# **REPORT**

# **Part one**

I obtained the data containing Air temperature and Sea Temperature from NOAA Weather Station buoy 46035 at 57.026 N 177.738 W in the NOAA National Data Buoy Center website. My first task was to save the data and read it in R. I saved the data in .csv format and therefore reading the data was by the read.csv() command. Thereafter I cleaned the data with a series of r codes and organized it in time series format using ts() command. I visualized the data using a ggplot and showed the plot with aid of a boxplot for each set of data. The box plots appear alike and this therefore implies that Air temperatures and sea temperatures are related.

Data cleaning methods such as imputation are mainly used to remove missing values from data in order to make data analysis possible. The missing values can either be corrected or imputed. The cleaning methods are consistent with constraints based on real world knowledge about the subject that the data describe. Therefore, when there are missing values in the data, I would perform data cleaning to remove or correct the missing parts and move on with data analysis.

The air and sea temperatures have changed over the years for the past 30 years according to the data from the NOAA National Data Buoy Center website. The statistical test suitable to test whether the temperatures have changed over the 30 years is the correlation test using the Cox Lewis test. This test analyses the index of dispersion on a series of events and therefore it is the suitable test that can test the differences in the means and also test the significance in the differences.

From the NOAA National Data Buoy Center web page, the temperature readings are recorded hourly for 24 hours a day and the project has specific instructions that the data should be sampled to take one sample per day. From this, I had to improvise a probabilistic sampling technique that would sample the data and take only one sample out of the twenty four in a day. The sample selected is just randomly and therefore it might take the minimum or even the maximum reading of the day. This have major effect on evaluation of temperature change because the results of the evaluation will be based on the sampled values. If the sample takes the third reading out of the 24 reading and it happens that the third reading is the highest reading of the day, we will be using wrong data and giving wrong conclusions. The best way to avoid this is by the use of averaged data. You take the average temperature read for every 24 hours and use them for analysis. The average is roughly close to all the temperature readings of the day and therefore evaluation using this gives a clear picture of the real temperature changes.

# **Part two**

# **Lethal Dose Table**

Lethal dose (LD50) is the amount of an ingested substance that kills 50 percent of a test sample. It is expressed in mg/kg, or milligrams of substance per kilogram of body weight.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Common name** | **Toxin** | **Lethal doses** | **Description** | **Toxic response** |
| Aspirin | Acetyl- salicylic acid C9H8O4 | LD50 200 mg/kg  (rat, oral) | Odorless white crystal | Gastric distress, confusion, psychosis, stupor, ringing in ears, drowsiness, hyperventilation |
| Table salt | Sodium chloride NaCl | LD50 3 g/kg  (rat, oral)  12357 mg/kg  (human, oral) | White cubic crystal | Eye irritant, elevated blood pressure |
| Bleach (fumes) | Chlorine CI2 | LD50 850 mg/kg (rat, inhaled) | Greenish colored gas, amber liquid, pungent odor | Corrosive to eyes, skin, respiratory  tract, nausea, vomiting, pulmonary edema |
| Lorchel mushroom | Gyromitrin C4H8N2O | LD50 200 mg/kg  (rat, oral) |  | Nausea, vomiting, severe liver  damage, coma, convulsions |
| Arsenic | Arsenic, arsenic trioxide  As, As4 O6 | LD50 15mg/kg  (rat, oral) | Grey, metallic crystals | Acute- irritates the yes, skin, respiratory tract, and nausea. Chronic convulsions, tissue legions,  hemorrhage, kidney impairment |
| Sugar | Glucose C6H12O6 | LD50 30 g/kg (rat, oral) | Sweet white powder | Depressed activity, gastrointestinal disturbances. If diabetic- heart disease, blindness, nerve damage,  kidney damage |

From the table above, we notice that chemical treatments applied to vegetables are highly risky to ingest as they make the vegetables have a high lethal dose and therefore can cause death.