

Microclimatic modelling in the iconic Macaronesian laurel forest



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CONTEXT

- The **Macaronesian laurel forest** is the last remnant of **Tertiary tropical forests** in Europe. This **refugium ecosystem** hosts a massive biomass of **epiphytes** and a unique diversity of **endemic species** requiring high levels of relative humidity and stable temperatures.
- < **12% of the pre-human distribution of the laurel forest remain**, with a majority of **degraded stages** dominated by woody *Erica* and very restricted patches of old-growth stands dominated by *Lauraceae*.
- Due to their **reliance on specific fog** conditions, laurel forests are **severely threatened by climate change**.

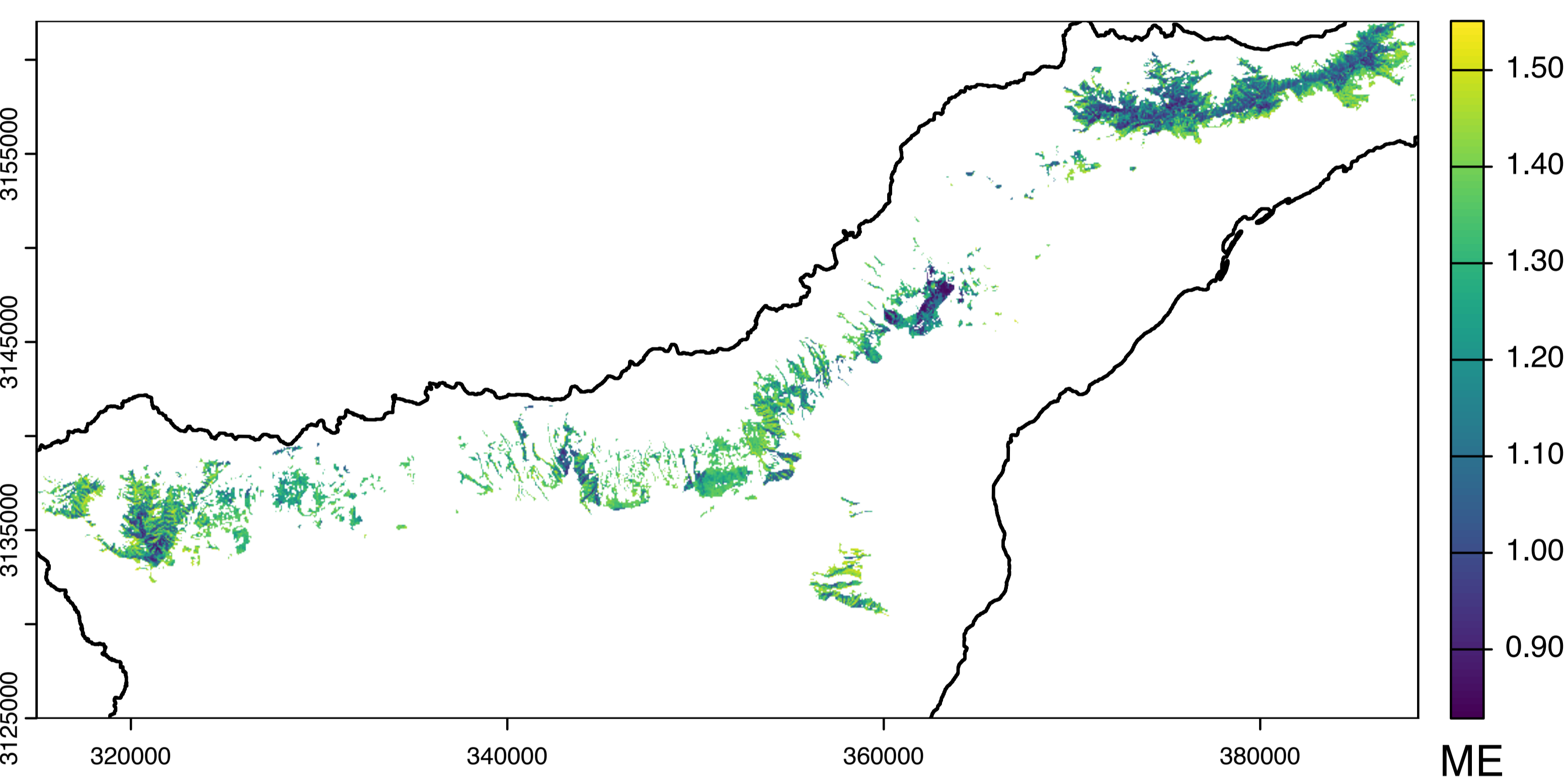


OBJECTIVES

- To what extent does the **degradation of the vegetation** alter the **buffering capacity** of the canopy?
- How do iconic, **endemic laurel forest species** respond to **changes in microclimatic effects**?

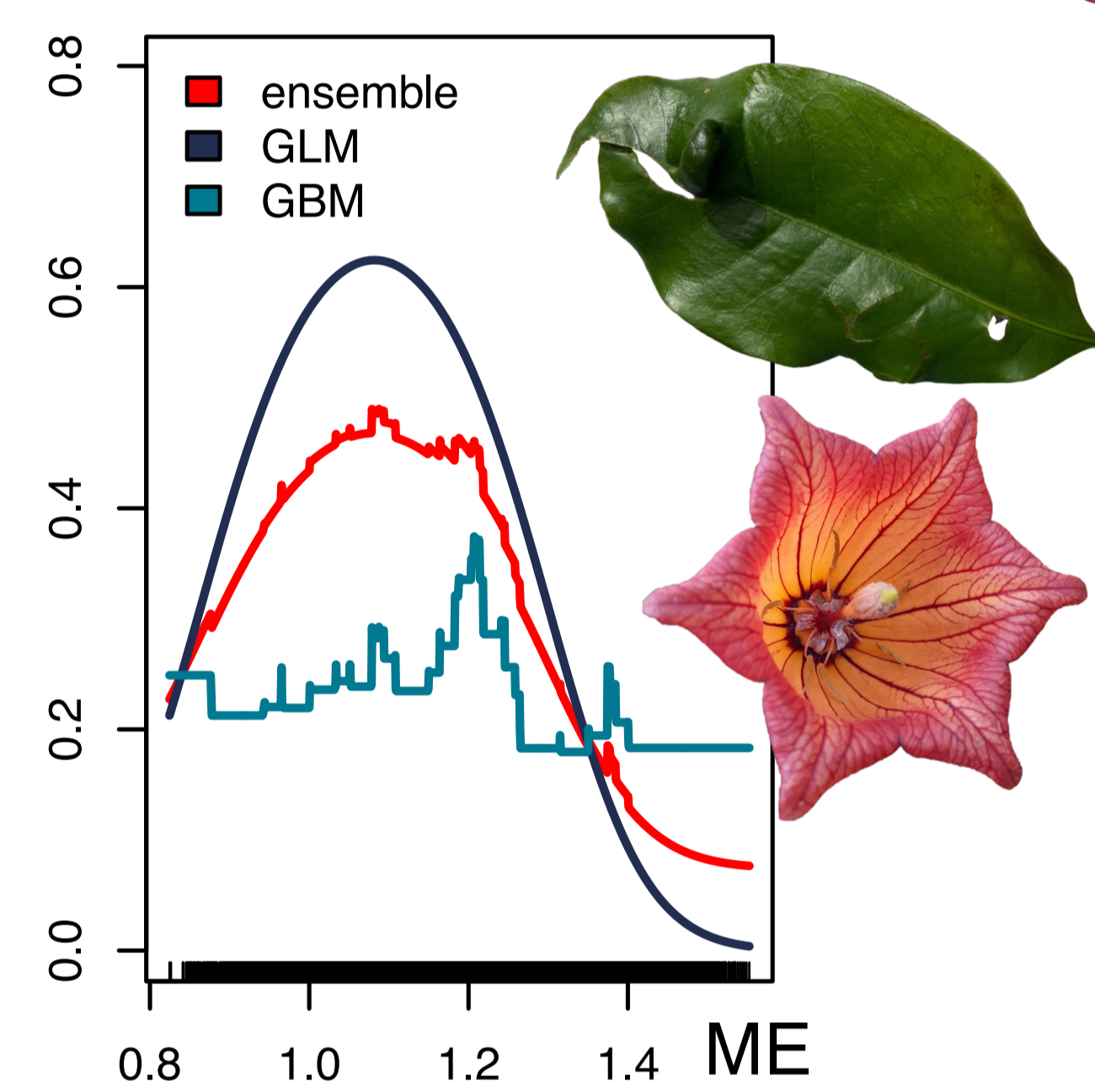
RESULTS

Spatial variation of the microclimatic effect (ME) for temperature in the laurel forest of Tenerife

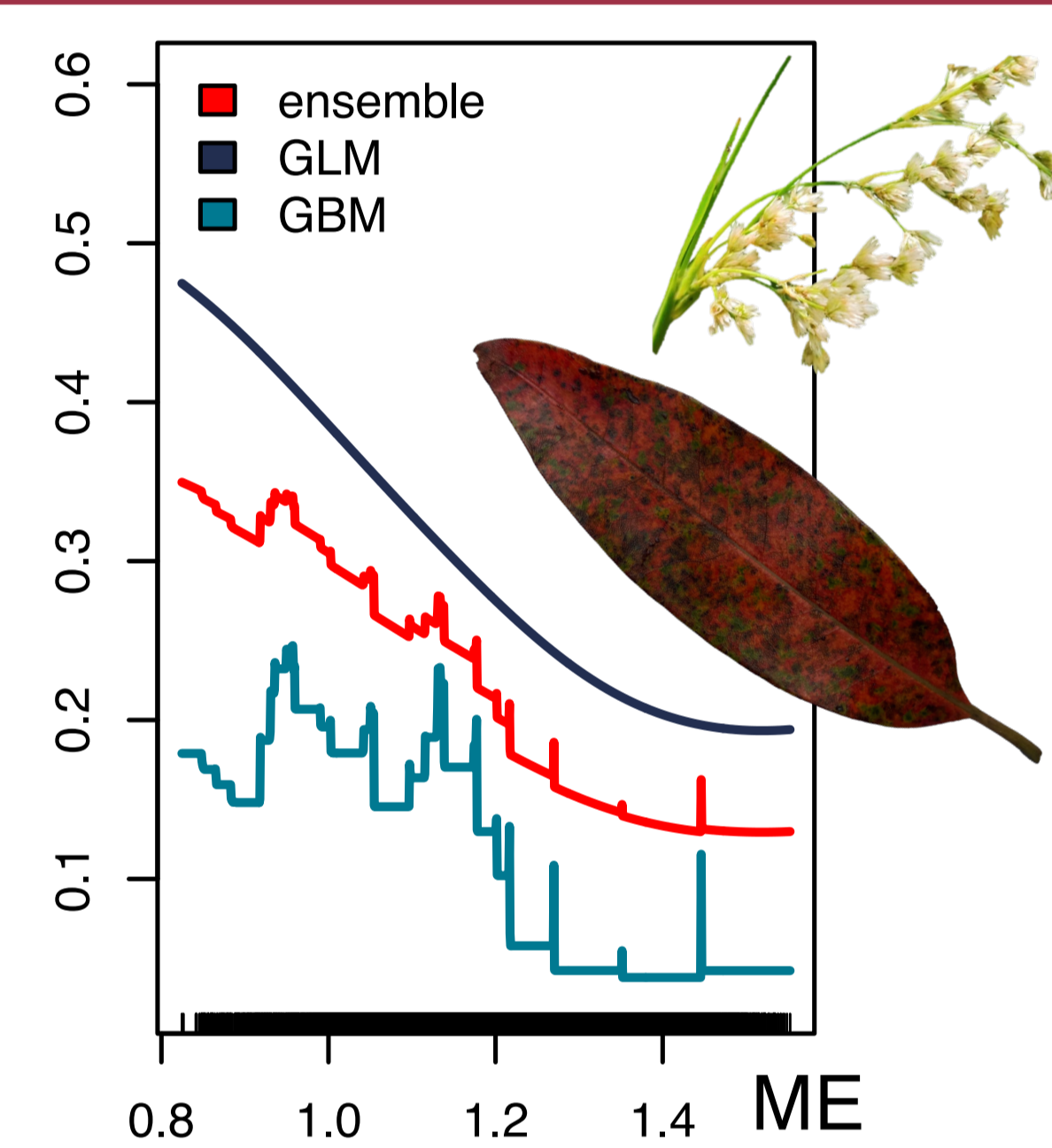


Species response curves to the microclimatic effect

Generalist species with broad tolerance to microclimatic buffering

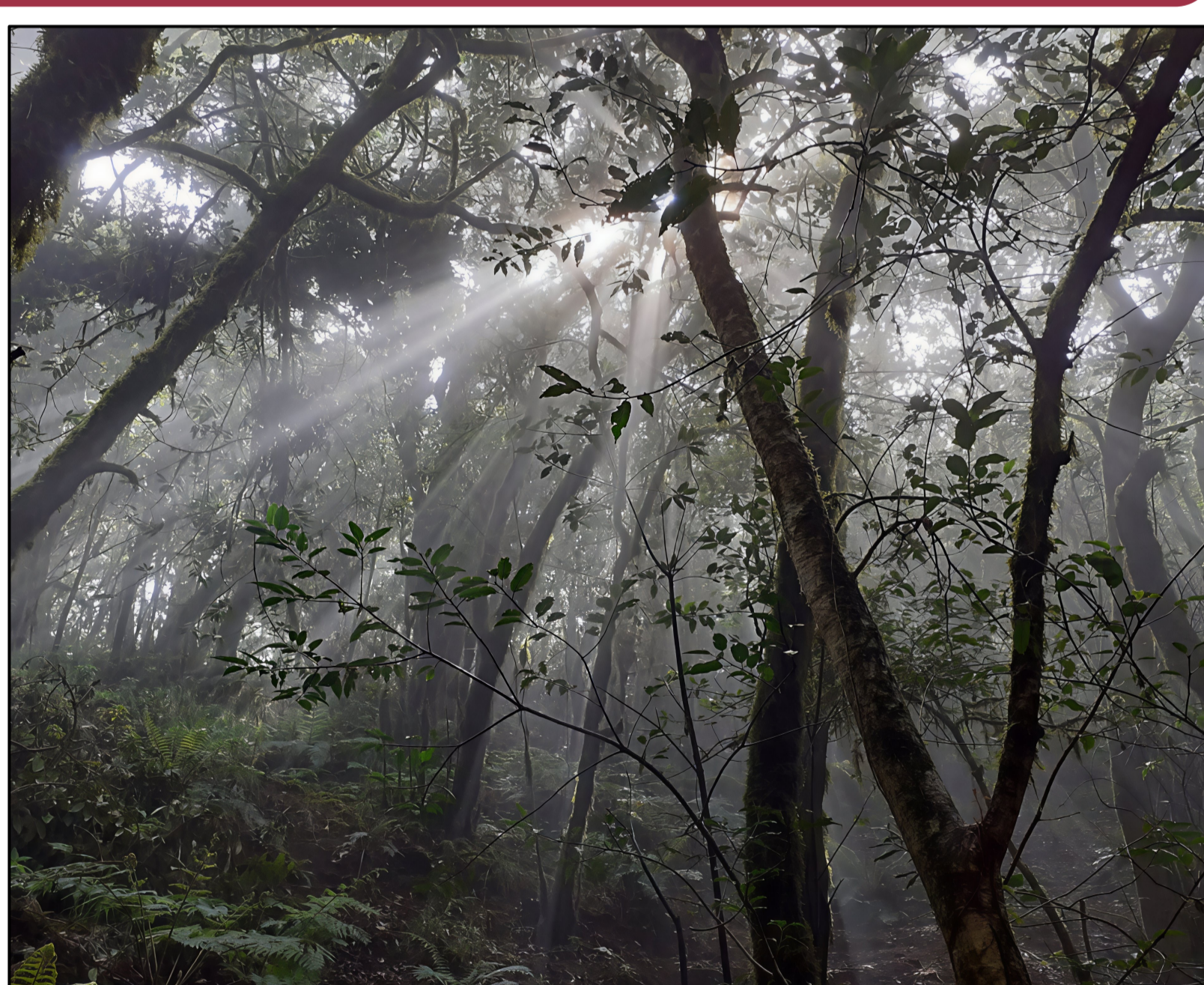


Specialist species restricted to the most buffered stands



Variation of the microclimatic effect across dynamic stages

From microclimatic buffering (b = 0.57)



To amplification (b = 1.67)



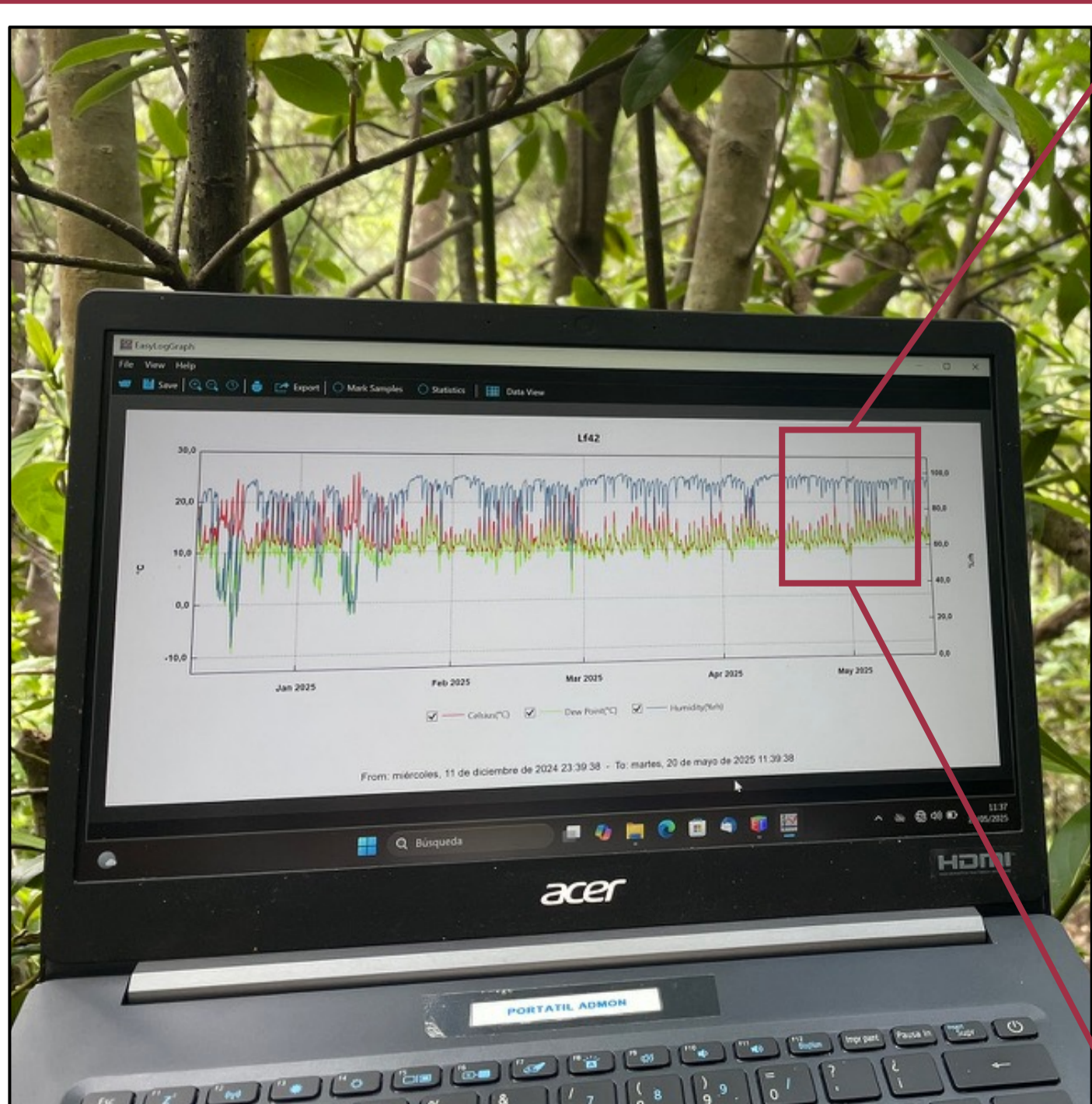
PERSPECTIVES

Towards **microclimatic models** (🌡️ & 💧) across the **Macaronesian laurel forest** at **different spatial scales**



- High-resolution, 3D** modelling of microclimatic conditions in the canopy and their **impact on epiphytes**
- Projecting microclimatic models onto maps of macroclimatic and remote sensing predictors over the **past decades** and coupling them with **historical epiphytic vegetation data** to assess the **impact of climate change on temporal species turnover**
- Identifying **climatic microrefugia** and **informing conservation actions**

METHODS



- Deployment of **46 sensors** in Tenerife in 2024-2025
- Characterization of the **microclimatic effect (ME)** for temperature through the slope of the relationship between macro- and microclimatic conditions (Gril *et al.* 2023)
- Modelling the spatial variation of ME** using topographic and remote-sensing predictors