

Combined morphology surveys Delfland 2011-2016

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1 General description

This data consists of topography and bathymetry surveys of the coast, derived from RTK-GPS and echo-sounding measurements. It is composed from different data sets which cover (a part of) the Delfland coast. This way a snapshot topography of the whole area is obtained. The used data sets are:

- Zandmotor <https://doi.org/10.4121/uuid:3836e5a5-4fdf-4122-84bd-a9bb679fb84c>
- NeMo <https://doi.org/10.4121/uuid:ac6a0962-91a8-4e20-a244-10e74a49a1d0>
- Vlugtenburg <https://doi.org/10.4121/uuid:b798422a-69ec-41be-a394-740aad70df19>
- JARKUS <http://opendap.deltares.nl/thredds/catalog/opendap/rijkswaterstaat/jarkus/profiles/catalog.html>

The temporal coverage spans from the completion of the Sand Engine (Zandmotor) in August 2011 to September 2016. The spatial coverage is the coastal area of Delfland from the Rotterdam waterway up to Scheveningen harbour.

The data is presented in two netCDF files:

combined_data_delfland_surveypath contains the raw xyz point clouds of the combined surveys, the individual point clouds from all sources are appended.

combined_data_delfland_transects contains the interpolated data towards pre-defined transects.

2 Description of data field names

This section contains an overview and description of the different *fields* in the netCDF files.

2.1 Surveypath

The *surveypath* netCDF file contains the combined raw data. Only two standard dimensions are used in this data:

Time T, 38 surveys

Number of points N, approximately $1 \cdot 10^5$ to $4 \cdot 10^5$.

In the netCDF the following fields are present, the indication in brackets shows the dimensions:

time [T] Time in days since 1970-01-01, the time is obtained from the Zandmotor surveys.

epsg [-] The netCDF comment contains information about the coordinate conversion from dutch RD-NAP (Amersfoort) to WGS84 coordinates.

survey_path [T N 3] Matrix containing xyz-coordinate triplets in WGS84, altitude positive up. Column 1 contains the longitudes (Easting), column 2 the latitudes (Northing) and column 3 the altitudes (altitude).

survey_path_RD [T N 3] Matrix containing xyz-coordinate triplets in RD-NAP (Amersfoort), altitude positive up. Column 1 contains the x-coordinates in m (Easting), column 2 the y-coordinates in m (Northing) and column 3 the z-coordinates in m (altitude).

2.2 Transects

The *transect* netCDF file contains the combined interpolated data, and some derived properties. Only three standard dimensions are used in this data:

Time T, 38 surveys

Alongshore L, 644 transects.

Cross-shore C, 1925 points.

Different coordinate systems are present: WGS84, RD-NAP (Amersfoort) and local alongshore/cross-shore coordinates. The latter is obtained by the following transformation, with $\theta = 311.3$, $RD_{x,origin} = 67067$ and $RD_{y,origin} = 444050$:

$$[ls, cs] = \begin{bmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{bmatrix} \begin{bmatrix} RD_x - RD_{x,origin} \\ RD_y - RD_{y,origin} \end{bmatrix} \quad (1)$$

In the netCDF the following fields are present, the indication in brackets shows the dimensions:

id [L] JARKUS compliant transect id. Sum of the areacode $\cdot 10^6$ and the alongshore RSP-coordinate in decametre.

areacode [L] JARKUS compliant areacode for the 15 coastal areas as defined by Rijkswaterstaat.

areaname [L] JARKUS compliant names for the 15 coastal areas as defined by Rijkswaterstaat.

rsp [L] JARKUS compliant alongshore coordinate in metre within the 15 coastal areas as defined by rijkswaterstaat. To be used with *cross_shore*.

alongshore [L] Local alongshore coordinate in metre, distance along the rsp-line, positive North. To be used with *cross_shore*.

cross_shore [C] Local cross-shore coordinate in metre relative to the RSP-line, To be used with *rsp* or *alongshore*.

time [T] Measurement date of the transects in the Zandmotor area, in days since 1970-01-01. Also the leading time-stamp of the data.

time_nemo [T] Measurement date of the transects in the Nemo area, in days since 1970-01-01.

time_vb [T] Measurement date of the transects in the Vlugtenburg area, in days since 1970-01-01.

time_vbnemo [T] Measurement date of the transects in the Vlugtenburg area in days since 1970-01-01, for transects measured in both Vlugtenburg and Nemo surveys.

time_jarkus [T] Average measurement date of the bathymetry of the JARKUS transects, in days since 1970-01-01.

angle [L] JARKUS compliant angle of the positive transect direction, in degrees positive clockwise 0 North.

rsp_x [L] X-coordinate in m (Easting) of the beach pole (Rijksstrandpaal) in RD-NAP.

rsp_y [L] Y-coordinate in m (Northing) of the beach pole (Rijksstrandpaal) in RD-NAP.

rsp_lat [L] X-coordinate in degree (Easting) of the beach pole (Rijksstrandpaal) in WGS84.

rsp_lon [L] Y-coordinate in degree (Northing) of the beach pole (Rijksstrandpaal) in WGS84.

x [L C] X-coordinate in m (Easting) in RD-NAP, to be used with *y*.

y [L C] Y-coordinate in m (Northing) in RD-NAP, to be used with *x*.

lat [L C] Latitude in degree (Northing) in WGS84, to be used with *lon*.

lon [L C] Longitude in degree (Easting) in WGS84, to be used with *lat*.

ls [L C] Alongshore coordinate in m, rotated and shifted from RD, to be used with *cs*.

cs [L C] Cross-shore coordinate in m, rotated and shifted from RD, to be used with *ls*.

max_cross_shore_measurement [T L] Maximum cross shore measurement index (0 based).

min_cross_shore_measurement [T L] Minimum cross shore measurement index (0 based).

epsg [-] The netCDF comment contains information about the coordinate conversion from dutch RD-NAP (Amersfoort) to WGS84 coordinates.

altitude [T L C] Altitude above geoid in m (NAP) for all combined surveys.

z_jarkus [T L C] Altitude above geoid in m (NAP) for JARKUS surveys.

z_jnz [T L C] Altitude above geoid in m (NAP) for all combined surveys, complemented with JARKUS.

interpolation_mask [T L C] Interpolation mask for all surveys: (0) if there is survey data within a 15m perimeter of the schematized point, or (1) if the data is interpolated.

linetype [L] Type of transect as defined by Rijkswaterstaat and Shore monitoring: JARKUS (1) , JARKUS verdicht (2), or Shore (3).

kind [L] Origin of the data on a transect: Zandmotor (1) , NeMo (2), NeMo-additional (3), or Vluchtenburg/NeMo (4).

transect_number [L] Transect number or index, starting from the South.

binwidth [L] Alongshore space in m associated with the transect, volume multiplier.