.

Gao, J.; Bai, F.; Yang, Y.; Gao, S.; Liu, Z., and Li, J., 2012. Influence of *Spartina* colonization on the supply and accumulation of organic carbon in tidal salt marshes of northern Jiangsu Province, China. *Journal of Coastal Research*, 28(2), 486–498.

Ke, C.Q.; Zhang, D.; Wang, F.Q.; Chen, S.X.; Schmullius, C.; Boerner, W.M., and Wang, H., 2011. Analyzing coastal wetland change in the Yancheng National Nature Reserve, China. *Regional Environmental Change*, 11(1), 161–173.

Kirwan, M.L. and Megonigal, J.P., 2013. Tidal wetland stability in the face of human impacts and sea-level rise. *Nature*, 504(7478), 53–60.

Qiu, J., 2011. China faces up to "terrible" state of its ecosystems. *Nature*, 471(7336), 19.

Tollefson, J., 2014. China plunges into ocean research. *Nature*, 506(7488), 276.

*DOI: 10.2112/JCOASTRES-D-14-00190.1 received 2 October 2014; accepted 4 October 2014; corrected proofs received 18 November 2014; published pre-print online 8 January 2015.*
©Coastal Education and Research Foundation, Inc. 2015

Downloaded From: https://complete.bioone.org/journals/Journal-of-Coastal-Research on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use