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GEOMORPHIC LANDSCAPE FEATURES AFFECT PLANT INVASION IN SALT MARSHES: THE ROLE OF TIDAL CHANNEL MEANDERS

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Study Description

The invasion of smooth cordgrass (*Spartina alterniflora* Loisel.) has greatly threatened China's coastal salt marshes, yet how geomorphic landscape features, such as tidal channel meanders, influence cordgrass invasion processes remains unclear. We found that lower hydrodynamic disturbance, bed shear stress, and higher propagule pressure triggered by eddies due to the convex structure of channel meanders facilitated the seedling establishment and subsequent growth, whereas the concave side considerably inhibited the cordgrass invasion. Our findings suggest that the meandering geomorphology of tidal channels could act as stepping stones to greatly facilitate cordgrass landward spread along tidal channels by creating invasion windows.

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Photo 1. Invasion range of *S. alterniflora* is promptly extending landward via tidal channels in salt marshes, as shown in this photograph (taken in the Yellow River Delta, China). As a consequence, the drainage density of tidal channels, the lateral hydrological connectivity between tidal channels and their served marsh flats, and bio-geomorphic landscape formation could be considerably altered. Photo credit: Zhonghua Ning.



Photo 2. UAV aerial image presents the process and pattern of *S. alterniflora* (green and green-yellow color in tidal channel margins) landward expansion attached to the meandering geomorphic structure of tidal channels, particularly the convex sides of channel meanders, which could provide consecutive spatial "windows of opportunity" for *S. alterniflora* establishment. Photo credit: Zhonghua Ning.



Photo 3. As shown in this photograph, *S. alterniflora* seedlings preferentially colonize on the convex side of tidal channel meanders. Compared with the concave side, the eddies and reduced flows generally exist on the convex side, thereby providing suitable physical environments (lower hydrodynamic disturbance, bed shear stress, and salinity-moisture stress) for seed stranding, seedling establishment, and subsequent growth of *S. alterniflora*. Photo credit: Zhonghua Ning.

These photographs illustrate the article "Tidal channel meanders serve as stepping-stones to facilitate cordgrass landward spread by creating invasion windows" by Zhonghua Ning, Baoshan Cui, Cong Chen, Tian Xie, Weilun Gao, Youzheng Zhang, Zhenchang Zhu, Dongdong Shao, Dongxue Li, and Junhong Bai, published in *Ecological Applications*. https://doi.org/10.1002/eap.2813.