# UNCERTAINTY QUANTIFICATION OF AIRBORNE TIME-DOMAIN ELECTROMAGNETIC IMAGING and CHARACTERISATION OF SALTWATER INTRUSION

*A Data Management Plan created using DMPonline.be*

**Creator:** Wouter Deleersnyder

**Affiliation:** KU Leuven (KUL)

**Template:** KU Leuven BOF-IOF

**Grant number** / **URL:** PDMT2/23/065

**ID:** 203944

**Start date:** 01-11-2023

**End date:** 01-11-2024

**Project abstract:**

The availability of fresh water is of the utmost importance for human activities. A particular source are the coastal aquifers. This brings along the problem of salt water intrusion by 'polluting" sea water. The latter is a complicated process, influenced on the short time scale by human activities and on the longer time scale by geological circumstances and (climate change) processes. It is far from straightforward to gather concrete data on the amount or location of salt water intrusion. This is not only of direct interest for monitoring purposes, but also from the pure geological viewpoint: can we gain access to geophysical parameters characterizing the subsurface layers that the salt water percolated? The aim of this project is to extract reliable information on the salt water intrusion using electromagnetic induction in the time domain (TDEM). The underlying research challenge is to extract electromagnetic and/or geophysical parameters by solving the associated inverse problem via two different approaches, which add the level of (un)certainty to the recovered parameters. The potential uncertainty results from inaccurate modelling of the underlying processes and the inherent complexity of the (ill-posed) inverse problem. The models and inversion strategies will find application to excavate the aforementioned parameters from existing airborne TDEM data of the Flemish coastal region, to better understand salt water intrusion, both at the qualitative and quantitative level.

**Last modified:** 05-01-2024

# UNCERTAINTY QUANTIFICATION OF AIRBORNE TIME-DOMAIN ELECTROMAGNETIC IMAGING and CHARACTERISATION OF SALTWATER INTRUSION

**Research Data Summary**

**List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.**

1. We will reuse existing numerical and digital data from the VMM, namely time-domain airborne electromagnetic data collected with the SkyTEM system in 2014 and 2017 in the context of the Flemish salinization map. The data is less than 1GB and stored in OneDrive in .xyz format.
2. We will reuse existing numerical and digital data from the UGent, namely frequency-domain electromagnetic data collected with the Dualem 421S and EM34 systems in 2022 in the context of a former gypsum landfill. The data is less than 1GB and stored in OneDrive in .txt format and accompanying GPS data in .csv format.

**If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:**

Both data sets are obtained via email from VMM (Vlaamse Milieumaatschappij, Dieter Vandevelde) and UGent (Ellen Van De Vijver).

**Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.**

- No

**Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).**

- No

**Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)?  If so, please comment per dataset or data type where appropriate.**

- No

**Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.**

- Yes

1. The raw data of the VMM cannot be shared. Resulting output (publications) are shared with the VMM.
2. The specific location (GPS location) of the landfill cannot be disclosed.

**Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.**

- No

#### Documentation and Metadata

**Clearly describe what approach will be followed to capture the accompanying information necessary to keepdata understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).**

There are existing files that explain the specifics.
Regarding the data from VMM there is a begeleiding.txt file.
Regarding the data from UGent there is a file survey_details.txt.

**Will a metadata standard be used to make it easier tofind and reuse the data?**
**If so, please specify which metadata standard will be used.**

**If not, please specify which metadata will be created to make the data easier to find and reuse.**

- No

We will not create additional metadata.

#### Data Storage & Back-up during the Research Project

**Where will the data be stored?**

- OneDrive (KU Leuven)

**How will the data be backed up?**

- Standard back-up provided by KU Leuven ICTS for my storage solution

**Is there currently sufficient storage & backup capacity during the project?**

**If no or insufficient storage or backup capacities are available, explain how this will be taken care of.**

- Yes

**How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?**

Due to the personal nature of OneDrive, files that you do not explicitly share are not accessible to anyone else.

**What are the expected costs for data storage and backup during the research project? How will these costs be covered?**

OneDrive for Business is free for staff and students of KU Leuven

#### Data Preservation after the end of the Research Project

**Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?**

**In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).**

- All data will be preserved for 10 years according to KU Leuven RDM policy

**Where will these data be archived (stored and curated for the long-term)?**

- Other (specify below)

The OneDrive of the supervisor, namely David Dudal.

**What are the expected costs for data preservation during the expected retention period? How will these costs be covered?**

OneDrive for Business is free for staff and students of KU Leuven

#### Data Sharing and Reuse

**Will the data (or part of the data) be made available for reuse after/during the project?**
**Please explain per dataset or data type which data will be made available.**

- No (closed access)

**If access is restricted, please specify who will be able to access the data and under what conditions.**

Upon reasonable request to Dieter Vandevelde (VMM) and Ellen Van De Vijver (UGent).

**Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?**

**Please explain per dataset or data type where appropriate.**

- No

/

**Where will the data be made available?**

**If already known, please provide a repository per dataset or data type.**

/

**When will the data be made available?**

/

**Which data usage licenses are you going to provide?**

**If none, please explain why.**

/

**Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.**

/

**What are the expected costs for data sharing? How will these costs be covered?**

/

**Responsibilities**

**Who will manage data documentation and metadata during the research project?**

Wouter Deleersnyder

**Who will manage data storage and backup during the research project?**

Wouter Deleersnyder

**Who will manage data preservation and sharing?**

David Dudal (data preservation) and Wouter Deleersnyder (sharing)

**Who will update and implement this DMP?**

Wouter Deleersnyder