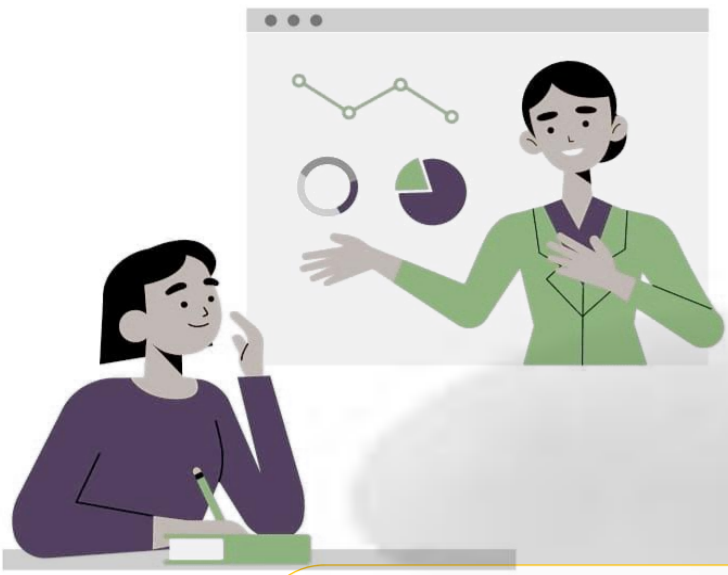
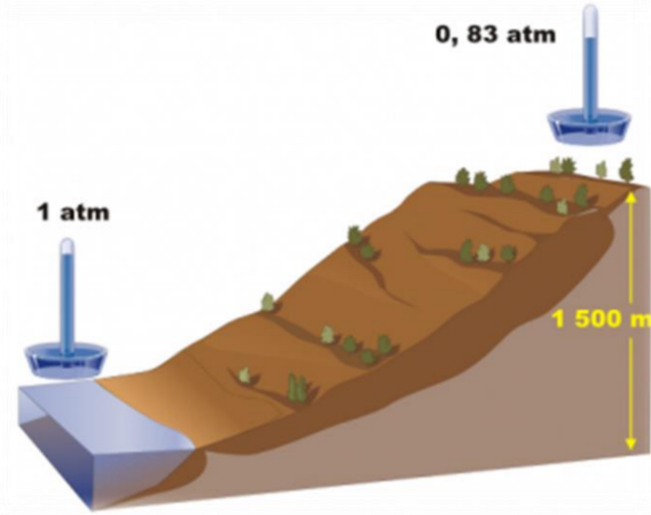


Atmospheric conditions in the north of the country in relation to SDG 13



- To analyze and apply the knowledge of descriptive statistics with respect to the wind speed variable individually and in conjunction with another variable to see if they have any relationship between them, extracted from the data of the Atmospheric Conditions at the MARI site with the Basic Weather Station BWS-200.



Abstract

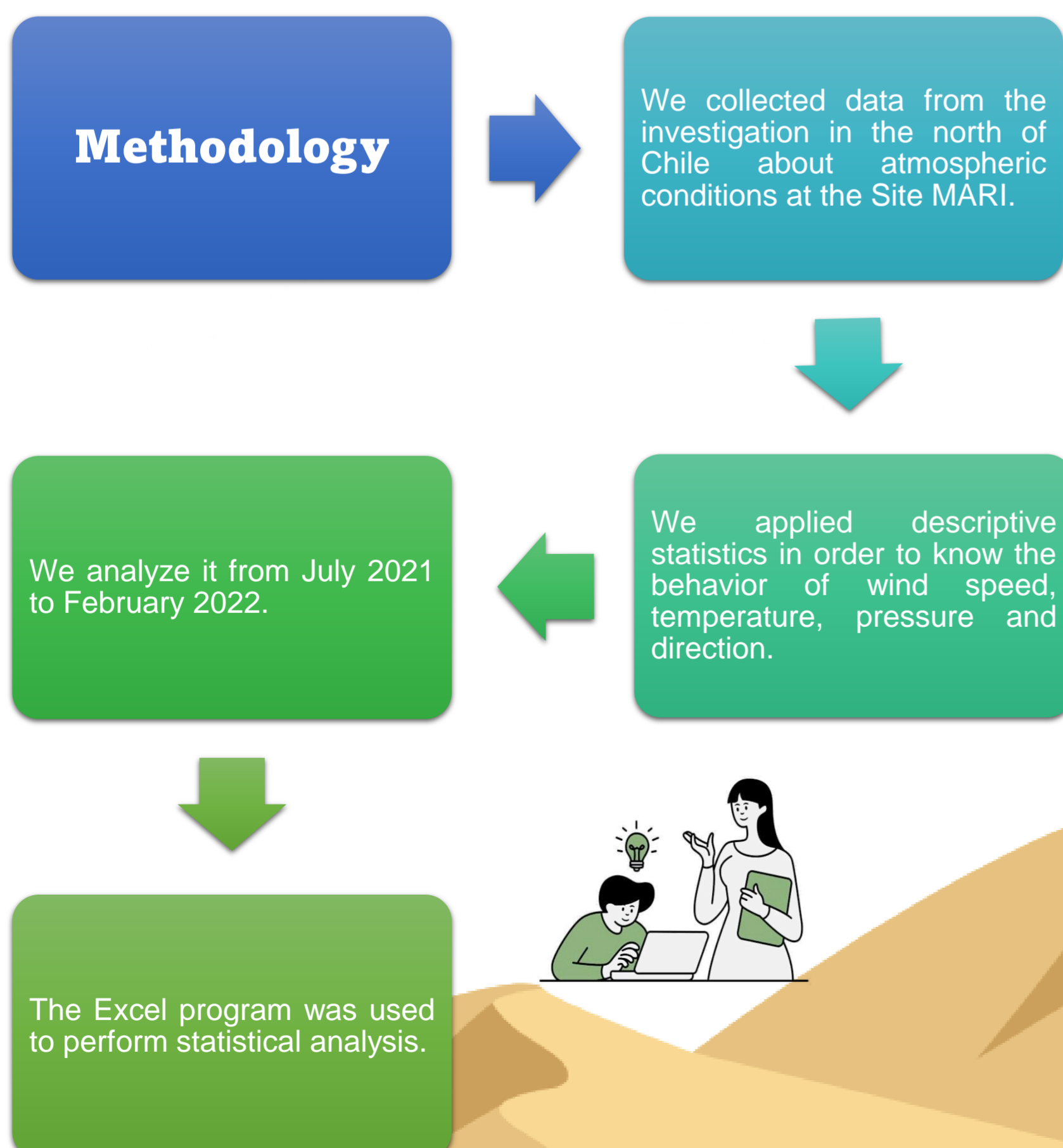
The observation about measurements of atmospheric conditions in the north of Chile and how it relates to goal 13 of the SDG for the weather

Introduction

- The effect that climate change has on health is serious and will affect through direct impacts such as heat waves, droughts, and severe storms, as well as indirect impacts such as respiratory diseases and, food and water insecurity, so it is important to study this objective and make an analysis of the atmospheric conditions. This study was developed at "Site MARI" in the north of Chile, where a radio telescope called MIST was used to calculate the measurements of climate conductivity. The results of the atmospheric conditions are considered, considering the extreme climatic conditions due to the high altitude and the strong winds in these places.

Hypothesis

- The temperature of the air has a direct relationship with the pressure of the air.
- The speed of the wind is higher when it comes from the west.



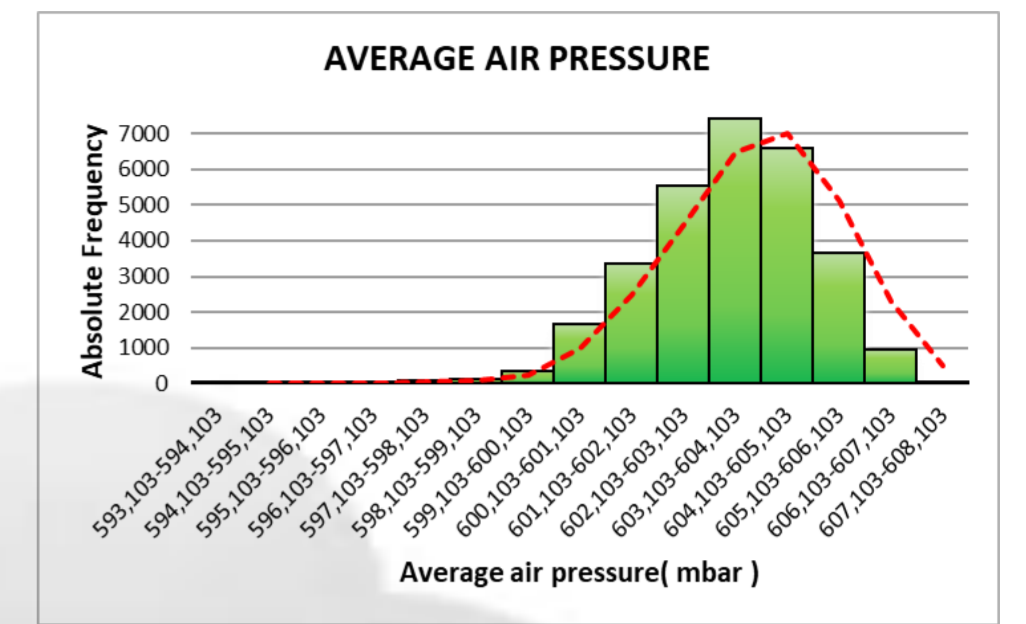
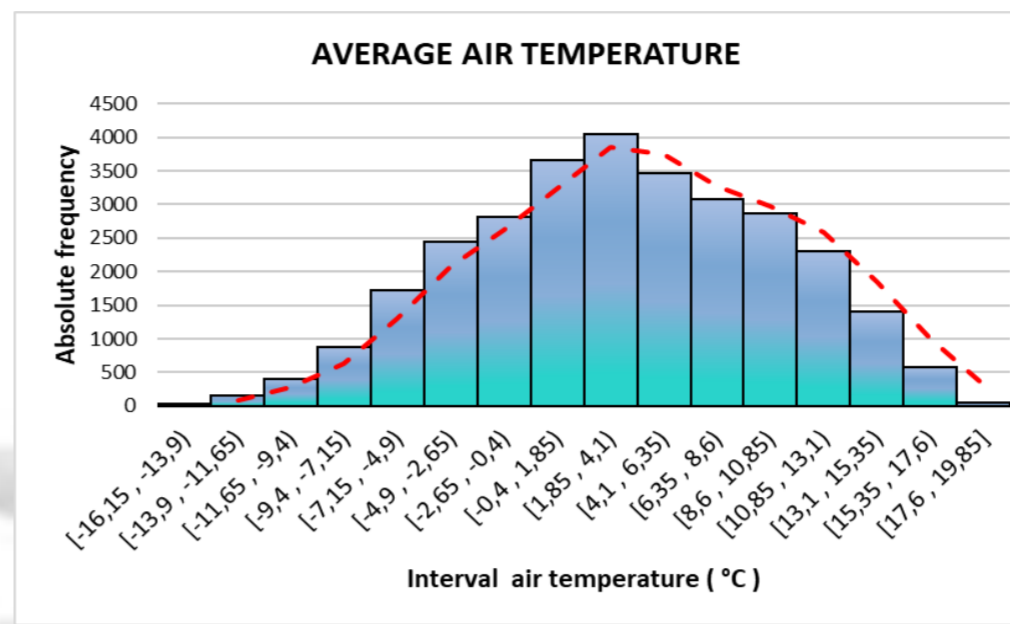
References

Bustos, Ricardo. «MIST Memo 29 Atmospheric Conditions at the MARI Site.» 2020. United, Nations. «Sustainable Development Goals.» 2022. <https://www.un.org/sustainabledevelopment/es/climate-change-2/>.



Development and results

Climate change may considerably change environmental conditions, especially in northern Chile due to its semi-arid climate, affecting the wind speed, temperature and air pressure, among others.

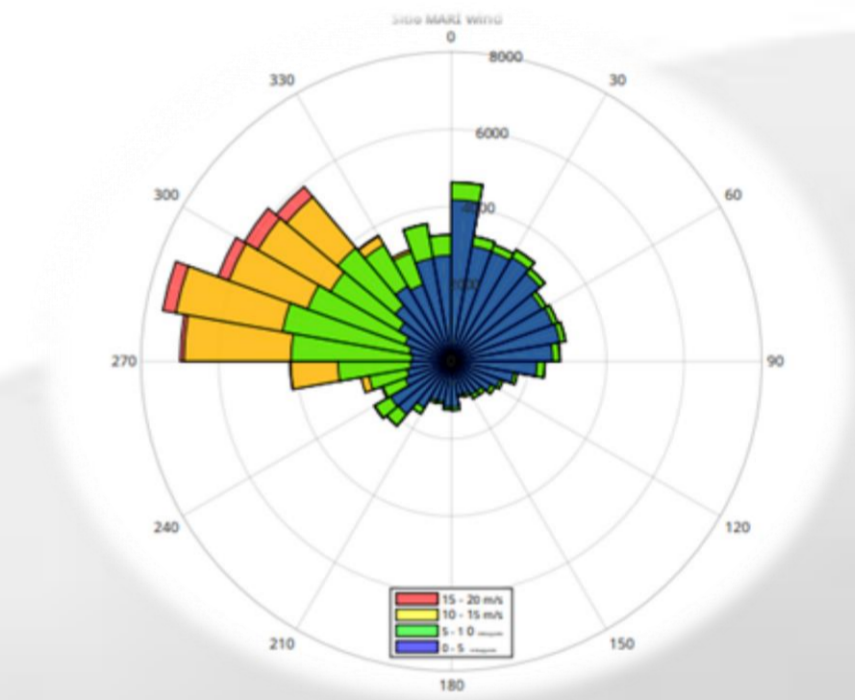
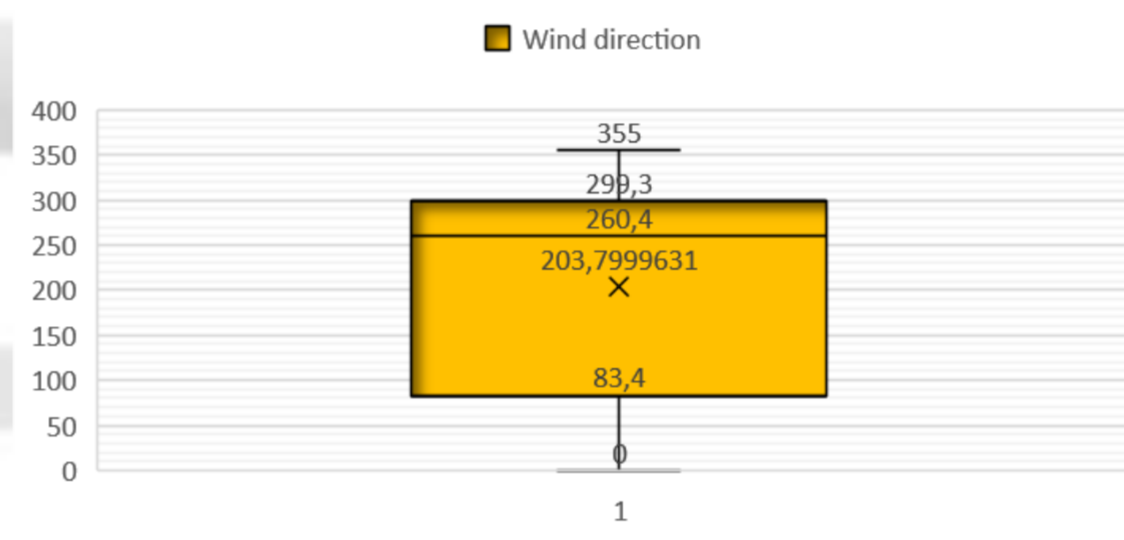


When analyzing the graph, the average air temperature was 3.48 °C, 50% of the air temperature does not exceed 3.42 °C, and the asymmetry distribution of the air temperature is symmetrical, having a low concentration of data in the mean. The air temperature was less than -16.15 °C and at most 18.71 °C, with a range of 34.86 °C. Also observed, the average air pressure is 603.49 mbar, and 50% of the air pressure does not exceed 603.62 mbar. In addition, the minimum pressure is 593.10 mbar and the maximum pressure is 607.44 mbar with a range of 14.33 mbar, and finally, we can say that the graph is negative asymmetric (bias = -0.72).

Correlation coefficient	Air temperature	Air pressure
Air temperature	1	
Air pressure	-0,108705312	1

The correlation coefficient between air pressure and air temperature has a value of approximately -0.1087. The relationship between these variables is inverse, but very low.

Wind direction(Degrees)



We can observe in this boxplot graph that the data is concentrated in the upper part of the distribution, so this would be negative asymmetric, whiskers where it shows the limit for the wind direction where its maximum is 355 degrees and with a minimum of 0 degrees, with a range of 355 degrees, and that 50% of the wind direction is 260.4 degrees.

Average wind speed (m/s)	Wind direction(Degrees)											Overall total	
	0-30	30-60	60-90	90-120	120-150	150-180	180-210	210-240	240-270	270-300	300-330		330-360
0-2	855	1103	1246	899	492	386	362	482	433	390	546	518	7712
2-4	1430	1087	735	482	371	316	339	424	352	360	811	971	7678
4-6	689	276	197	149	191	99	87	210	293	406	639	818	4054
6-8	67	55	90	68	55	22	30	119	403	832	567	217	2525
8-10	15	27	23	24	4	7	6	47	490	1321	545	55	2564
10-12	6	10	4	9				7	356	1460	606	17	2476
12-14	4			2					195	987	573	12	1773
14-16									55	398	321	4	778
16-18									3	156	80	1	240
18-20									1	44	26		71
20-22										2	1		3
Overall total	3066	2558	2295	1633	1113	830	825	1289	2581	6356	4715	2613	29874

When analyzing the data between wind direction and average wind speed, low wind speeds were recorded from all directions, but as the speed increased in some sectors, the direction frequencies began to decrease. Already exceeding speeds of 14 m/s, no speeds were recorded from a large sector, which is from 0° to 240° (From North to West clockwise), likewise the highest speeds are coming only from the Northwest (from 240° to 360°), with a total of 2859 records.

Conclusion



After analyzing the graphs and tables, we can conclude that the correlation coefficient between air pressure and air temperature has a value of -0.1087 approximately; this value is in an interval between -0.2 and 0. With this, we can conclude that our first hypothesis is incorrect, since the relationship between these variables is inverse but very low. Our second hypothesis is correct, since the wind speed is higher coming from the west. But being more specific, the highest recorded speeds come from the Northwest (240° to 360° clockwise), since from the Southwest there were only low speeds.