



## Variability of methane fluxes at the Ebro Delta due to rice field: comparison between inventories and Radon Tracer Method based results.

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The Ebro River Delta, in the northwestern Mediterranean basin, has an extension of 320 km<sup>2</sup> and is mainly covered by rice fields. Rice fields are known to be one of the main sources of anthropogenic methane emissions, and a better estimation of its temporal variability in relation to the different rice cultivation phases is important to help with the implementation of emission reduction strategies (Àgueda et al., 2017),

In the framework of the ClimaDat network, an atmospheric station was installed in the middle of the Ebro Delta in 2012. A Picarro G2301 for greenhouse gases (GHG) atmospheric concentrations and an ARMON (Atmospheric Radon Monitor) for atmospheric <sup>222</sup>Rn concentrations were collocated among other instruments. Nocturnal hourly atmospheric observations of CH<sub>4</sub> and <sup>222</sup>Rn measured between 2013 and 2019 were used to apply the Radon Tracer Method (RTM) for retrieving CH<sub>4</sub> fluxes over the footprint area.

The Ebro River Delta has a reduced dimension and a complex meteorological regime highly influenced by the Ebro channelled winds and the sea breezes, making it difficult to calculate GHG fluxes using global or regional inversion models. However, the use of high-resolution backtrajectories (model WRF-Flexpart) coupled with the traceRadon daily radon flux maps for Europe (Karsten et al., 2022), with a resolution of 0.05 degrees, has allowed the use of the RTM in this complex area.

Methane fluxes estimated by RTM were compared with fluxes directly measured with chambers in past studies (Martínez-Eixarch et al., 2018) and with data obtained by the EDGAR inventory (Crippa et al., 2022). Results show a promising agreement between methane fluxes obtained with different methods, and a variability clearly governed by the rice crop cycle which is not reflected in the methane emissions values reported in EDGAR inventories.

### References

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