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|  | Data Analytics |

Greenland warming last 140 years

Janus, Mario

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**Introduction (max 1 page)**

Originally I planned to analyze the risks of desertification in countries and I found a really good data source with a lot of atmospherically parameters (wind, rainfall, clouds, temperature, vegetation etc.) at <https://apps.ecmwf.int/datasets/data/era20c-daily/>. Unfortunately the website is currently doing a database move till October, so it was not possible to request any data from this website. So therefore my topic for the final project is the analyzing of Greenland warming over the last 140 years.

As everybody knows the global warming is big issue for current and future generations. The warming of Greenland plays a big role in this context, as it one of the biggest reservoir of frozen water on land (except Antarctica). The melting of this water is already increasing the sea level and the sea level has already been rising for 21cm since 1900. The increase in temperature in Greenland could or will accelerate the sea level rise even further. Should all ice in Greenland melt, the global sea level will increase by another 3 meters from this ice alone. This will have a big impact on coastal areas and the infrastructure there. Especially Asian countries are affected a lot by this, because a lot of big cities and industrial centers are located in coastal areas. To fight the sea level rise will need a lot of investments to harness and protect this cities from the sea level rise as dams and flood doors will need to be build to protect this cities. Also small islands in the pacific are affect a lot by the sea level rise, as most of the small islands are just a few meters over the current sea floor and they are getting more prone to flooding by storms (especially hurricanes). The flooding of this islands causes also emigration issues, as this people loose their homes due the flooding and this is already happening on some islands there, who have to abandon their home forever due the sea level rising. My goal with this project is to analyze the warming in Greenland and also predict the temperature increase in future.

**Data and data sources (1 page)**

For this I have collected data from the website <https://crudata.uea.ac.uk/cru/data/greenland/>. The locations are Nuuk and Ilulissat on the west coast and Qaqortoq on the south coast. As there is data from the west and south coast, I want to analyze which area is more prone to warming and if there is a correlation between this two areas. This data contains 3 data sets from three locations in Greenland that reaches back till 1784 from historical year books. As the data from 1784 to 1872 contains a lot of empty values (represented by -999), I will only use the data from 1873 onwards, because this data is complete. The data comes as .dat file and the scientists used some regression model on the average monthly temperature. Therefore the monthly average temperature in the data set is not represented by real temperature values, but the encoded temperature will still give insight of the climate change in Greenland. To estimate the true mean monthly temperature from the thrice daily observations carried out before the  
introduction of the synoptic stations, the scientist used a weighted average of  
the observations they calculated the monthly mean  
temperatures (T m) in the Yearbooks with the following formule:  
Tm = (2 \* T8 + 2 \* T14 + 5 \* T21) / 9  
T8, T14 and T21 are the monthly mean temperatures  
measured at 8, 14 and 21 hours local time respectively.

**Data collection**

How you collect the data

**Data cleaning and Exploratory data analysis (5 pages)**

**Entities. ERD (2 p)**