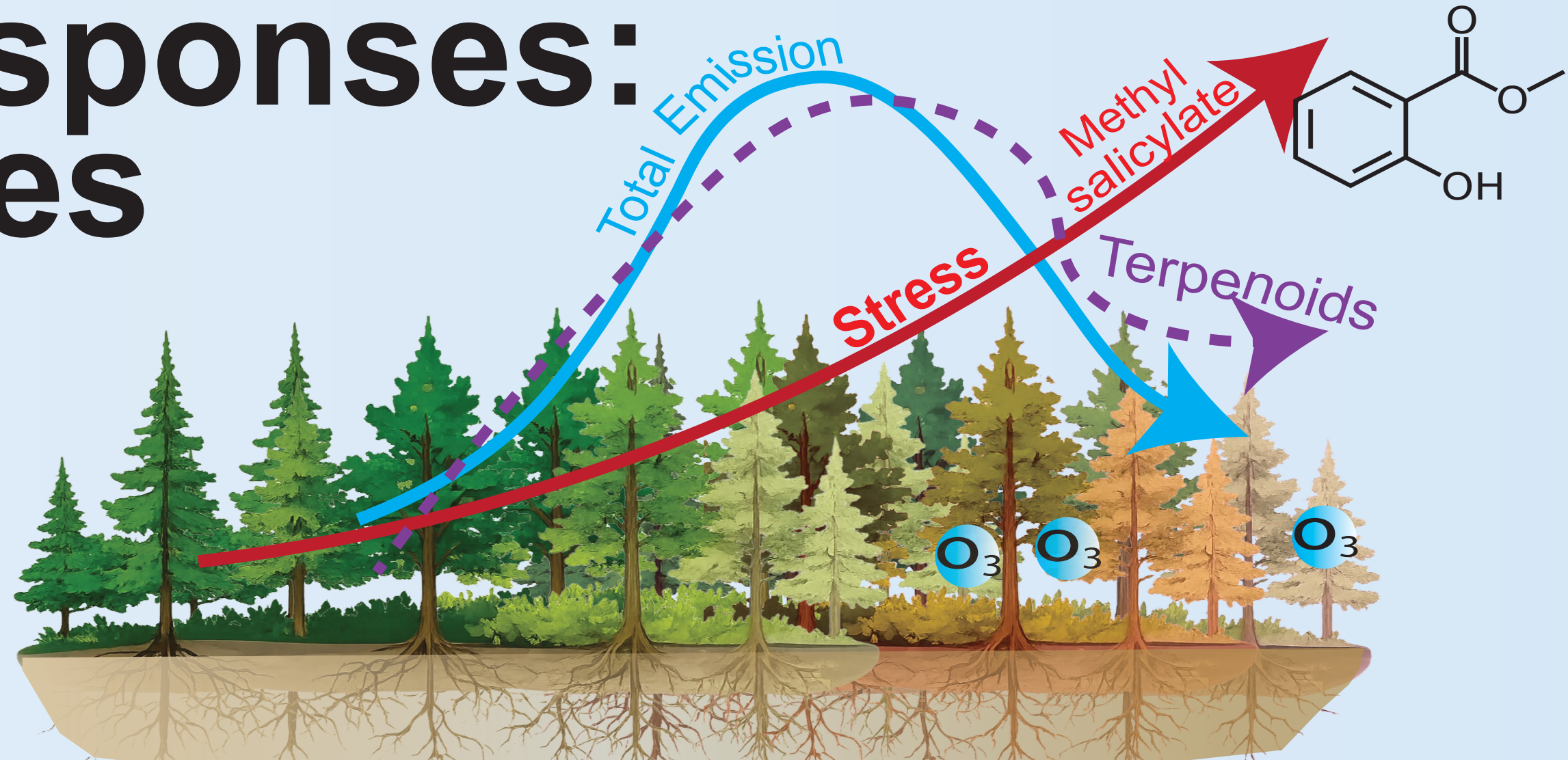


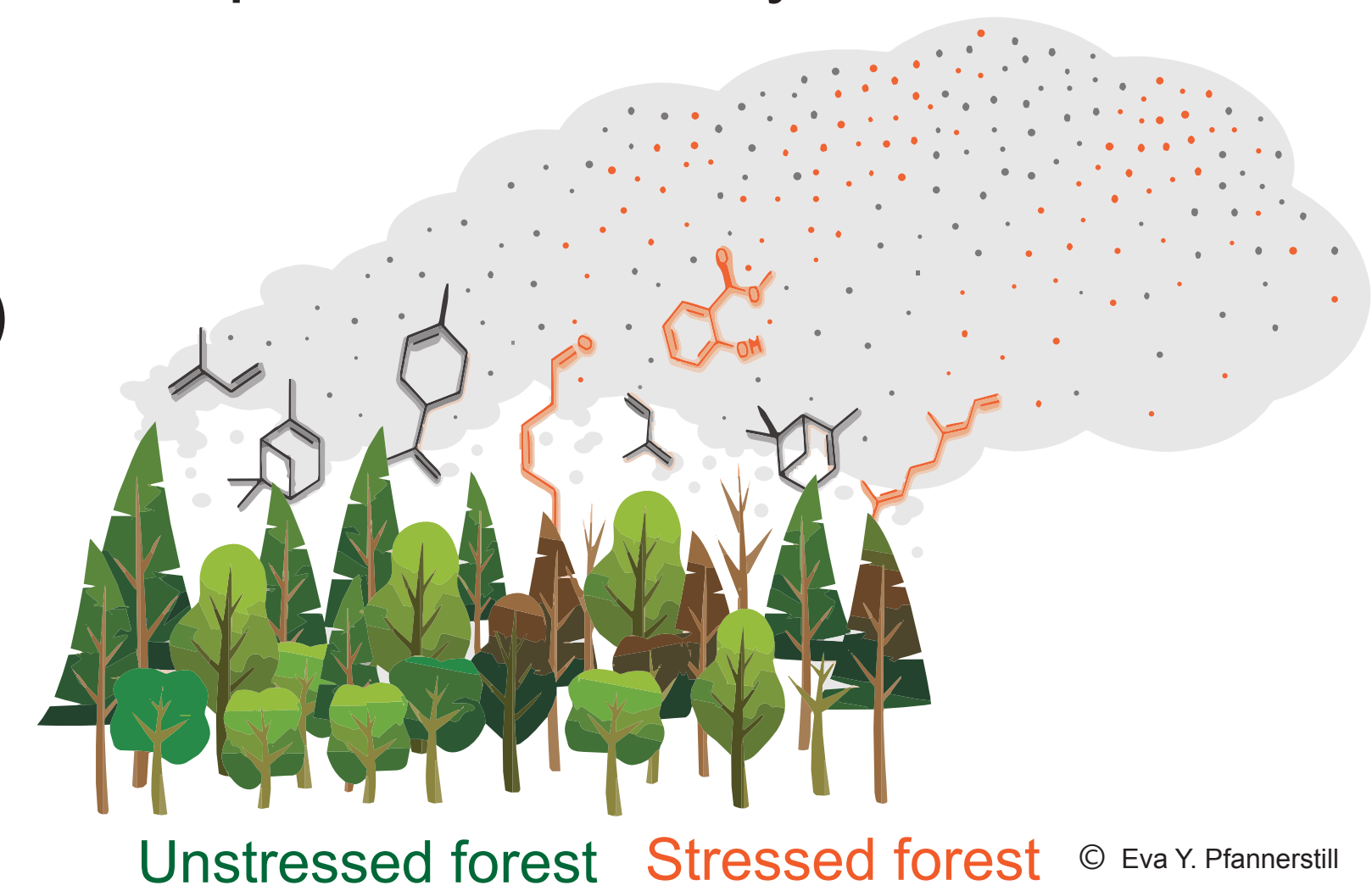
Ozone alters heat-driven Biogenic VOC responses: evidence from forest and urban tree species under sequential stress

Biplob Dey^{1,3}, Clémence Depp¹, Yichen Gu¹, Toke Due Sjøgren⁴, Peeyush Khare¹, Georgios I Gkatzelis¹, Yizhen Wu¹, Sindhu Vasireddy⁶, Alexander Knohl^{3,5}, Riikka Rinnan⁴, Anna Novelli¹, Hendrik Fuchs^{1,7}, Thorsten Hohaus¹, Eva Y Pfannerstill^{1,2}



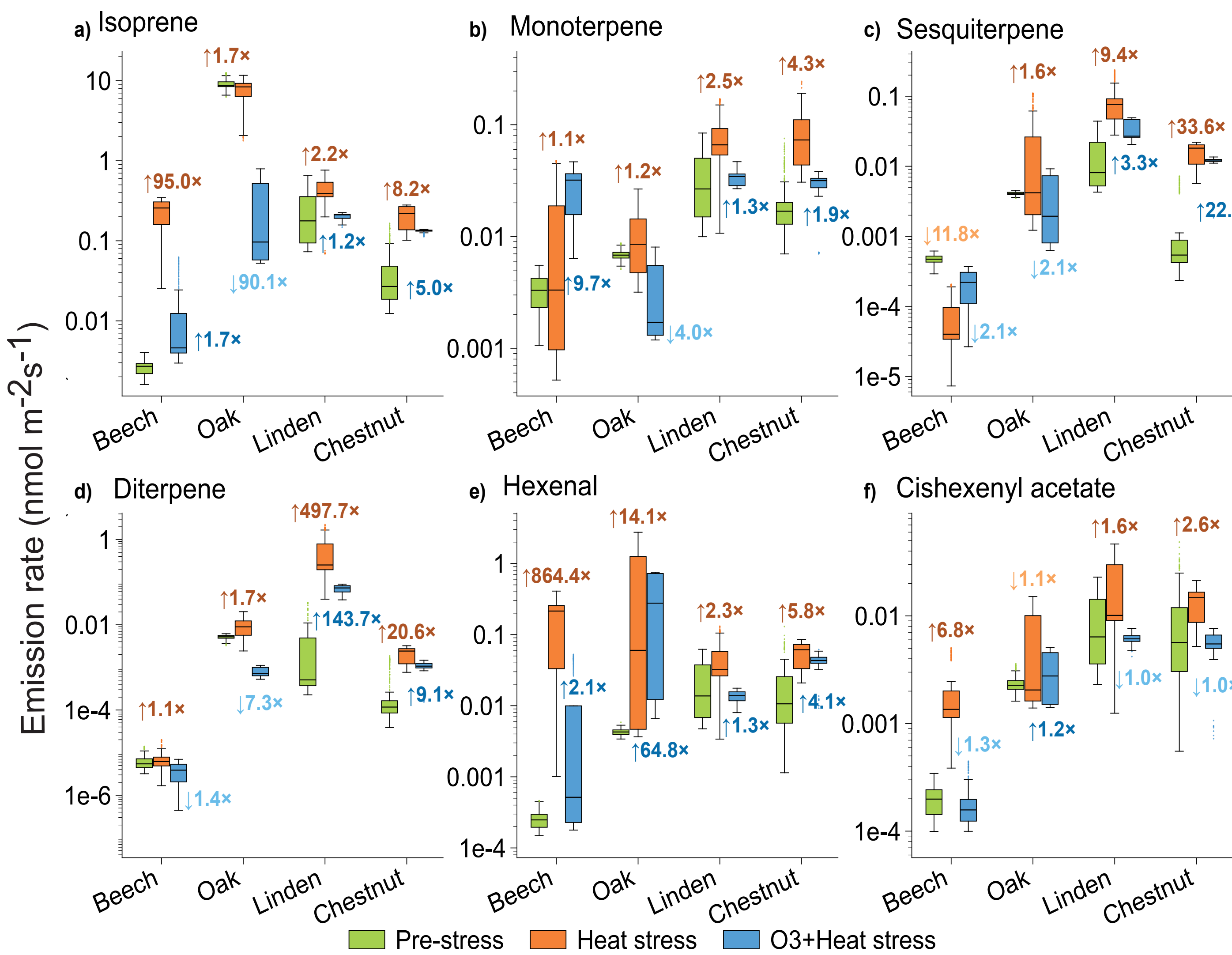
INTRODUCTION

- Stressed forests are becoming more common with climate change, but their impact on atmospheric chemistry remains largely unknown.
- Investigate Biogenic volatile organic compounds (BVOC) emission rate patterns
- Estimate temperature sensitivity coefficient (β)
 $E_T = E_{30} \exp(\beta (T - T_{30}))$
- Identify specific stress fingerprints

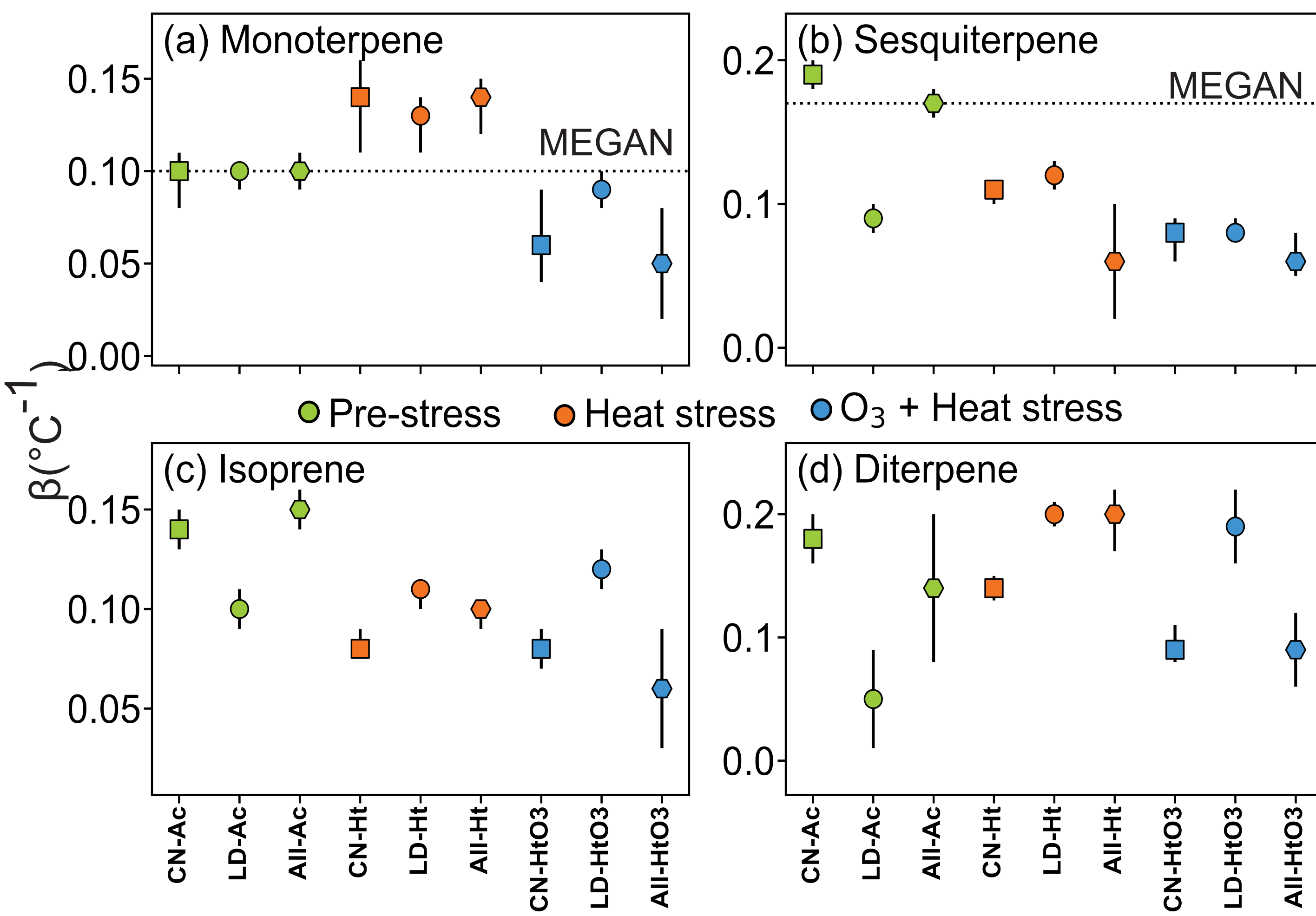


RESULTS

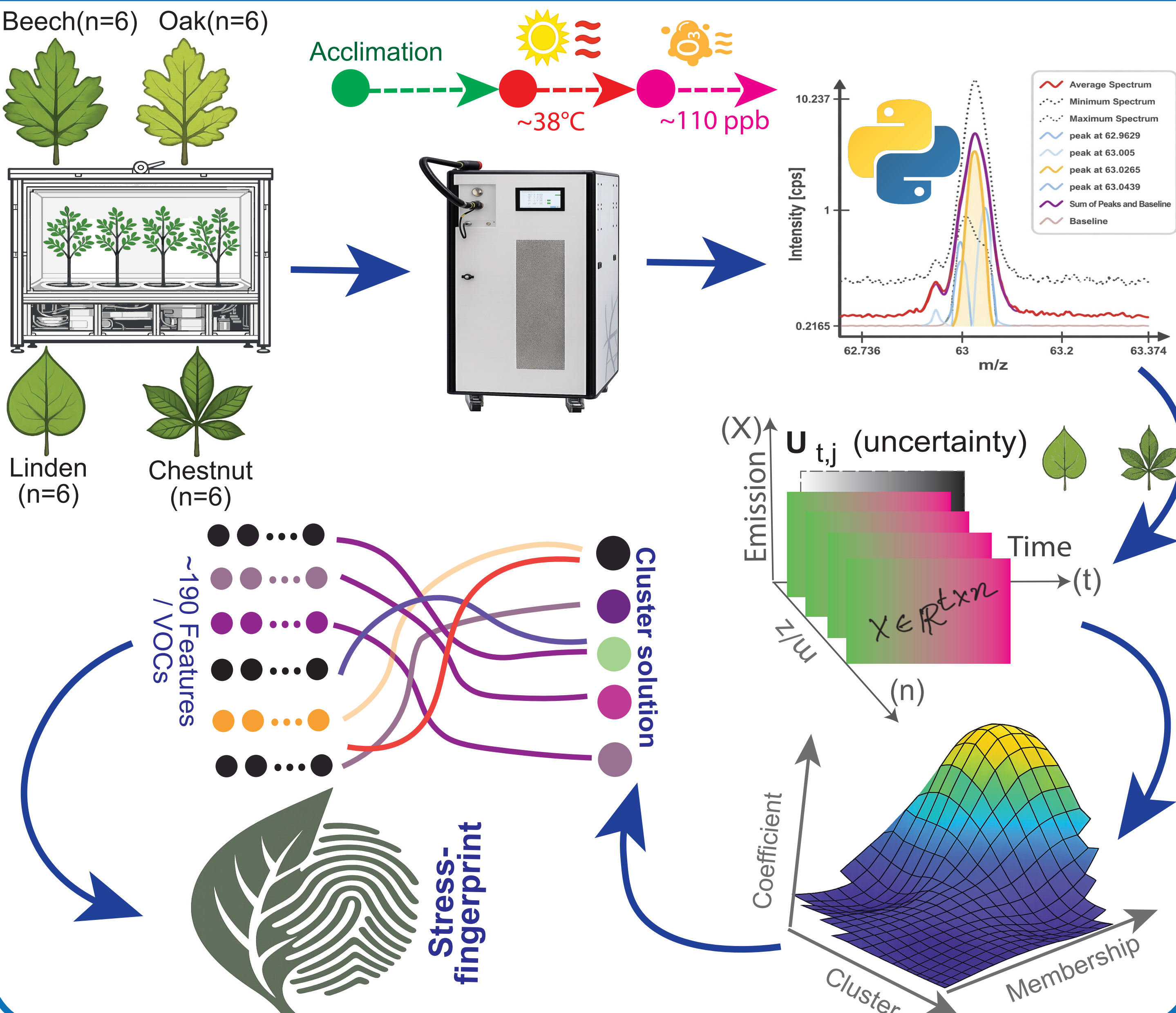
Complex Responses of BVOC Emission to Stress



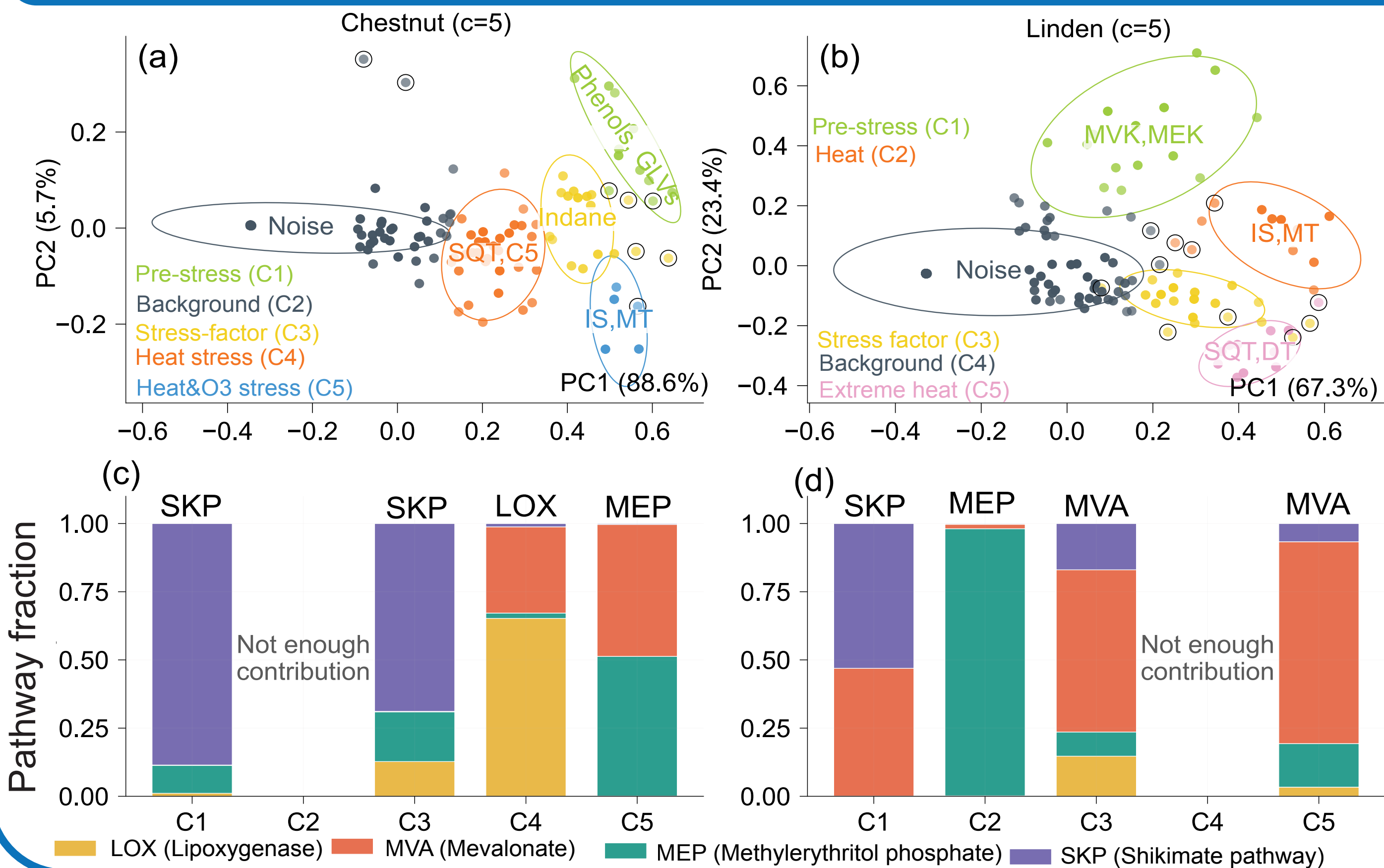
Stress Reshapes Temperature Sensitivity



METHODS

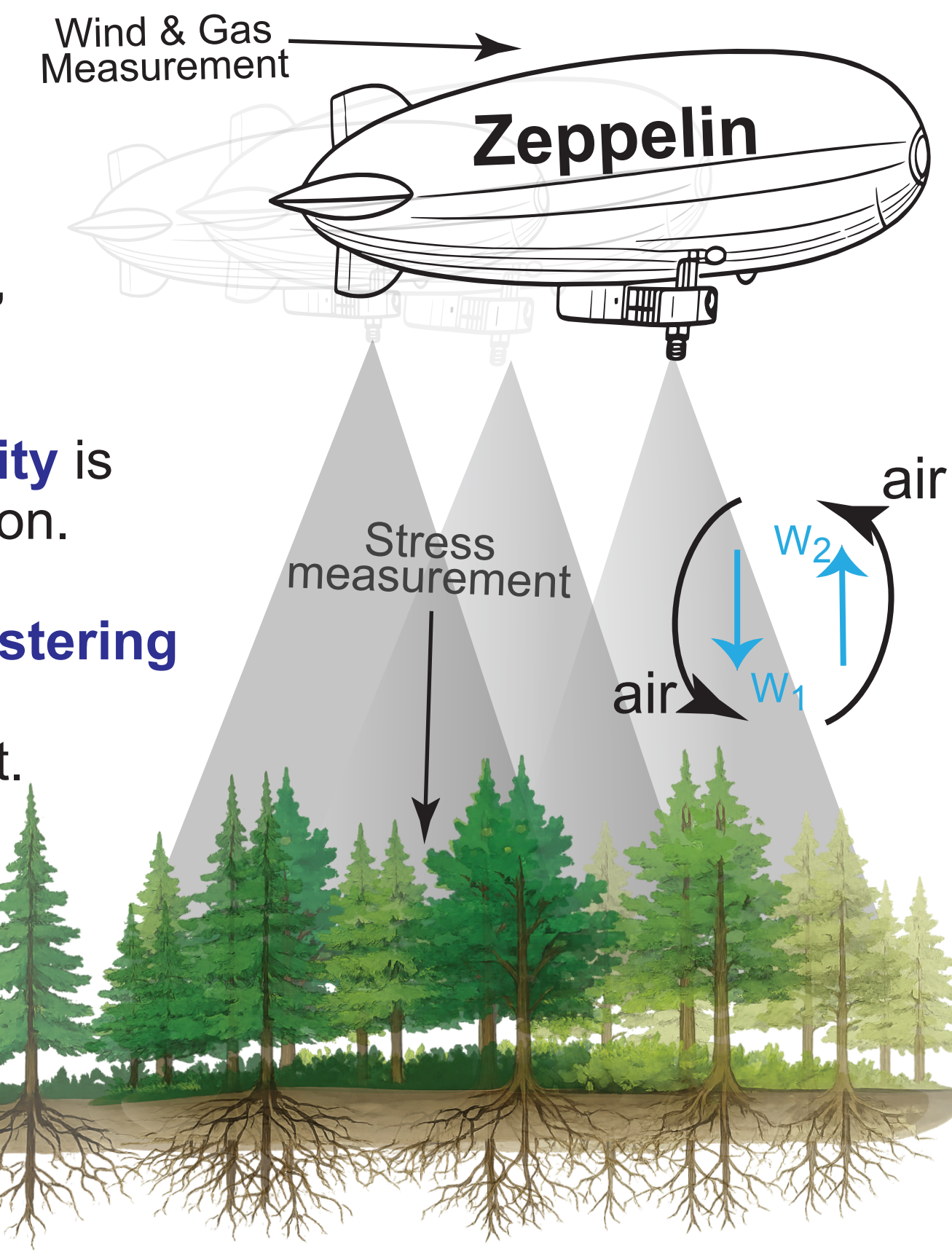


Uncertainty-aware Fuzzy-C Identified Stress-fingerprint



TAKEAWAY & OUTLOOK

- Sequential heat and ozone stress reshaped BVOC emissions, with species-specific responses.
- Sesquiterpenes found as a "stressometer", like Bourtsoukidis et al. (2025).
- Lower monoterpene temperature sensitivity is expected under future heat and ozone pollution.
- The first uncertainty-integrated fuzzy clustering method successfully identified clear stress fingerprints with biochemical pathway shift.



Vote for OSPP



¹Forschungszentrum Jülich, Institute of Climate and Energy Systems: Troposphere (ICE-3), Jülich, Germany (b.dey@fz-juelich.de)
²Institute of Geophysics and Meteorology, University of Cologne, Cologne, Germany
³Bioclimatology, Faculty of Forest Sciences and Forest Ecology, University of Göttingen, Göttingen, Germany
⁴Department of Biology, Center for Volatile Interactions (VOLT), University of Copenhagen, Copenhagen, Denmark
⁵Centre of Biodiversity and Sustainable Land Use (CBL), University of Göttingen, Göttingen, Germany
⁶Jülich Supercomputing Centre, Forschungszentrum Jülich, Jülich, Germany
⁷Department of Physics, University of Cologne, Cologne, Germany

