

# Nitrous Oxide Emissions in Riparian Zones of the Tagus Basin. Results from Static and Automatic Chambers

Carmen Galea<sup>1\*</sup>, Luis Lassaletta<sup>1</sup>, Juliana Hurtado<sup>1</sup>, Rasmus Einarsson<sup>1</sup>, Antonio Vallejo<sup>1</sup>, José Miguel Sánchez<sup>2</sup>, Sabine Sauvage<sup>2</sup>, Maria do Rosário Cameira<sup>3</sup>, Roxelane Cakir<sup>1</sup>, Jaime Recio<sup>2</sup>, Hamid Yammine<sup>1</sup>, Alberto Sanz-Cobeña<sup>1</sup>.

<sup>1</sup>Escuela Técnica Superior de Ingeniería Agronómica Alimentaria y de Biosistemas (ETSIAAB), Universidad Politécnica de Madrid (UPM) Madrid, Spain

<sup>2</sup>Laboratoire d'Ecologie Fonctionnelle (ECOLAB), Ecole Nationale Supérieure Agronomique de Toulouse (ENSAT) Toulouse, France

<sup>3</sup>Centro de Engenharia dos Biosistemas (CEER), Instituto Superior de Agronomia (ISA) Lisboa, Portugal

\*c.galea@upm.es



## Riparian Buffers and Greenhouse Gases emission

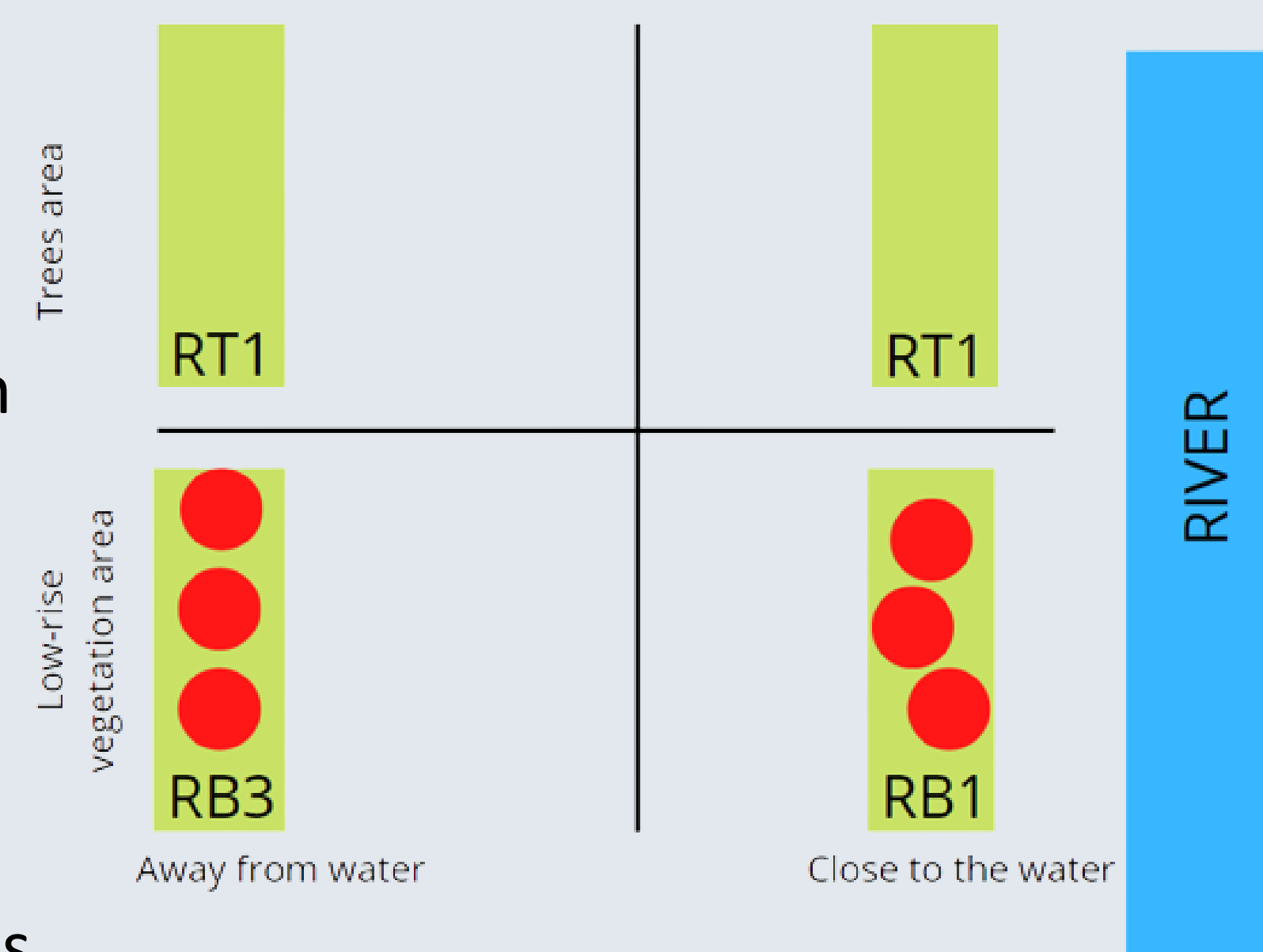
- Riparian ecosystems act as **buffers** for nitrate and ammonium surplus from intense agricultural activities, **preventing water pollution and eutrophication**.
- However, riparian soils can act as **hotspots** of **N<sub>2</sub>O**, produced by the nitrification and denitrification processes boosted by the presence of N surplus and anaerobic conditions.



## Measurements in two Mediterranean areas

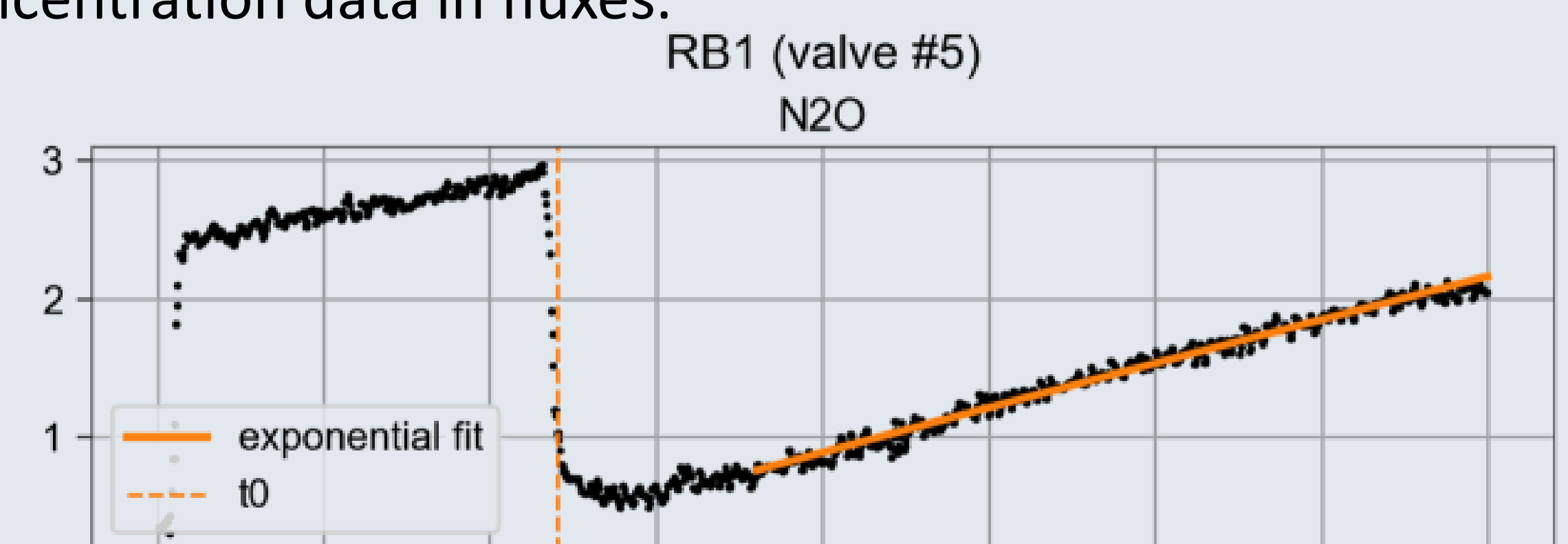
In the framework of the European project **Interreg Agro-Green SUDOE** we are measuring greenhouse gases emissions with automatic and static chambers in two Mediterranean riparian zones.

Measurements are conducted in two areas of the **Tagus basin**: one in Sorraia River in Coruche (Portugal); and the other in Henares River, Madrid (Spain).



## Automatic and static chambers

- Estimate the emission dynamics in different **time scales**.
- Studying the potential **main drivers** that affect N<sub>2</sub>O production in both daily and seasonal scales.
- Processing the high amount of data** collected from the automatic system: development of a **software** (PICARRITO) that converts gases concentration data in fluxes.

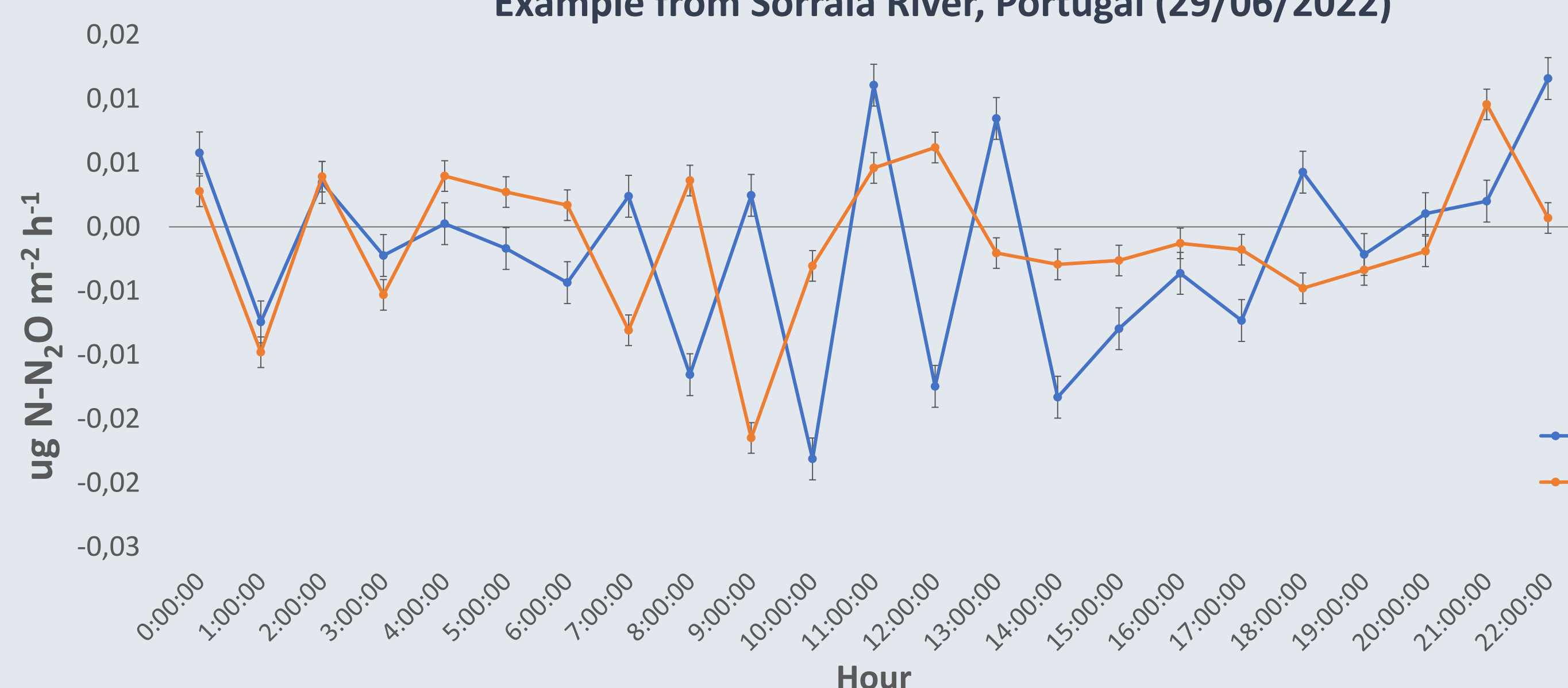


## Assessing potential main drivers in riparian GHG emissions

- Our results show **correlation between the proximity to water and N<sub>2</sub>O emission**, due to the water content of this types of soils that favors denitrification processes.
- We also find differences between areas with **different vegetation**, possibly explained by the Carbon content of the soil and other physiological processes that involve the plant.

## Daily dynamics

Example from Sorraia River, Portugal (29/06/2022)



## Seasonal dynamics

Example from Henares River, Spain (2021-2022)

