

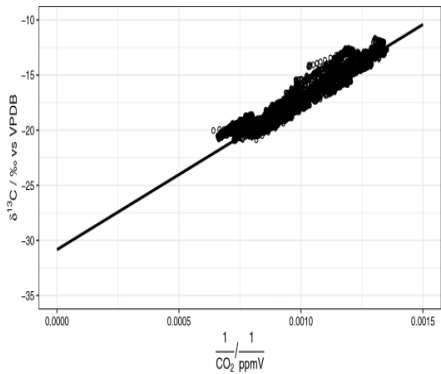
# Geological CO<sub>2</sub> contributions quantified by high-temporal resolution carbon stable isotope monitoring in a salt mine

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High temporal-resolution measurements of an field-deployed laser isotope spectrometer enable recognition of temporal and interdependent CO<sub>2</sub>-dynamics using a mixing model of known end-members.

$$C_G = \frac{(\delta^{13}C_T \times C_T - \delta^{13}C_F \times C_F - \delta^{13}C_C \times C_T + \delta^{13}C_C \times C_F)}{\delta^{13}C_G - \delta^{13}C_C}$$

| Source of CO <sub>2</sub>    | Concentration / ppmV | δ 13C / ‰ vs. VPDB    |
|------------------------------|----------------------|-----------------------|
| Atmosphere (C <sub>F</sub> ) | 400 ± 10             | - 8.9 ± 0.2           |
| Geology (C <sub>G</sub> )    | calculated           | - 6 ± 1 (measured)    |
| Combustion (C <sub>C</sub> ) | calculated           | - 30.8 ± 1 (measured) |
| Total (C <sub>T</sub> )      | measured ± 10        | measured ± 0.2        |

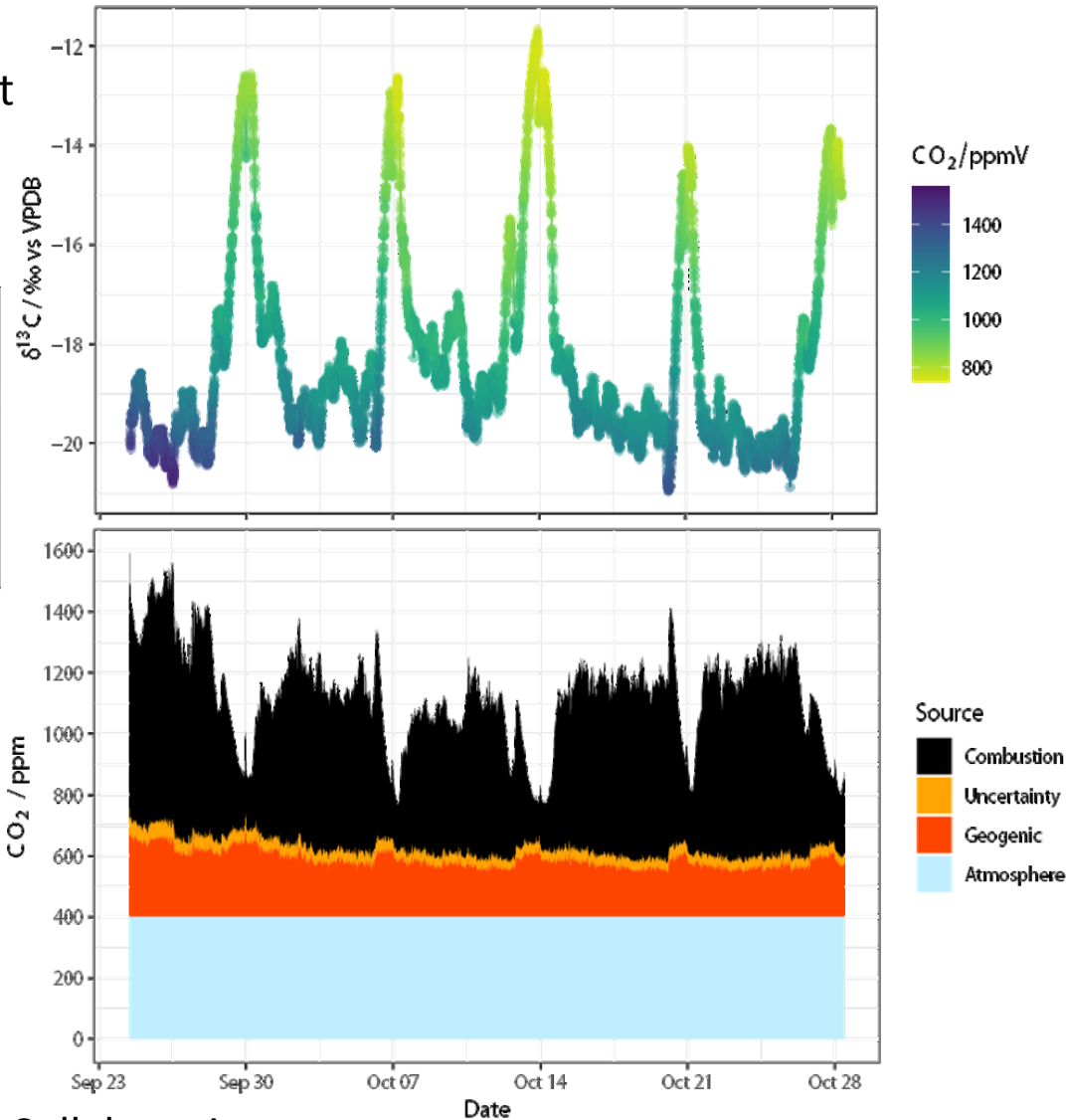


## Results:

- Daily concentration variations in the mine: 67-591 ppmV
- Contribution of geogenic CO<sub>2</sub>: 137-324 ppmV

## Conclusions

- Variations of total CO<sub>2</sub> coincide with the weekly operation of the mine.
- Machinery represents the largest and most variable contribution.
- Contributions of geogenic CO<sub>2</sub> respond to established gradients.



Read / cite:

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<https://rdcu.be/cg4TF>

