



## Changes in the geodiversity of Dutch peatlands inferred from 19th and 20th century landscape paintings

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Geodiversity is the natural and cultural range of geological, geomorphological and soil features. We analysed the large database of 19th and early 20th century paintings of Simonis and Buunk ([www.Simonis-Buunk.com](http://www.Simonis-Buunk.com)) to track changes in the geodiversity of Dutch peatlands since pre-photographic times.

Peat dominated in two of the eight main landscapes of the Netherlands: the Lowland peats in the Holocene west and the Highland peats in the sandy Pleistocene eastern parts. Painters were mainly attracted by the lowland peats.

Since more than thousand years, peat plays a major role in Dutch military security, economy, ecology and cultural life. Natural variety and cultural use resulted in a geodiversity that is unique in Europe. There are more than 100 place names with 'veen' (= peat), and surnames with 'veen' are common. Proof of the exploitation of peat for salt and fuel exists from the Roman times onwards. In the 9th century, peatlands were drained and reclaimed for growing wheat. Already in the 11th century, it was necessary to build dikes to prevent flooding, to control waterlevels to avoid further oxidation, and to convert landuse to grassland. But subsidence continued, and in the 14th century windmills were needed to drain the lands and pump the water out. In the 16th century industrial peat exploitation fuelled the rise of industries and cities. All this draining and digging caused the peat surface to shrink. The few remaining living peats are conserved by nature organisations.

### Geodiversity and landscape paintings

In the peat landscapes, popular painting motives were high water levels, the grasslands of the 'Green Heart', the winding streams and remaining lakes. The paintings of landscapes where peat had been removed, show watermanagement adaptations: wind mills, different water levels, canals made for the transport of fuel, bridges, tow paths and the 'plassen', i.e. the lakes left after peat exploitation. The droogmakerijen (reclaimed lakes), now 2 to 5 m below sealevel, were less inspiring.

### Examples of geodiversity changes illustrated by the landscape paintings

- Peat extraction stopped
- Land use changed e.g. the deforestation of the 'Bovenlanden'
- Erosion by waves and boats caused the collapse of peat islands in the artificial lakes
- Peat polders of the Green Heart were sacrificed for building projects
- 90% of the original wind mills were replaced by electrical and motor pumps
- Horse traction was replaced by motor vehicles, which made tow paths and high wooden bridges redundant.
- Dam burst risk increased and skating scenes disappeared with climate change,

### References

Jungerius, P.D., 2010. Sea level rise and the response of the Dutch people – Adaptive strategies based on geomorphologic principles give sustainable solutions. In: Martini I.P. & Chesworth, W.(eds.) Landscapes and Societies. Springer Verlag.