

# Faculty of Geosciences Department of Sustainable Development Section Environmental Sciences

www.uu.nl/copernicus

# **Ecohydrogeochemistry of Former Tidal Wetlands**

Drs. M.J.J. van der Weiden, Prof. Dr. J. Griffioen, Prof. Dr. M.J. Wassen, Dr. A.M.M. van Haperen

Vening Meinesz building A, Princetonlaan 8a, 3584 CB Utrecht

# Introduction

The Netherlands is famous for its waterworks such as the 'Deltawerken' and the 'Afsluitdijk'. Dutch citizens all benefit from this by reduced flooding risk, land reclamation and increased fresh water availability. However, these waterworks also led to loss of tidal dynamics in the estuaries with negative effects on biodiversity. Therefore, it is important to monitor the effects and optimize water management for the benefit of nature. Monitoring is carried out in 7 former tidal wetlands (Table 1; Figure 1).

'Rijkswaterstaat' carried out monitoring in the early years after reclamation but abandoned this due to a transfer of responsibility for these areas towards nature conservation organizations.



#### Table 1

Former Tidal Wetlands in the Netherlands. Reclaimed refers to the year the area was cut off from the sea. Years since reclamation indicate the period of freshening till now (2018).

	Nr	Former Tidal Wetland	Reclaimed	Years since reclaim
	1	Friese IJsselmeer coast	1932	86
	2	Braakman	1952	66
	3	Veerse meer	1961	57
	4	Lauwersmeer	1969	49
	5	Grevelingen	1971	47
	6	Markiezaatsmeer	1983	35
Ľ,	7	Krammer-Volkerak and Zoommeer	1987	31

#### Figure 1

Reclaimed areas in the Netherlands since 1300. Indicated with arrows: Former Tidal Wetlands. Indicated with red arrows: Analyzed in 1993-1994 and 2016-2017.

## **Research question**

Ecology

How do former tidal areas develop? This question is answered by developing an

# Results

• Our multidisciplinary research currently focuses on former tidal wetlands in the

100	Method				
-	Reality	Simulation and Scenarios			
ANT -	Vegetation development	Vegetation development	7		

ecohydrogeochemical model that simulates physico-chemical and ecological processes over time and predicts future developments.

With this model we expect to support optimization of management targeted at biodiversity conservation. Grevelingen.

Hydrology

- Since 1971 freshening caused a cascade of geochemical reactions and a unique development of vegetation types.
- With our 'Buienradar for the subsoil' we will simulate the effects of the partial repair of the tide.



Vegetation development

### Breakthrough curve

Piper diagram 🔬 🖓 🔨

