

Measuring CO2 from space

This project aims to find CO2 concentration where the program is going to execute , by using the Astro Pi Izzy's infrared camera. Carbon dioxide reacts to infrared light differently to most other gases, so we can use its unique capabilities to chart the data.

Team CERC hopes this method of using the IR sensor could be effective, since this sensor, when run at the same time as the TensorFlow library can also provide us with live results or the picture of the earth with annotations of where the dangerous gases are.

Since it just needs the camera to be running along with the TensorFlow model. This project will be using python code, AI/ML model Team planning to create and process the camera's results. We will be using the libraries: Matplotlib, OpenCV, TensorFlow, NumPy, Pandas, Sci-Pi and many more. While coding this project, we believe that there will be many barriers such as the fact that there many of the libraries need extra coding and definitely we will gain a lot of knowledge of space and Science .

Another problem is that we won't be able to use this data to pinpoint exactly where all of the CO2 is coming from due to the wind although estimations are possible by using the information known about air currents.

Team CERC is going to code an experiment that uses the infrared camera's data and TensorFlow, an online machine learning library that can be coded to have capabilities to picture depth and finding pixels, which can show the CO2 profiling along its earth's travel.

Team CERC hopes to help to solve global issues, by mapping where much of the CO2 ends up and checking wind current data since CO2 is being transported by the wind, mainly

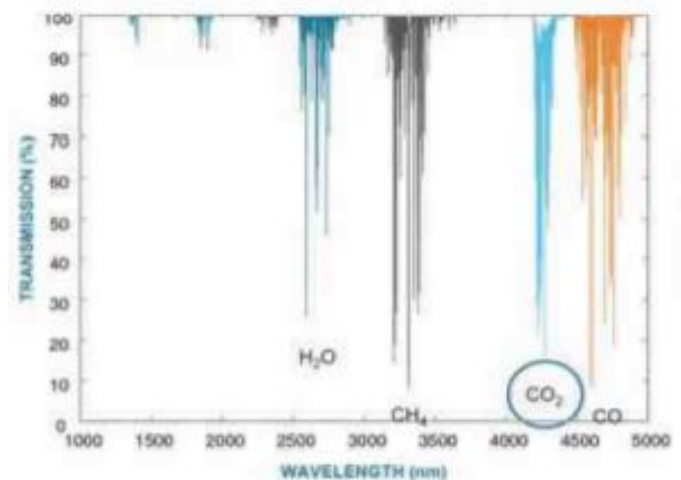


Figure 1. IR absorption of CO₂ and some other gases.

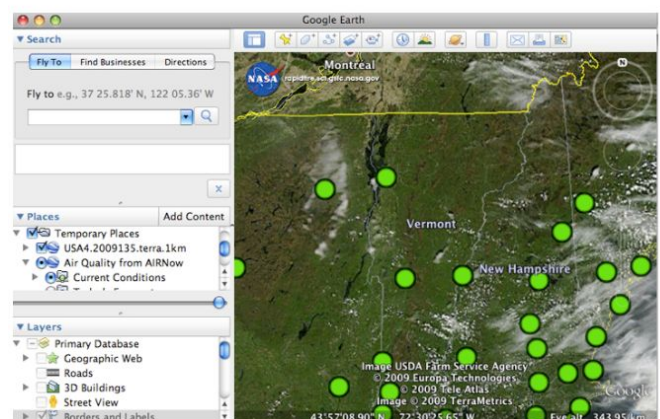
$$\rho(t, p) = \rho(25^{\circ}\text{C}, 1013\text{hPa}) \times \frac{p}{1013} \times \frac{298}{(273+t)}$$

where

ρ = gas volume concentration [ppm or %]

p = ambient pressure [hPa]

t = ambient temperature [$^{\circ}\text{C}$]



Current air quality conditions from EPA ground measurements are overlaid on a current MODIS satellite image in Google Earth.

towards the north. We expected results from multiple pictures of the earth, with colours on places of differing concentrations of CO₂.

Team CERC consists of two children of age 13 from year 8. With the limited knowledge we have and keen to explore the possibilities of space, we all are thankful and hope to work with this project and take it further.

References:

[.Terra Project Experiment](#)

[.Coding](#)

[.How to measure carbondioxide](#)

[.Air Pollution](#)