



## **A proposition for a UNESCO application for European Geoparks: towards an international Geopark ‘Delta’ in the Netherlands and Belgium**

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In North-western Europe the rivers Rhine, Meuse and Scheldt have created a giant river delta over the past 3 million years. The area is usually observed by people as a flat and dull type of terrain, although sometimes unexpected elevation differences and sharp contrasts in landscapes occur. Geological phenomena, or ‘geosites’, in the Scheldt region, north of Antwerpen (B) and in the southern Netherlands testify from a dynamic landscape showing a range from very old to very young geological processes. Local exposures in Nieuw-Namen show a Pliocene partly indurated beach sediment witnessing coastal beach conditions in the Pliocene epoch as indicated by the presence of *Aequipecten opercularis*. The very well preserved microfauna, as well as the typical iron sandstone banks reflecting possibly Tertiary soil formation offer a unique geological exposure in the European landscape. Above the beach sands a hiatus of 2.5 million years is exposed, formed by river erosion during ice ages of the Quaternary. The resistant iron-sandstone outcrops are the erosional remains dating from that period. During the last ice age (Weichselian) permafrost conditions have caused frost-crack development, later covered by eolian sands. The sequence is concluded with Holocene soil formation and it represents a geological ‘island’ where fluvial and tectonic history over 3 million years has made a diverse landscape.

Directly north of the Nieuw-Namen site a modern-day tidal regime is present in the Land of Saefthinge with tidal flats on the flanks of the Westerschelde. The hiatus in the geological site Nieuw Namen can be compared to the Brabantse Wal escarpment, which is another unique geomorphological structure, with a steep slope with an elevation difference up to 25 meter that can be followed over more than 30 km. In the slope 1.8 million years old tidal deposits of Tiglian age are exposed, covered by eolian dune deposits that were blown out of the Scheldt valley west of the escarpment during the late Weichselian. The hiatus between the two units is demonstrated by a thin gravel bed reflecting the long time period of Middle and Late Pleistocene erosion during which also the escarpment was formed by fluvial erosion of the Scheldt river.

The deeply incised late Weichselian Scheldt valley in front of the escarpment was flooded due to Holocene sea-level rise and organic and marine deposits were formed. Medieval marine flooding occurred as a response to human occupation and subsidence of the peat lands. Large parts of the flooded landscape were eventually covered with a thick layer of clay that also covered most medieval settlements and large parts of the old infrastructure, freezing it in time. The combined geological history of this region, added with the cultural history of drowned medieval villages, cities and landscapes indicates that the area is characterized by two settlement periods, a medieval one that is located below the modern one. From the 17th century onwards the inundated region was reclaimed by making polders that still dominate the present-day landscape at the foot of the escarpment.

The typical Dutch theme of the ‘battle against water’ in this concept has also gained a growing support from an increasing number of parties. The great diversity in geological processes and resulting landscapes is unprecedented on a global scale and has had its impact on the region’s cultural and economic history, shaping Today’s reality. This has inspired local parties, non-academic institutions, and science professionals to combine their efforts to apply for a European Geopark status. The Geopark incorporates both geological and natural aspects and social economic (sustainable) development, innovation and cooperation between governments, knowledge based institutes and local business & industries. This way, the road to the Geopark status will help catalyse innovative initiatives and developments in the region. Main pillars of innovation in the region are: biobased economy, maintenance, advanced logistics, care innovation, agro-business and social innovation (inclusion).

Our main objective and roadmap is to gather all relevant primary stakeholders in order to design a bidbook in combined effort, applying for a European Geopark as well as a UNESCO Global Geopark status of this specified region. The coalition of stakeholders will launch a public campaign in order to inform and involve locals.