

Data from: Anthropogenic drivers for exceptionally large meander formation during the Late Holocene

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- ⇒ Quik C, Candel JHJ, Makaske B, Beek R van, Paulissen M, Maas GJ, Verplak M, Spek T, Wallinga J. 2020. Anthropogenic drivers for exceptionally large meander formation during the Late Holocene. *Anthropocene* 32:1–15, DOI: <https://doi.org/10.1016/j.ancene.2020.100263>.

⇒ Quik C, Candel JHJ, Makaske B, Beek R van, Paulissen M, Maas GJ, Verplak M, Spek T, Wallinga J. 2020. Data from: Anthropogenic drivers for exceptionally large meander formation during the Late Holocene. 4TU.Centre for Research Data. DOI: 10.4121/uuid:c9c892de-4f3f-4c1b-b684-17c700b02f31.

Description of the data in this data set:

An overview of the files is listed below. For methodological details please refer to the manuscript and Supplementary Materials (see reference above). The data are grouped in the folders *ArchaeologicalData*, *CoringData*, *DriftsandareaData*, *HistoricalData* and *OSLdata*.

Archaeological data

This folder contains the archaeological inventory of sites in the study area (table 1), dated between the Neolithic and Middle Ages (c. 5000 BCE – 1500 CE), mainly based on the national Dutch archaeological repository Archis III. The dataset contains the location (name, toponymic name, and x and y coordinates in the Dutch RDnew-coordinate system with unit in metres), details of the find and reference to the way it was plotted in figure 3 in the manuscript.

TABLE 1: File overview for folder 'ArchaeologicalData'.

<i>Filename</i>	<i>Filetype</i>	<i>Description</i>
ArchaeoDat	.xlsx	Archaeological database for the study area.
ArchaeoDat	.csv	Same as above.

Coring data

An overview of the coring data files is listed in table 2. Explanation of the headers and description conventions as used in the files regarding the coring data is listed in table 3. SZJK refers to drift-sand Junner Koeland, SZJB to drift-sand Junnerbelten, OGJK to channel morphology west of Junner Koeland. Above the lithological descriptions for each coring, every file contains the site name, X and y coordinates (unit in metres, Dutch RDnew-coordinate system), surface elevation in m +NAP (approximately matching metres above mean sea level), coring date and field notes. Abbreviation NA = not applicable.

TABLE 2: File overview for folder 'CoringData'.

<i>Filename</i>	<i>Filetype</i>	<i>Description</i>
CoringDataSZJB	.xlsx	Coring data of the seven corings (each also saved separately, see seven rows below) at the drift-sand area Junnerbelten, located south of Prathoek.
CoringDataSZJB-4	.csv	Same as above (data saved per coring site).
CoringDataSZJB-3	.csv	
CoringDataSZJB-2	.csv	
CoringDataSZJB0	.csv	
CoringDataSZJB2	.csv	
CoringDataSZJB3	.csv	
CoringDataSZJB4	.csv	
CoringDataSZJK	.xlsx	Coring data of the nine corings (each also saved separately, see nine rows below) at the drift-sand area located west of Junner Koeland.
CoringDataSZJK-1	.csv	Same as above (data saved per coring site).
CoringDataSZJK0	.csv	
CoringDataSZJK1	.csv	
CoringDataSZJK2	.csv	
CoringDataSZJK3	.csv	

CoringDataSZJK4	.csv	
CoringDataSZJK4.5	.csv	
CoringDataSZJK5	.csv	
CoringDataSZJK6	.csv	
CoringDataOGJK	.xlsx	Coring data of the five corings (each also saved separately, see five rows below) near the abandoned river channel west of Junner Koeland.
CoringDataOGJK1	.csv	Same as above (data saved per coring site).
CoringDataOGJK2	.csv	
CoringDataOGJK3	.csv	
CoringDataOGJK4	.csv	
CoringDataOGJK5	.csv	

TABLE 3: Explanation for the headers of the coring data files.

<i>Header</i>	<i>Description</i>
Depth	Depth of the core in centimetres below the surface.
Horizon	Soil horizon following the international rules for soil description of the WRB*.
Texture	Soil texture according to the Dutch soil classification, approximately matching the USDA classification.
M50 (um)	Median of the sand fraction in micrometres.
Rounding	Sediment rounding (well/moderate/poor).
Sorting	Sediment sorting (well/moderate/poor).
Gravel (%)	Visually estimated percentage of gravel.
Gravel (mm)	Indication of gravel diameter in millimetres.

Colour	Soil colour as determined with the Munsell Soil Colour charts. E.g. 10YR 5/3 indicates sheet 10YR was used, matching colour had value 5 and chroma 3.
Gley (%)	Visual estimation of the amount of gley.
HCl	Reaction with 0.1 M HCl solution.
ORG	Notes on organic content of the soil.

* IUSS Working Group WRB (2015). World Reference Base for Soil Resources 2014, update 2015 – International soil classification system for naming soils and creating legends for soil maps. World Soil Resources Reports No. 106. ISBN 9789251083697. Rome: FAO, 192p.

Drift sand area data

This folder contains shapefiles of the drift-sand area as displayed on a range of historical maps, that was used in figure 5 of the manuscript.

TABLE 4: File overview for folder 'DriftsandareaData'.

<i>Filename</i>	<i>Filetype</i>	<i>Description</i>
ds1884	.shp ¹	Drift-sand area derived from the historical map of 1884 CE, as displayed in figure 5 of the manuscript.
ds1851	.shp ¹	Drift-sand area derived from the historical map of 1851 CE, as displayed in figure 5 of the manuscript.
ds1817	.shp ¹	Drift-sand area derived from the historical map of 1817 CE, as displayed in figure 5 of the manuscript.
ds1786	.shp ¹	Drift-sand area derived from the historical map of 1786 CE, as displayed in figure 5 of the manuscript.
ds1720	.shp ¹	Drift-sand area derived from the historical map of 1720 CE, as displayed in figure 5 of the manuscript.

¹ Note that these files should be opened with GIS software (e.g. ArcGIS).

Historical data

This folder contains the historical data on farmsteads in the study area and GIS files that were used in figures 3 and 4 of the manuscript. Descriptions of the headers and attribute tables can be found in tables 6 to 10.

TABLE 5: File overview for folder 'HistoricalData'.

<i>Filename</i>	<i>Filetype</i>	<i>Description</i>
HistDat	.xlsx	Inventory of farmsteads in the study area. Details on headers are provided in table 6.
HistDat	.csv	Same as above.
NumberOfFarmsteads	.xlsx	Data table on which figure 4 of the manuscript was based.
NumberOfFarmsteads	.csv	Same as above.
CadastreBuildings	.shp ¹	GIS file of the buildings in the study area derived from the 1832 CE cadastral map (data acquired from the HisGIS programme, https://hisgis.nl/ , published with permission). Details on headers are provided in table 7.
CadastreParcels	.shp ¹	GIS file of the parcels in the study area (i.e. cadastral municipality 'Ambt Ommen' and selected parts of adjacent cadastral municipalities) derived from the 1832 CE cadastral map (data acquired from the HisGIS programme, https://hisgis.nl/ , published with permission). Details on headers are provided in table 8. Additional details on used terms are listed in tables 9 and 10.
CadastreParcelsSymbology	.lyr ¹	Symbology definition that can be used with the shapefile CadastreParcels.

¹ Note that these files should be opened with GIS software (e.g. ArcGIS).

TABLE 6: Explanation for the headers of the file HistDat.xlsx.

<i>Header</i>	<i>Description</i>
village	Village where the farmstead is situated. Four villages and their territories together make up the study area.
farmstead_name	Name of the farmstead, mostly as mentioned on the 1832 cadastral maps. Occasionally older names (with years of mention) are given.

	The record with farmstead_name 'Hoff toe Ommen' was excluded from the GIS files, as this farmstead was situated outside the mark of Arriën (even though this was contested by villagers of Arriën).
in_Bailiffs_accounts_1499_1500	Indicates whether the farm name is mentioned in the Bailiff's accounts of 1499-1500 CE, i.e. an archive formed by the bishop of Utrecht's steward or bailiff.
in_Fief_registers_Utrecht_Bishopric_1379_1805	Indicates whether the farm name is mentioned in the Fief registers of the Utrecht Bishopric covering the period 1379-1805 CE.
fief_number_in_fief_registers	If the farm name is mentioned in the Fief registers, this field gives the corresponding fief number in Eijken, 1995. Else, value is 0.
in_Tax_register_1520	Indicates whether the farm name is mentioned in the Tax register of 1520 CE.
Medieval_farmstead_split_off	Indicates whether a farmstead of Medieval origin was split off (and hence is younger than) another farmstead that already existed.
farmstead_location_known_based_on_Cadastre_1832	Indicates whether the farmstead can be located on the 1832 cadastral map. Scored as 'uncertain' in cases where the Medieval name is only distantly similar to an 1832 farm name, or if the 1832 cadastre provides no farm name, but the owner's name in 1832 matches a Medieval farmstead name that was not yet located with certainty.
unique_parcel_code	Unique code for farmsteads that could be located on the cadastral map 1832. The first part of the code is the name of the cadastral municipality, followed by a letter indicating the cadastral section (corresponding to the villages studied), and by the number of the cadastral parcel.
Cadastre_of_1832_HISGIS	Contains information derived from the cadastre of 1832, mostly the name of the farm owner, the spatial situation of the farm in relation to the village (e.g. central or peripheral), and the local place-name.
outcome_of_check_with_OAT_scans	Outcome of visual comparison of the HISGIS data with high-resolution scans of the original cadastral registers (consulted on https://beeldbank.cultureelerfgoed.nl/ , using the query 'Ambt Ommen'). Relevant data (e.g. farm name and owner name) of all farmsteads that could be located in the cadastral data set were checked. OAT = <i>Oorspronkelijk Aanwijzende Tafel</i> : in the Cadastre of 1832 this is the table containing parcel numbers with corresponding details about land ownership, land use, attributed local place-name, estimated land tax value, etc. These tables constitute the core of the Cadastre 1832, together with the cadastral maps (Dutch: <i>minuutplans</i>).
specification_of_outcome	Addition to the previous field. In case of a deviation of the HISGIS data from the data as displayed by the scans of the original cadastral registers, the type of deviation is described.

estimated_farmstead_age	The outcome of following the flow diagram (figure 1 in Supplementary Materials of the manuscript) to estimate the age of farmsteads based on the Late Medieval and Late Modern sources listed in table 1 in Supplementary Materials of the manuscript.
remark	Additional information to clarify and support the outcome of our estimation.

TABLE 7: Explanation for the headers of the file CadastreBuildings.

<i>Header</i>	<i>English translation</i>	<i>Description</i>
FID	FID	Unique ID to identify each record.
Shape *	Shape *	Type of geometric shape displayed in the GIS map layer.
Plaats	Place-name, toponym	Place-name of the area where the farmstead is located. The cadastre of 1832 identifies several place-names within each of the villages studied.
Minuutplan	Cadastral ‘minute’ map	Reference to a high-resolution scan of the original 1832 cadastral map. For each record, the corresponding scan can be consulted by entering the code in this field into the search box on https://beeldbank.cultureelerfgoed.nl/ .
Soort	Sort, type, category	Type of feature. The value ‘huis en erf’ means ‘(farm) house and yard’.
Perccodeun	Unique parcel code	Unique code of the cadastral parcel. The first part of the code is the name of the cadastral municipality, followed by a letter indicating the cadastral section (corresponding to the villages studied), and by the number of the cadastral parcel.
village	village	Village where the farmstead is situated. Four villages and their territories together make up the study area.
farmstead_	farmstead	Name of the farmstead, mostly as mentioned on the 1832 cadastral maps. Occasionally older names (with years of mention) are given.
in_Bailiff	in Bailiff’s accounts	Indicates whether the farm name is mentioned in the Bailiff’s accounts of 1499-1500 CE, i.e. an archive formed by the bishop of Utrecht’s steward or bailiff.
in_Fief_re	in Fief registers	Indicates whether the farm name is mentioned in the Fief registers of the Utrecht Bishopric covering the period 1379-1805 CE.
fief_numbe	fief number	If the farm name is mentioned in the Fief registers, this field gives the corresponding fief number in Eijken, 1995. Else, value is 0.
in_Tax_reg	in Tax register	Indicates whether the farm name is mentioned in the Tax register of 1520 CE.
farmstead1	farmstead location known	Indicates whether a farmstead named in one or more of the aforementioned medieval sources can be located on the 1832 cadastral map. Scored as ‘uncertain’ in cases where the medieval name is only distantly similar to an 1832 farm name, or if the 1832 cadastre provides no farm name, but the owner’s name in 1832 matches a medieval farmstead name

		that was not yet located with certainty. Note farms depicted without farm name on the cadastral map 1832 also have the score 'yes'.
outcome_of	outcome_of_check_with_OAT_scans	Outcome of visual comparison of the HISGIS data with high-resolution scans of the original cadastral registers (consulted on https://beeldbank.cultureelerfgoed.nl/ , using the query 'Ambt Ommen'). Relevant data (e.g. farm name and owner name) of all farmsteads that could be located in the cadastral data set were checked.
specificat	specification of outcome	Addition to the previous field. In case of a deviation of the HISGIS data from the data as displayed by the scans of the original cadastral registers, the type of deviation is described.
estimated_	estimated farmstead age	The outcome of following the flow diagram (figure 2) to estimate the age of farmsteads based on the Late Medieval and Late Modern sources listed in table 1.
remark	remark	Additional information to clarify and support the outcome of our estimation.

TABLE 8: Explanation for the headers of the file CadastreParcels.shp.

<i>Header</i>	<i>English translation</i>	<i>Description</i>
FID	FID	A different unique ID to identify each record.
SHAPE *	SHAPE *	Type of geometric shape displayed in the GIS map layer.
OBJECTID	OBJECTID	Unique ID to identify each record.
Kadgem	Cadastral municipality	Name of the cadastral municipality.
Sectie	Section	Section of the cadastral municipality. Individual sections are indicated by letters.
Genaamd	Section name	Name of the section of the cadastral municipality.
Plaats	Place-name, toponym	Place-name of the area where the parcel is located.
Minuutplan	Cadastral 'minute' map	Reference to a high-resolution scan of the original 1832 cadastral map. For each record, the corresponding scan can be consulted by entering the code in this field into the search box on https://beeldbank.cultureelerfgoed.nl/ .
Perceelnr	Parcel number	Number of the cadastral parcel as registered in the 1832 cadastre.
Naameigen	Owner's surname	The family name of the owner of the cadastral parcel.
Voorneig	Owner's first name(s)	The first name(s) of the owner of the cadastral parcel.
Beroepeig	Owner's profession	The profession of the owner of the cadastral parcel. By far the most frequent was 'landb.' ('farmer').
Woonpleig	Owner's place of residence	The place of residence of the owner of the cadastral parcel.
Soort	Type of landuse	Original type of land use of the cadastral parcel at the time of survey, as described in the 1832 cadastral registers.
Naam_recht	Surname of the rightful claimant	Surname of the person or party entitled to use the cadastral parcel.

Voor_recht	First name(s) of the rightful claimant	First name(s) of the person entitled to use the cadastral parcel.
Ber_recht	Profession of the rightful claimant	Profession of the person entitled to use the cadastral parcel. By far the most frequent was 'arbeider' ('worker'), followed by 'landb.' ('farmer').
Woon_recht	Place of residence of the rightful claimant	Place of residence of the person entitled to use the cadastral parcel.
Sorteercod	Standardized type of land use	Standardized categorisation of land use of the cadastral parcel at the time of survey. Different values indicating the same category land use in the aforementioned field 'Soort' were standardized into one value. See table 9 for all values and their translation.
Huisnaam	House name	House or farm name in case the parcel contains a building (e.g. a farm) named on the cadastral map.
Rechten	Rights	Rights vested in the cadastral parcel. See table 10 for all values and their translation.
Perccodeun	Unique parcel code	Unique code of the cadastral parcel. The first part of the code is the name of the cadastral municipality, followed by a letter indicating the cadastral section (corresponding to the villages studied), and by the number of the cadastral parcel.
SHAPE_Length	SHAPE_Length	Perimeter of the polygon (in meters).
SHAPE_Area	SHAPE_Area	Area of the polygon (in square meters).

TABLE 9: Explanation for the file CadastreParcels.shp, field 'Sorteercod'.

<i>Value</i>	<i>Translation</i>
begraafplaats	cemetery
boomgaard	orchard
bos	wood, forest
bouwland	arable land
broekgrond	marshland, carr
broekland	marshland, carr
erf	(farm) yard
grasgrond	grassland
grasland	grassland
hakhout	coppice wood
heide	heathland
hooiland	meadowland
moeras	marsh

nijverheid	industry
onbekend	unknown
tuin	garden
veengrond	peatland
vermaak	recreation ground, park
water	water
weg	road, path
zand	sand, sandy ground

TABLE 10: Explanation for the file CadastreParcels.shp, field 'Rechten'.

<i>Value</i>	<i>Translation</i>
erfpacht	ground lease
Regt van opstal	building on leasehold land
vruchtgebruik	usufruct

Optically Stimulated Luminescence (OSL) data

This folder contains the raw OSL data of the drift sands (see table 11).

TABLE 11 File overview for folder 'OSLdata'.

<i>Filename</i>	<i>Filetype</i>	<i>Description</i>
OSLdating	.xlsx	<p>Tab 'De values': single equivalent doses with associated errors. Note: results for aliquots with calculated uncertainties in equivalent dose (De) of 0 were ignored in our analyses. In this excel file, these results are formatted in <i>red italics</i>.</p> <p>Tab 'Additional info dose rate': Additional information on sample depth (for cosmic dose), water and organic content (for attenuation) and activity of K-40 and several radionuclides in the U and Th decay chains. Missing values for radionuclides are due to peaks below the detection limit for that radionuclide.</p> <p>These data are also available in OSLdatingDeValues.csv and OSLdatingAdditionalinfo.csv (see below).</p>

OSLdatingDeValues	.csv	Contains the same data as OSLdating.xlsx in tab 'De values'. Note: results for aliquots with calculated uncertainties in equivalent dose (De) of 0 were ignored in our analyses.
OSLdatingAdditionalinfo	.csv	Contains the same data as OSLdating.xlsx in tab 'Additional info dose rate'.

Additional data and information:

For details and data on the historical maps, ground control points used in georeferencing, and channel centrelines please refer to:

- ⇒ Quik C, Wallinga J, 2018. Reconstructing lateral migration rates in meandering systems – a novel Bayesian approach combining optically stimulated luminescence (OSL) dating and historical maps. *Earth Surface Dynamics* 6, 705-721, <https://doi.org/10.5194/esurf-6-705-2018>.
- ⇒ Quik C, Wallinga J. 2018b. Data from: Reconstructing lateral migration rates in meandering systems; a novel Bayesian approach combining OSL dating and historical maps. 4TU.Centre for Research Data. DOI: <https://doi.org/10.4121/uuid:1ca25393-aa99-48dc-b382-0506322bc449>.

For details on the palaeohydrological reconstruction please refer to:

- ⇒ Candel JHJ, Kleinhans MG, Makaske B, Hoek WZ, Quik C, Wallinga J. 2018. Late Holocene channel pattern change from laterally stable to meandering – a palaeohydrological reconstruction. *Earth Surface Dynamics* 6 (3): 723–741 DOI: <https://doi.org/10.5194/esurf-6-723-2018>.

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