

Historical maps of the coastal zone of Flanders

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The Low Countries have a rich history in terms of cartography. Flanders and the Netherlands were leaders in this field after the renaissance in the 15th century, and especially during the 16th and 17th centuries. Van Deventer, Mercator, Ortelius, Blaeu and many others left a heritage of very precise and detailed maps of Flanders and the Netherlands, thanks to their excellent technical and theoretical knowledge.

In this context, a project was developed to digitize and georeference historical maps of the Belgian coastal zone which are part of the collection of the *Cultuurbibliotheek* (Bruges). These maps will be made available for all relevant end users such as (historical) marine researchers who focus on the Flemish coastal region and bordering regions in the Netherlands and France. Maps from the 16th to the 18th century were used.

The goal of this study is plural. The historical maps will be digitally disclosed through *GeoServer*, an open source server for sharing geospatial data. Furthermore, derived products will be created. Multiple maps of the same region, from different times, will be used to create time-lapse movies that demonstrate the (coastal) evolution of that region. Notable regions for this are the nature reserve “Het Zwin”, the Scheldt estuary and the region of Ostend. Finally, a web application will be launched where all the aforementioned products will be integrated and disclosed for the public.

Historical maps cannot be used as map layers in *GeoServer* nor is it possible to create time-lapse movies without first georeferencing them. Georeferencing is the process of positioning a map with respect to a coordinate reference system (CRS), or basically giving it coordinates. The CRS used in this study is WGS84, which is also used by our GPS systems. The historical maps are georeferenced by means of a geographic information system (GIS), namely *QGIS*. A background map in the preferred CRS allows to link points on the historical map with the corresponding points in the new CRS. These points can be thought of as pins, at which the historical map is pinned to the background map. They are also called ground control points (GCP's). GCP's are a crucial part of georeferencing. The more GCP's that were used, the more accurate the result.

Next, the georeferenced maps undergo a precision test. This is done in the program *MapAnalyst*. This program generates a distortion grid on the historical map on which the amount of distortion with respect to the background is visualized throughout the map. Furthermore, *MapAnalyst* generates parameters such as the average standard deviation, the mean positional error, etc. The distortion grid and these parameters will be made available in an information sheet with the relevant metadata.

The maps with a sufficient accuracy are selected for vectorization. In this step, the coastlines of the georeferenced historical maps are carefully redrawn in *QGIS*, and saved as vector shapefiles. These files can later be used for further analysis of the coastline.

This project targets different end users ranging from researchers to broad public. The georeferenced maps and corresponding metadata are mainly useful for experts, whereas the scans and time-lapse movies will appeal to a broad audience. Potential users comprise local historians, heritage organizations, museums, provincial visitor centers, coastal municipalities, environmental education, government administrations and scientists in multiple domains.

References

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