**Deutscher Wetterdienst (DWD) Data**

The Deutscher Wetterdienst (DWD) Providers Weather and climate data for free with an extensive array of measured parameters with different time intervals for a large selection of weather stations. In Hamburg alone, there are two Stations and about five near the city. In the Thesis, primarily the data from the Fuhlsbüttel, Hamburg has been used due to the proximity to the Geomatikum, where the Isotope measurements and one of the Infrared total column stations have been located.

A significant advantage of using the data provided by the DWD is the standartification and quality control done by the DWD, providing considerable confidence in the measurements. Additionally, the wide arrange of parameters provided including precipitation, Soil and air temperature, solar radiation intensity etc. provided the ability to compare and correlate many aspects of Methane emission.

* <https://opendata.dwd.de/climate_environment/CDC/observations_germany/climate/>
* <https://wetterdienst.readthedocs.io/en/latest/data/coverage/dwd/observation/minute_10.html>
* <https://www.dwd.de/DE/leistungen/klimadatendeutschland/mnetzkarten/messnetz_mi.pdf;jsessionid=053DAD8C1C2781FF1086CA7986DFCD01.live11053?__blob=publicationFile&v=12>
* <https://www.dwd.de/DE/leistungen/klimadatendeutschland/klarchivtagmonat.html#buehneTop>

**Bundesamt für Gewässerkunde (BfA)**

The Water Level Data was provided by the Bundesamt für Gewässerkunde (BfA), and the data has been collected, checked and Quality controlled by the Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV). The Data provided has a high temporal resolution of 1 min and high precision of 1 cm. The Location of the Station is St. Pauli which again was chosen for its proximity to the Geomatikum. The WSV provides many measurement stations, some stations provide data on chemical composition and pollution of the Water. Unfortunately, they don’t provide contentious timeline measurements so those measurements can only be used as a reference, but not in correlation to the methane emissions.

*Bitte benutzen Sie bei Publikationen die folgende Zitierweise:*

*Datenquelle:*

*Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV), bereitgestellt durch die Bundesanstalt für Gewässerkunde (BfG). Dies gilt für Erst-, Zweit- und jedwede Nachnutzung.*

*Die übermittelten Datensätze entstammen der Pegeldatenbank der  
Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV).  
Sie wurden durch die pegelbetreibenden Wasserstraßen- und Schifffahrtsämter geprüft und veröffentlicht.  
Trotzdem sind Datenfehler und Inkonsistenzen nicht vollständig auszuschließen. Eine Gewähr für die Richtigkeit und Vollständigkeit der Daten wird insofern weder durch die WSV noch durch die BfG übernommen.*

* <https://www.hamburg.de/clp/hu/seemannshoeft/clp1/>
* <https://www.pegelonline.wsv.de/webservices/files/Wasserstand+Rohdaten/ELBE/HAMBURG+ST.+PAULI>
* <https://undine.bafg.de/elbe/guetemessstellen/elbe_mst_seemannshoeft.html>
* <https://www.kuestendaten.de/Tideelbe/DE/dienste/karte?lang=de&topic=portal_tideelbe&bgLayer=bkg_open_farbig&E=564579.35&N=5930875.46&zoom=10.699999999999983&catalogNodes=13,8,104&layers=52583503286005e042812ad7d0d541c1&layers_visibility=5ce99fee0698d889f0cd2e0809f973dd>
* <https://www.bafg.de/DE/Home/homepage_node.html>

**Wind Data by Hamburg Universität**

The University of Hamburg conducts their own Independent Wind Measurements at multiple locations, two of them were of particular interest and have been used in this thesis. The First is at the Geomatikum, located very close to the Isotope measurement inlet. At a Hight of 86m. The Second location is the Weather tower at Billbrook, where wind measurements are performed at the height of 50m and 110m. While the Tower is located relatively far from the Geomatikum, it has the advantage of a very reliable measurement as disturbance from the Structure and the surrounding building is minimal. The Wind measurements the University provides are averaged for a 10-minute interval, enabling a good time resolution later. While all provided data has been used and analysed, it becomes apparent that the data measured at the Geomatikum provides the best results with further investigations.

* https://wettermast.uni-hamburg.de/frame.php?doc=MessanlageEng.htm

**LIDAR by DLR**

Not been used yet

* <https://www.vaisala.com/en/wind-lidars/wind-energy/windcube>
* <https://www.pa.op.dlr.de/DFWind_PA/lidar.html>

**CHIMERE**

CHIMERE is a three-dimensional Eulerian limitedarea chemistry-transport model for the simulation of regional atmospheric concentrations of gas-phase and aerosol species.

Not Used.

**Thesis Structure**

1. Abstract
2. Introduction
3. The Campain
4. Theory
   1. Mass Spectroscopy
      1. Method of measurement
   2. Keeling Method
   3. FTIS
   4. Inversion model
   5. MuccNet
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   7. Peak Identification Algorithm
5. Results
   1. Identification of Peaks
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6. Discussion
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