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Biophysical self-organization of coastal wetlands

Unraveling spatial complexity on tidal flats and marshes,
from the Precambrian to today

Roeland Christiaan van de Vijssel

Propositions

1. Prior to the evolution of complex life on Earth over 500 million years ago, spatial self-organization already was a key landscape-structuring process. (Chapter 2)
2. The development of coastal wetlands cannot be understood from a biotic nor from an abiotic viewpoint; wetlands are shaped by coupled biophysical processes by definition. (Chapters 2 and 4)
3. In order to understand the spatially complex patterns omnipresent in nature, we need to venture beyond the traditional theories of self-organization. (Chapter 3)
4. Pioneer organisms do not necessarily depend passively on a prolonged period of reduced physical disturbances to establish; some ecosystem engineers can actively create their own window of opportunity for establishment. (Chapters 4 and 5)
5. Scientific progress and channel networks have in common that probing multiple side-paths is often more efficient than focusing on a single trajectory.
6. The further computer power increases over the years, the more important it becomes that scientists are selective in choosing the processes they implement in their numerical models.
7. Making policy makers and the general public aware of the basic principles of feedbacks, tipping points and windows of opportunity would greatly contribute to the solution of important societal challenges, such as ensuring a global-scale transition to renewable energy sources.
8. *“Shall I refuse my dinner because I do not fully understand the process of digestion?”* (Oliver Heaviside, mathematician and physicist). Asking this rhetorical question can enhance research progress without losing scientific thoroughness.
9. First advice to anyone stuck on a scientific problem: get away from your desk.
10. All achievements start as failures.