Geo-Academy Summer School 2025

Using Python to analyse the Keeling curve

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The **Keeling Curve** is a graph of the annual variation and overall accumulation of carbon dioxide in the Earth's atmosphere based on continuous measurements taken at the Mauna Loa Observatory on the island of Hawaii from 1958 to the present day.

The curve is named for the scientist Charles David Keeling, who started the monitoring program and supervised it until his death in 2005.

Keeling's measurements showed the first significant evidence of rapidly increasing carbon dioxide (CO_2) levels in the atmosphere.[1]

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Photo of an air intake tube at Maunakea Observatories in Hawaii. The system was installed on December 8, 2022. (Image credit: NOAA)

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How to measure CO2

NDIR sensors (Non-Dispersive Infrared):

– The most common method in indoor environments, climate research, and industry.
– Carbon dioxide absorbs infrared light at specific wavelengths. The sensor measures how much IR light is absorbed and calculates the CO_2 concentration based on that.

film: how a CO2 detector works

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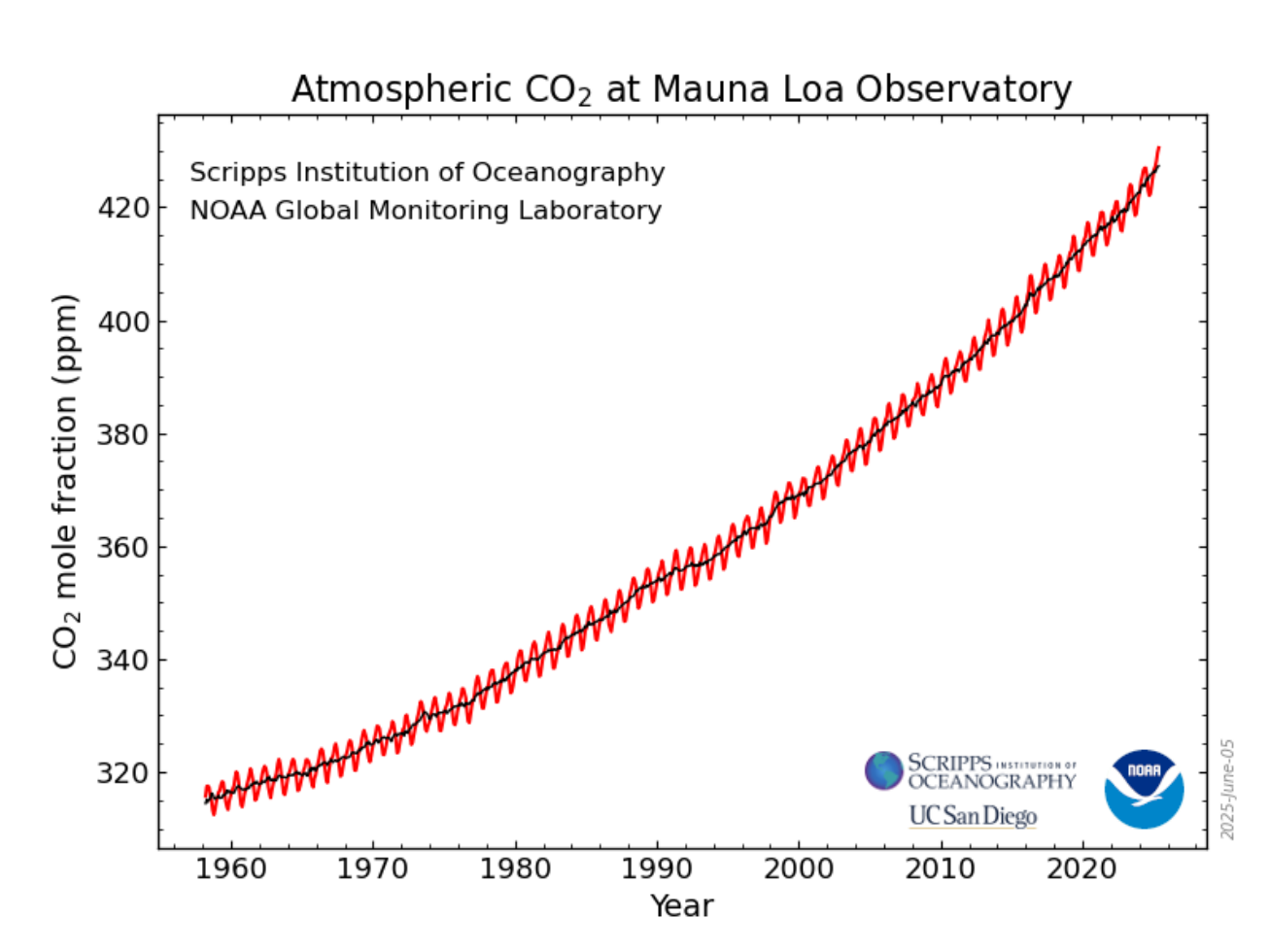

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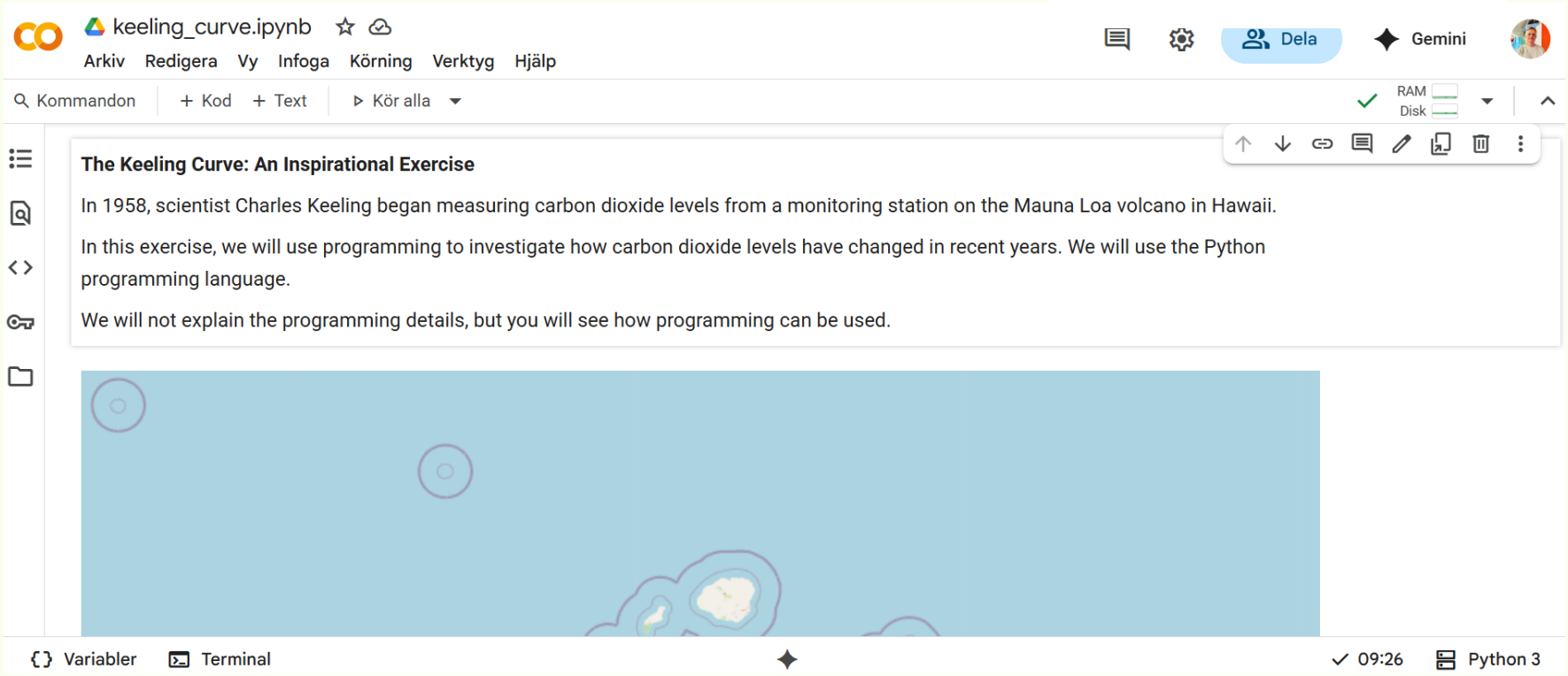
The Keeling Curve: An Inspirational Exercise

Link to the activity: https://colab.research.google.com/drive/1X04PllKtch36gvXsw2Y9MwZNOF4ZaArQ?usp=sharing



You can find the presentation and the links to the activities on our homepage:

GeoAcademy - Vattenhallen Science Center

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Thanks!

- Time for coffee break

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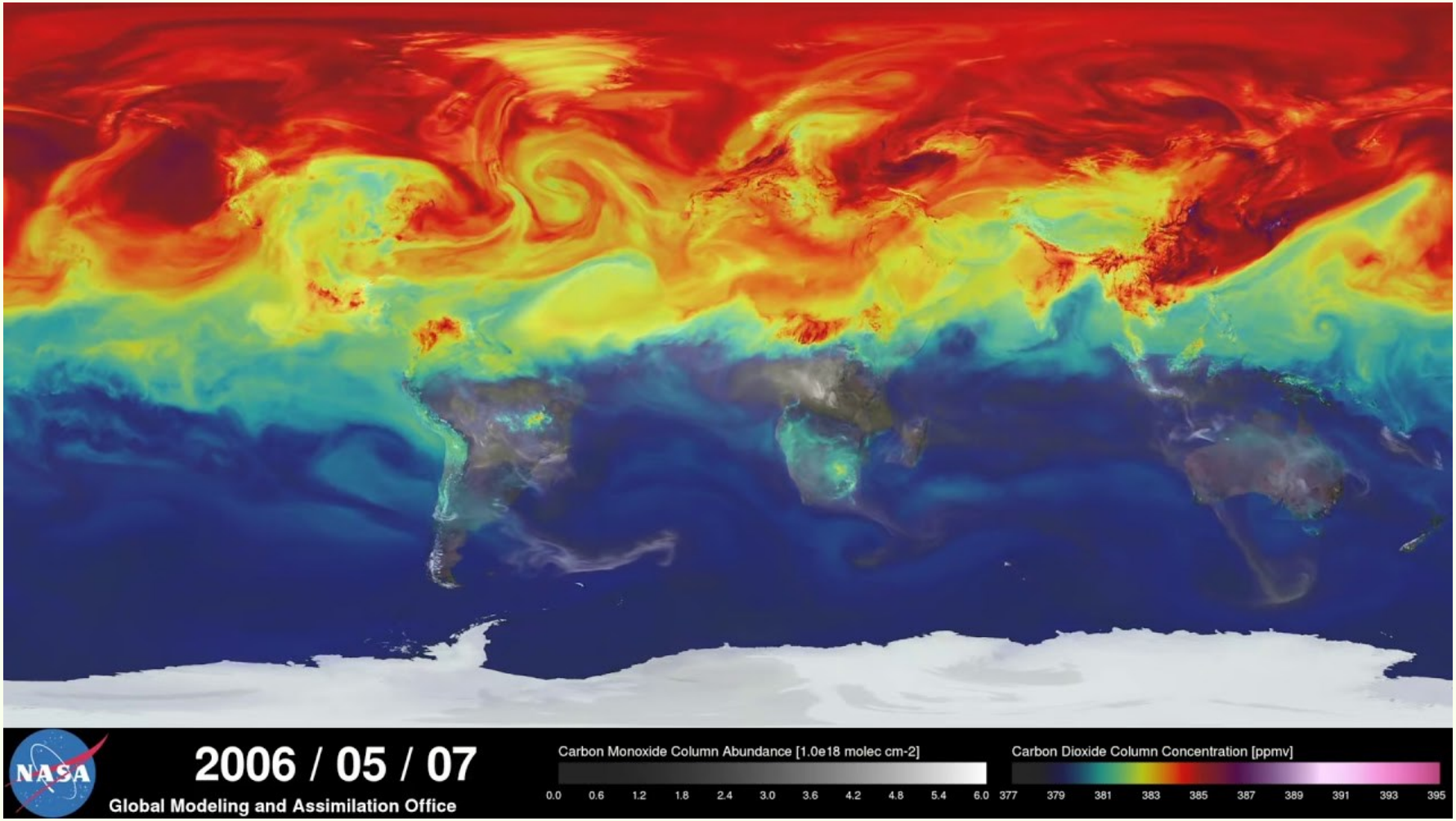

NASA, **A Year in the Life of Earth's CO2**

https://www.youtube.com/watch?v=x1SgmFa0r04