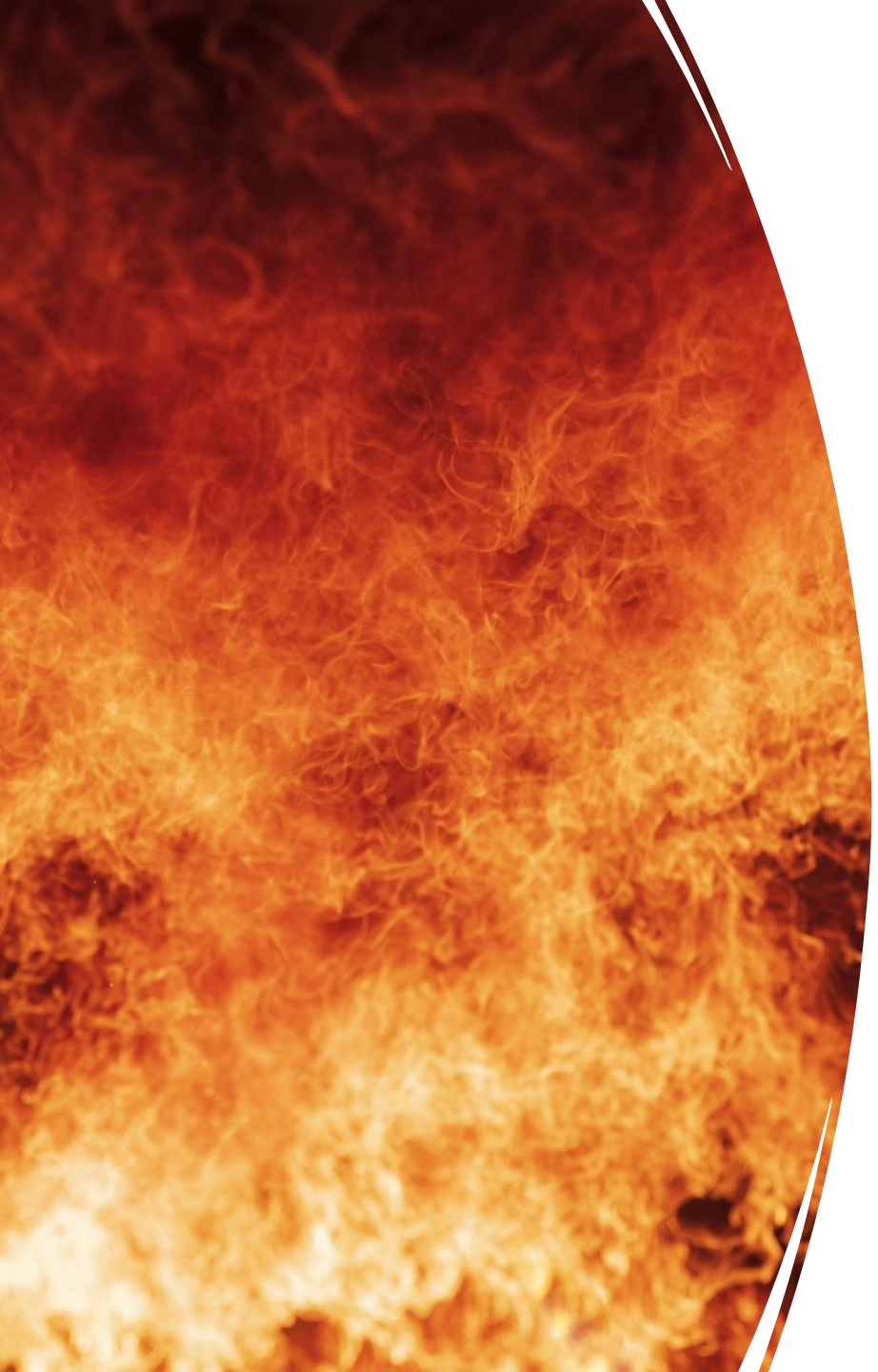


HOW HAS BURNED VEGETATION BEEN RECOVERING ?

ASSESSING POST-FIRE RECOVERY USING REMOTE-SENSING PRODUCTS AND DYNAMIC GLOBAL VEGETATION MODELS

TIAGO ERMITÃO

CÉLIA GOUVEIA, ANA RUSSO, ANA BASTOS

IPMA

INSTITUTO DOM LUIZ

UNIVERSITÄT LEIPZIG

Ciências ULisboa

fct Fundação para a Ciência e a Tecnologia

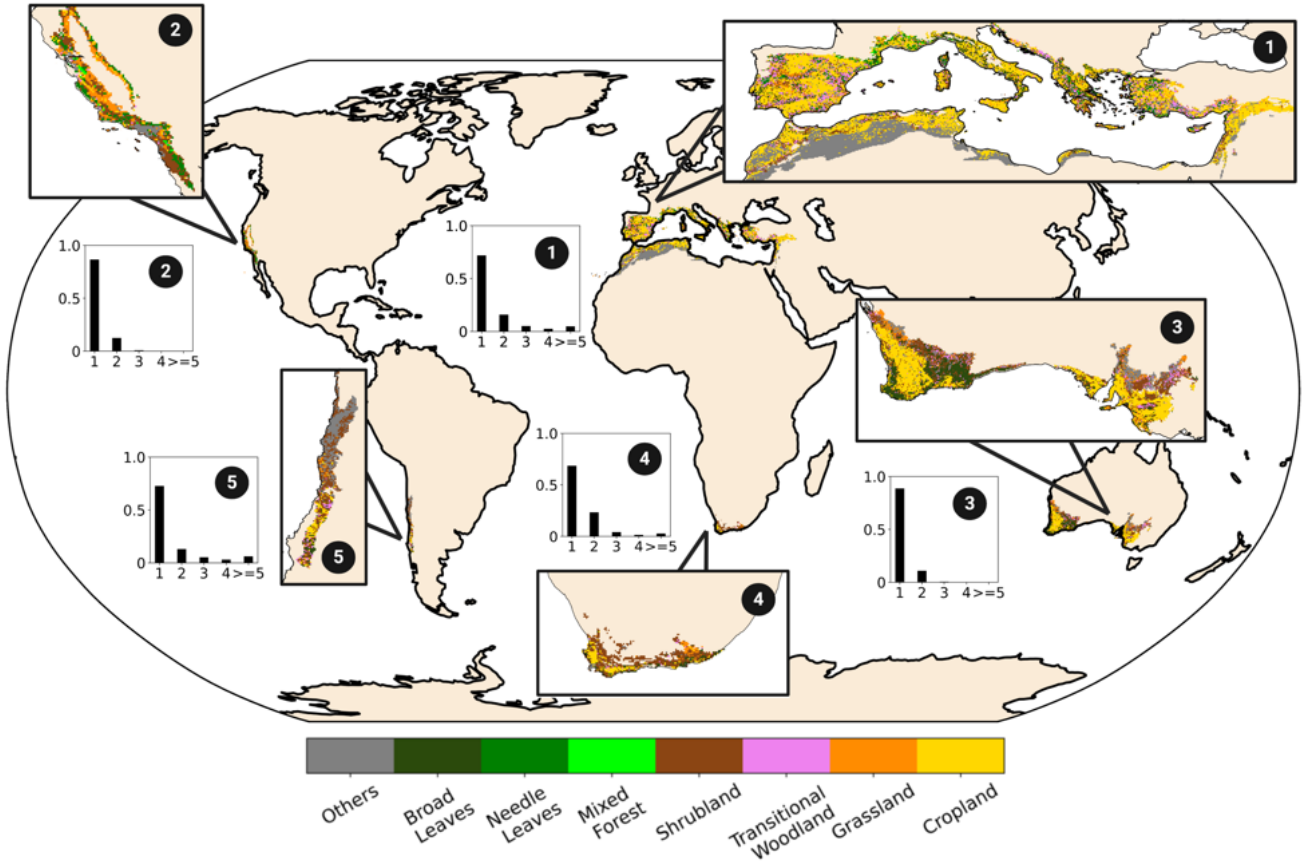
MIT Portugal

DHEFEUS

reccap-2 cci

TASK 1

TASK 2



Under review for **Global Change Biology** Journal

RECOVERY FOLLOWING RECURRENT FIRES ACROSS MEDITERRANEAN ECOSYSTEMS

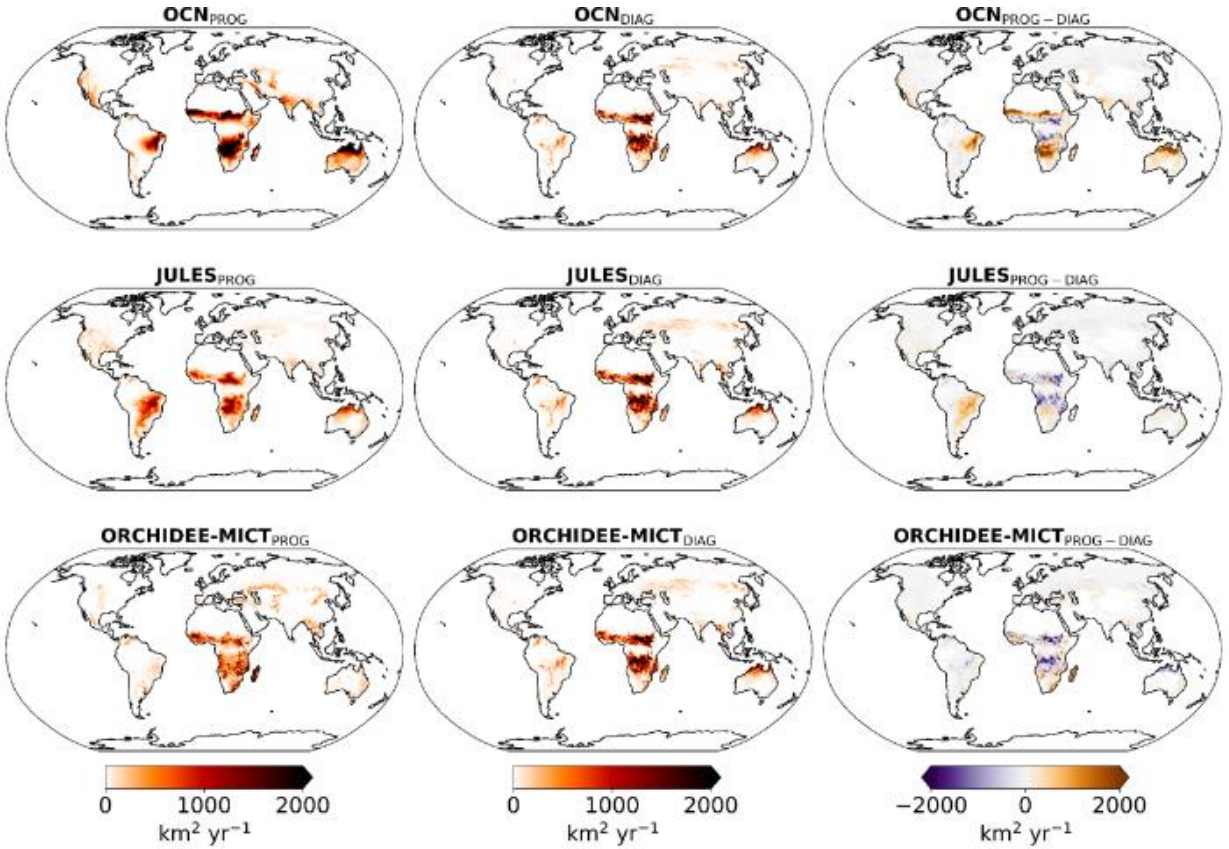
Tiago Ermitão[1,2], Célia Gouveia[1,2], Ana Bastos[3,4] and Ana Russo[1,5]

1 Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa, Lisbon, Portugal
2 Instituto Português do Mar e da Atmosfera, IPMA, Lisbon, Portugal
3 Max Planck Institute for Biogeochemistry, Department of Biogeochemical Integration, 07745 Jena, Germany
4 Institute for Earth System Science and Remote Sensing, Leipzig University, Leipzig, 04103 Leipzig, Germany
5 CEF - Forest Research Centre, Associate Laboratory TERRA, School of Agriculture, University of Lisbon, Lisboa, Portugal

Develop a framework based on **time-series** of the Enhanced Vegetation Index (EVI) rather than using space-for-time substitution approach, to evaluate how vegetation recovery is modulated by fire severity, pre-fire state of vegetation and by post-fire meteorological conditions across the **Mediterranean biome worldwide**.

TASK 1

TASK 2



Work in progress…

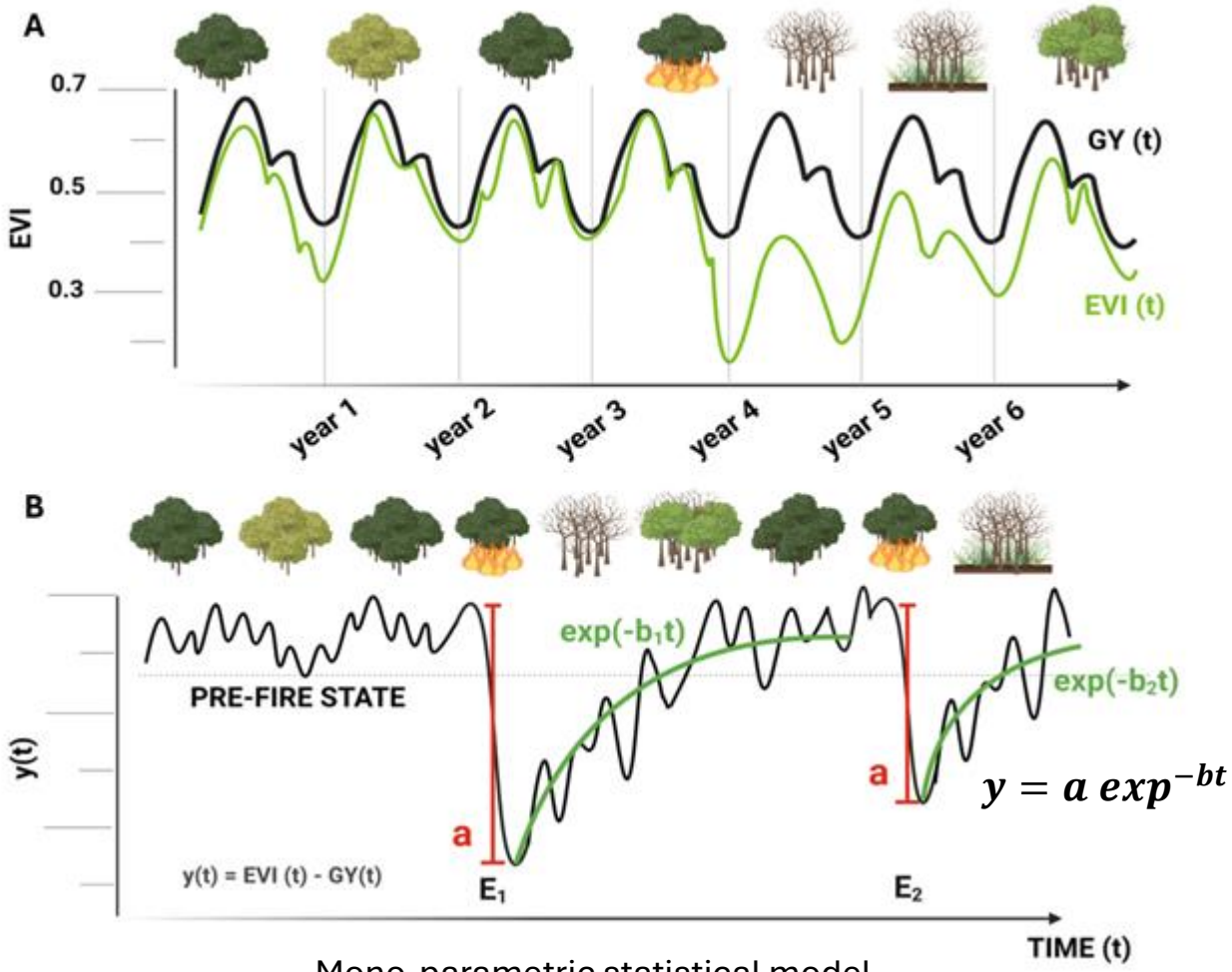
IMPROVING THE ESTIMATION OF GLOBAL CARBON BUDGETS BY PRESCRIBING REMOTELY-SENSED BURNED AREAS ON DGVMs

Tiago Ermitão[1,2], Ana Bastos[3,4], Célia Gouveia[1,2], Ana Russo[1,5] & RECCAP2 team

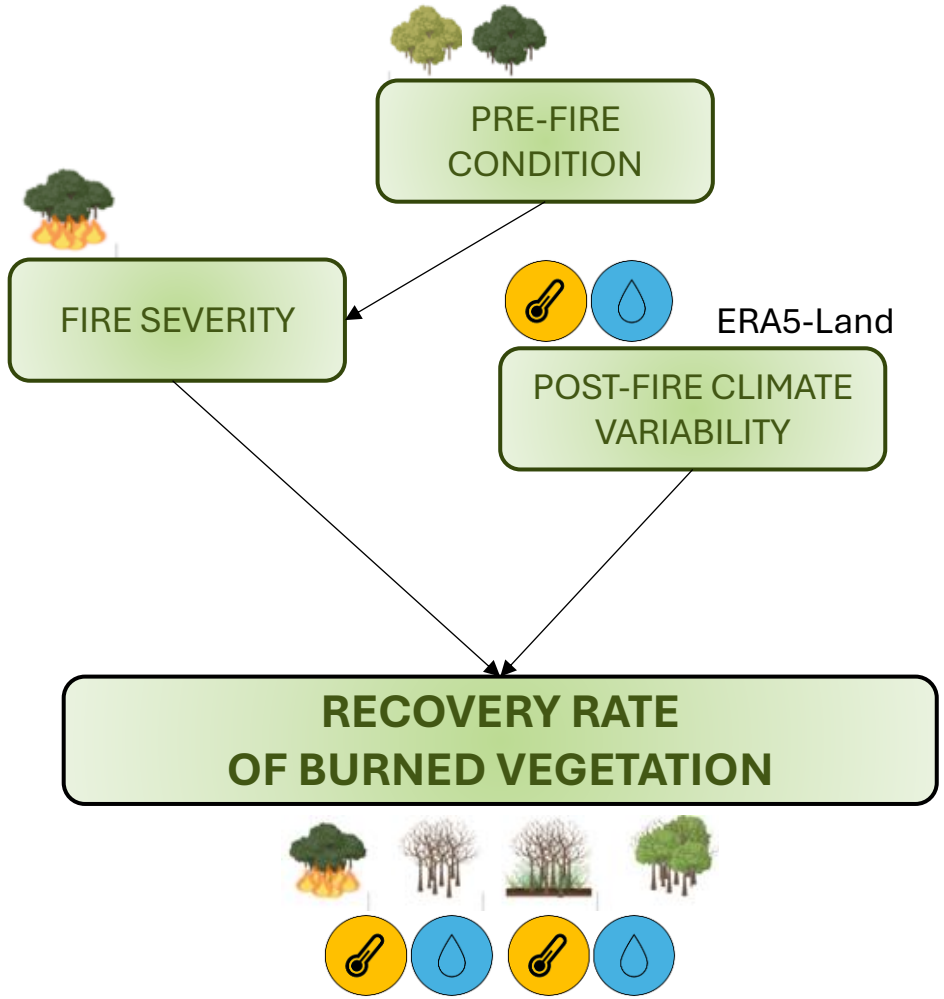
1 Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa, Lisbon, Portugal
2 Instituto Português do Mar e da Atmosfera, IPMA, Lisbon, Portugal
3 Max Planck Institute for Biogeochemistry, Department of Biogeochemical Integration, 07745 Jena, Germany
4 Institute for Earth System Science and Remote Sensing, Leipzig University, Leipzig, 04103 Leipzig, Germany
5 CEF - Forest Research Centre, Associate Laboratory TERRA, School of Agriculture, University of Lisbon, Lisboa, Portugal

We test the feasibility of a hybrid process-based between DGVMs and EO-driven near-real time attribution framework, where **models** are constrained by EO data on **burned area from ESA CCI product**, and ERA5 reanalysis climate forcing, aiming to deliver improved updates of human and natural carbon fluxes and biomass change (fFire, Above Ground Carbon, AGC, Leaf Area, LAI and GPP) on global scale.

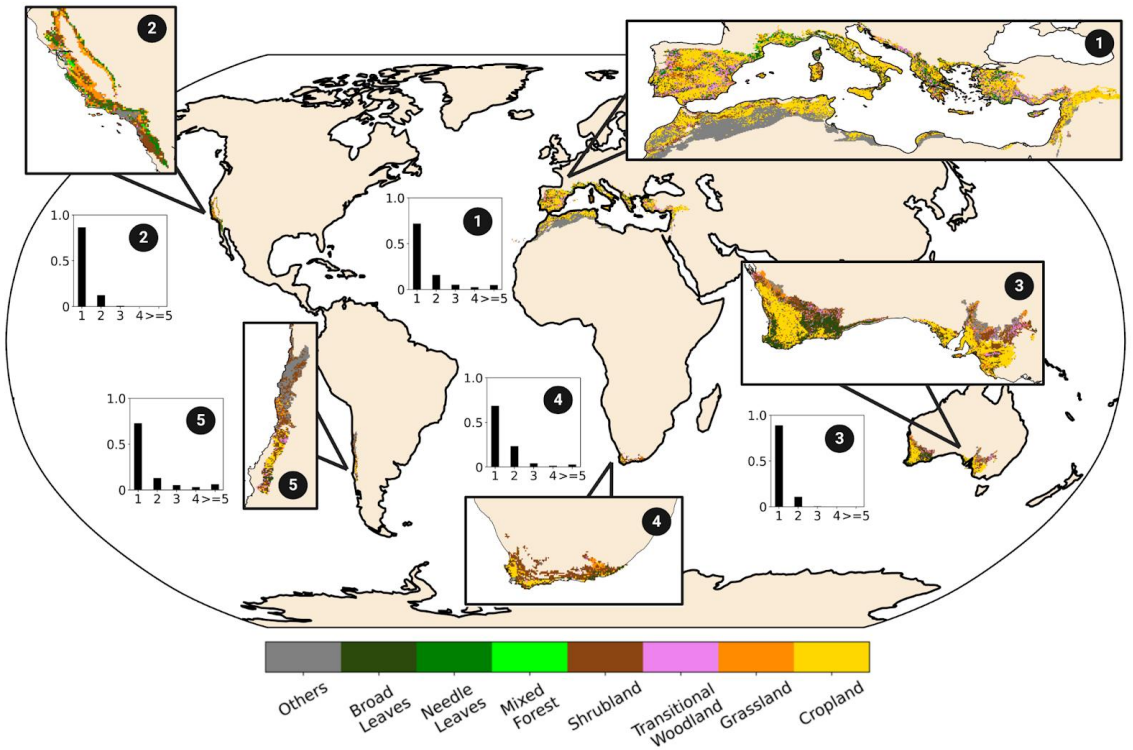
TASK 1

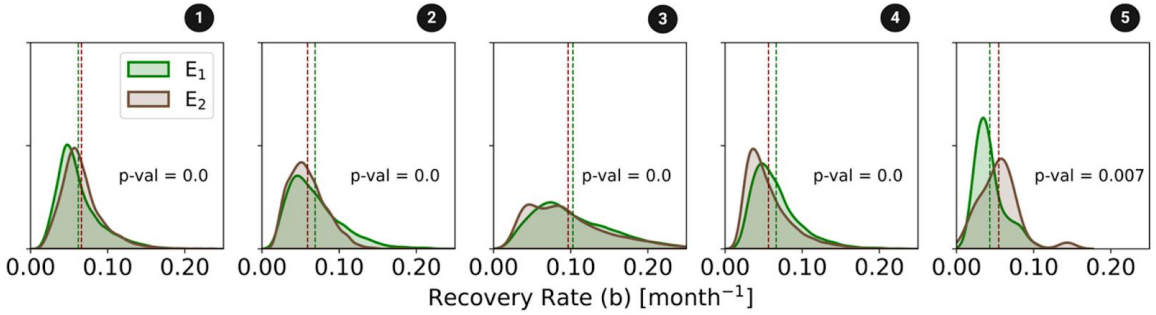


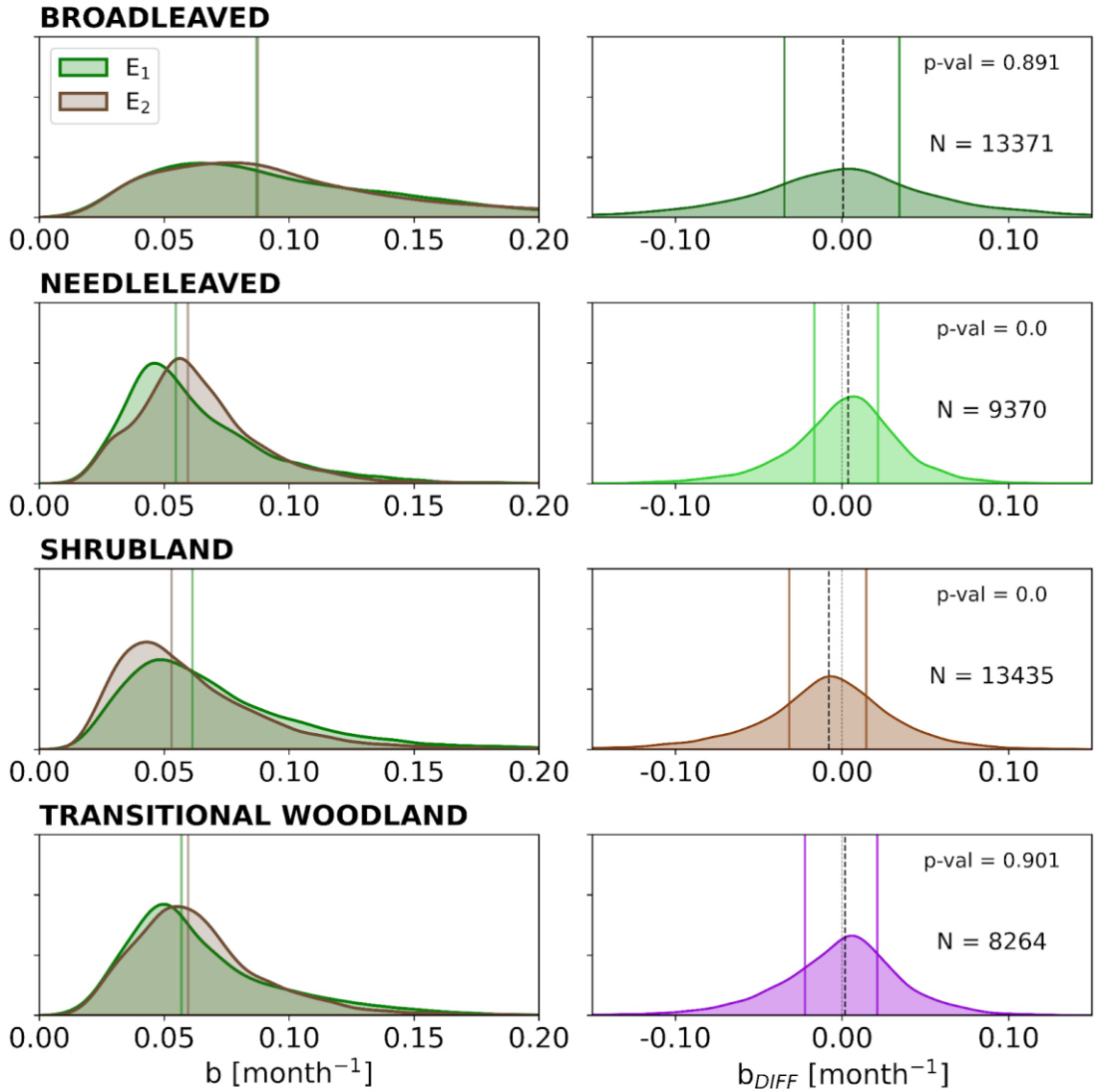
Mono-parametric statistical model
(Gouveia et al., 2010, 2018; Bastos et al., 2011)

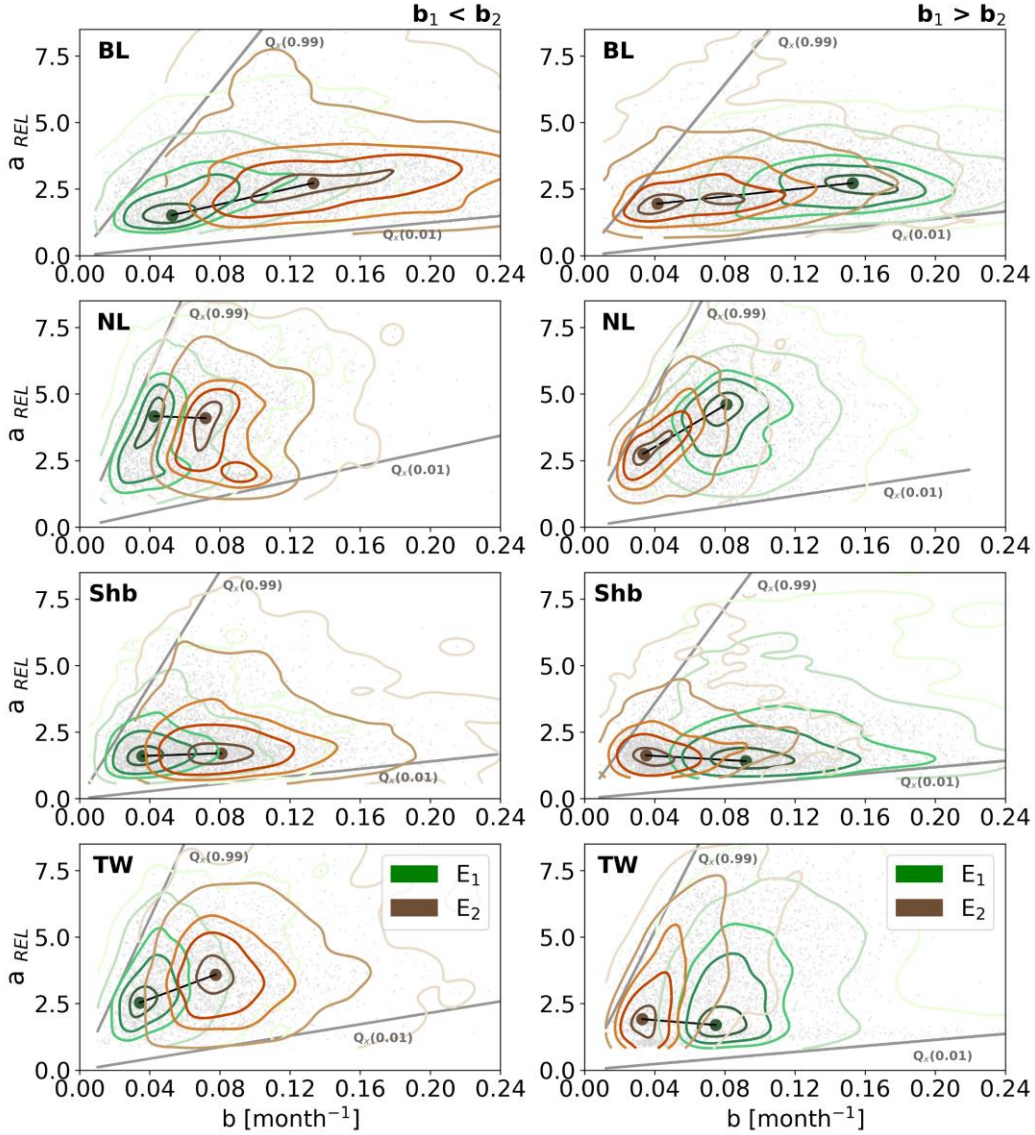


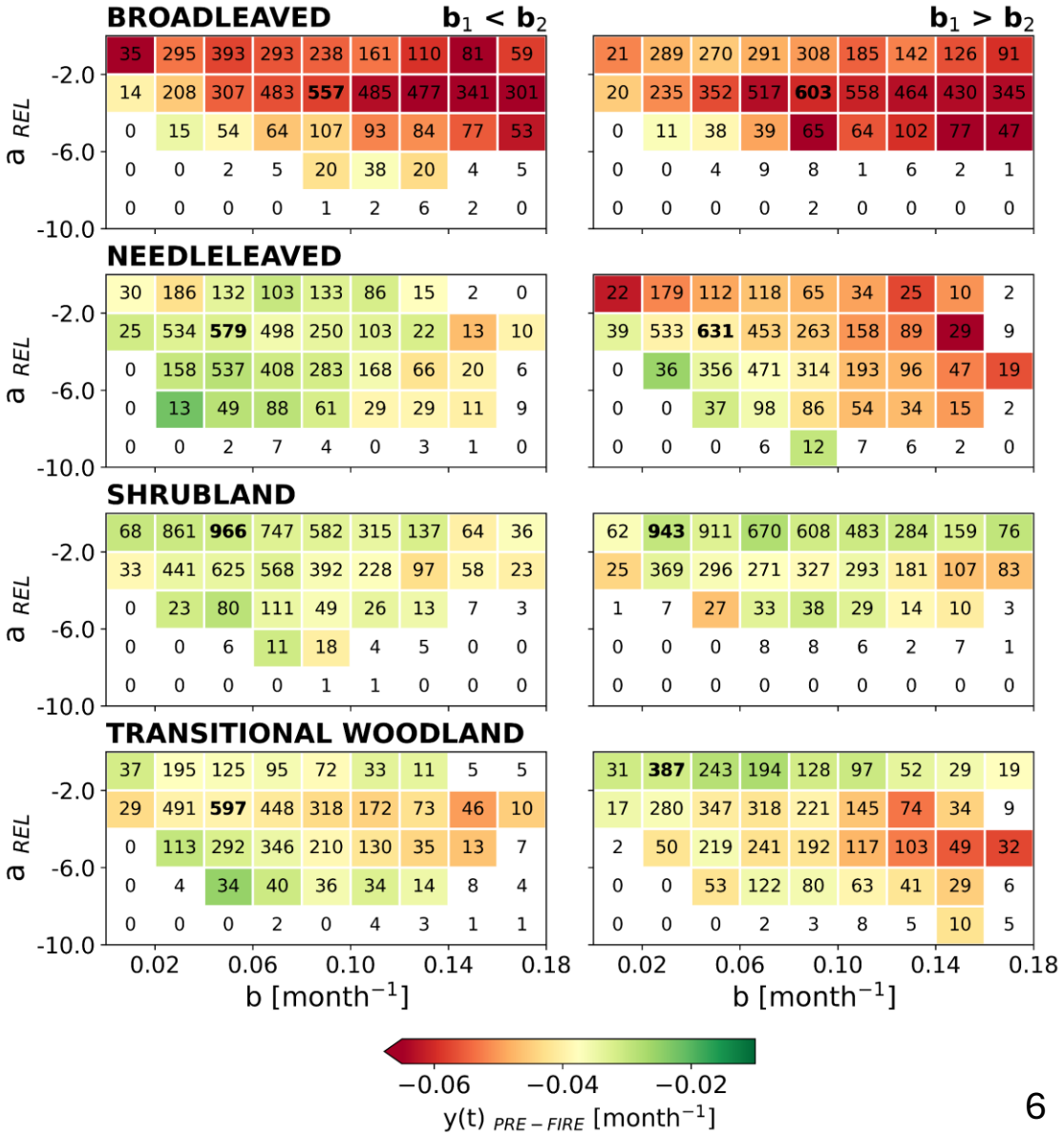
RECOVERY RATE | **FIRE SEVERITY & PRE-FIRE CONDITION** | **CLIMATE**



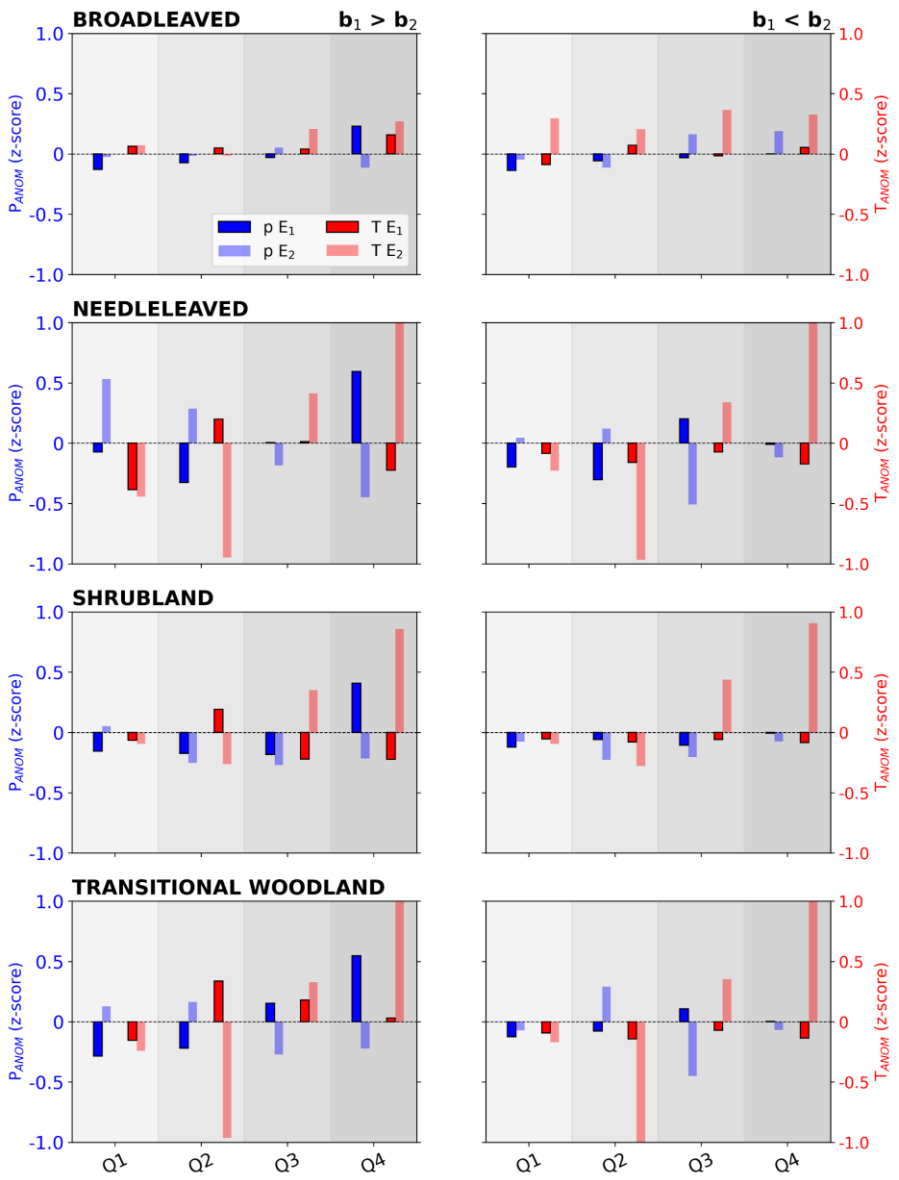


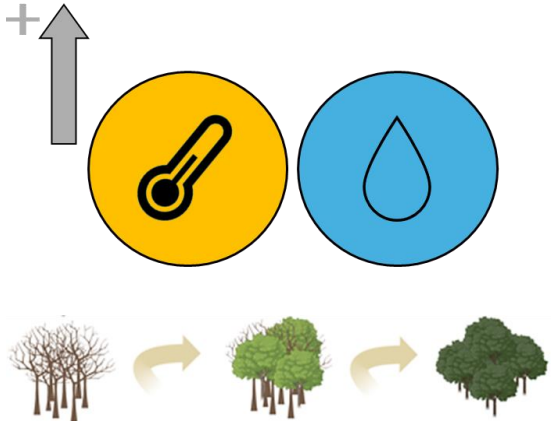



b1 < b2
b1 > b2
BL
NL
Shb
TW
E1
E2
Qx(0.99)
Qx(0.01)
a REL
b [month−1]

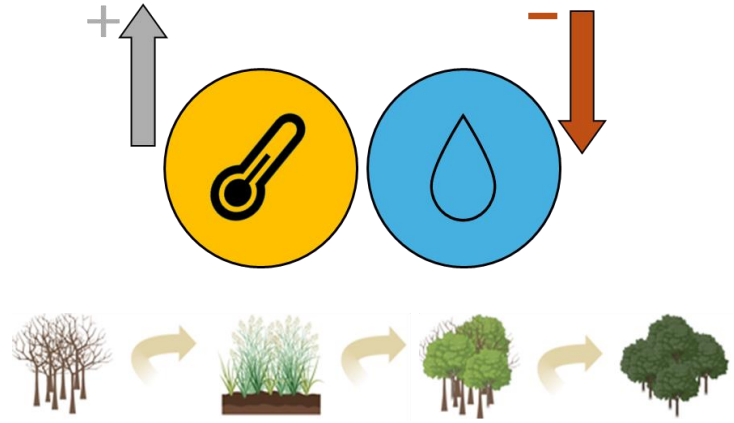

BROADLEAVED
NEEDLELEAVED
SHRUBLAND
TRANSITIONAL WOODLAND
b1 < b2
b1 > b2
a REL
b [month−1]
y(t) PRE−FIRE [month−1]

RECOVERY RATE | FIRE SEVERITY & PRE-FIRE CONDITION | CLIMATE





FASTER RECOVERY RATES

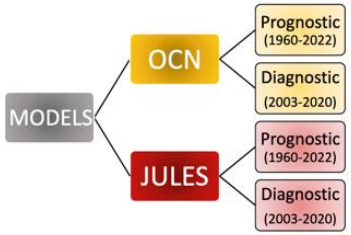


SLOWER RECOVERY RATES

TASK 2

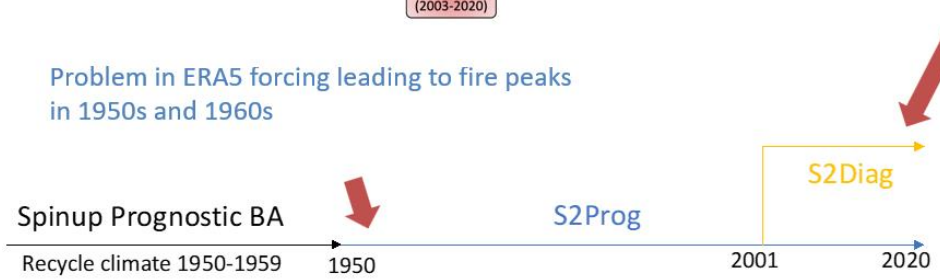
PRESCRIPTION OF BURNED AREA FROM FIRE CCI51

- OCN
- JULES
- ORCHIDEE-MICT

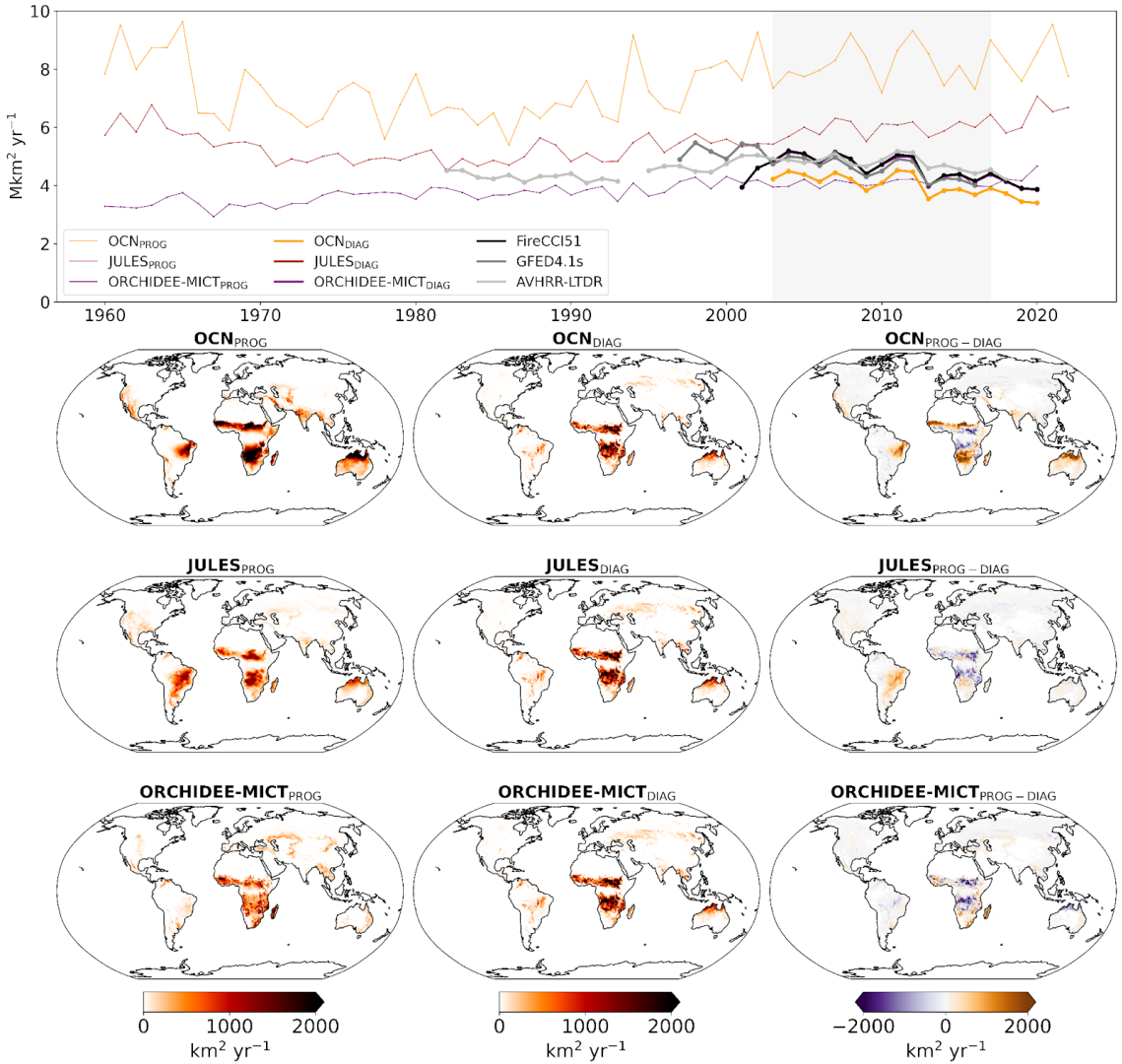


After meeting, Fire-CCI recommended to start in 2003

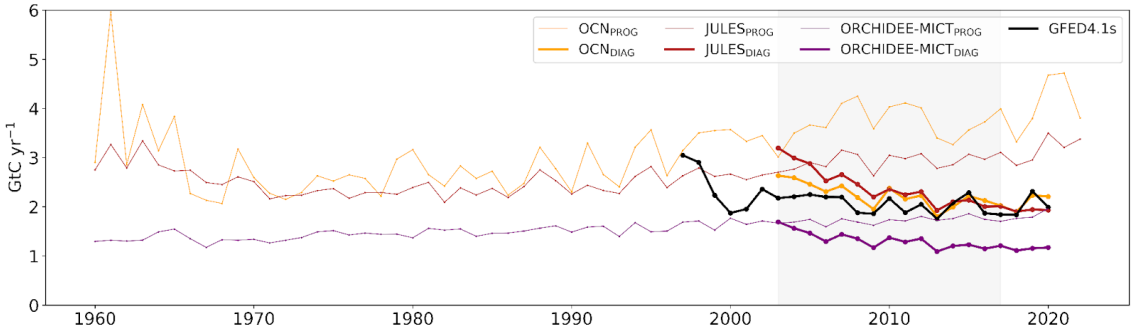
Problem in ERA5 forcing leading to fire peaks in 1950s and 1960s

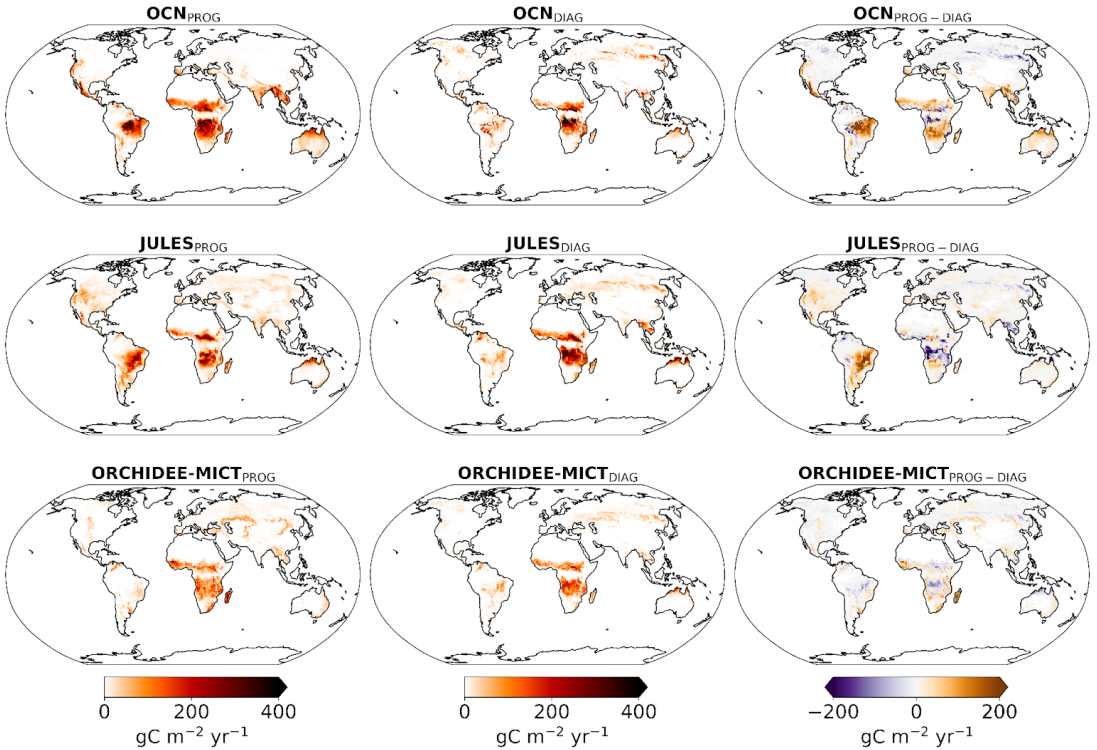


- FIRE EMISSIONS
- ABOVE GROUND CARBON
- LAI GPP

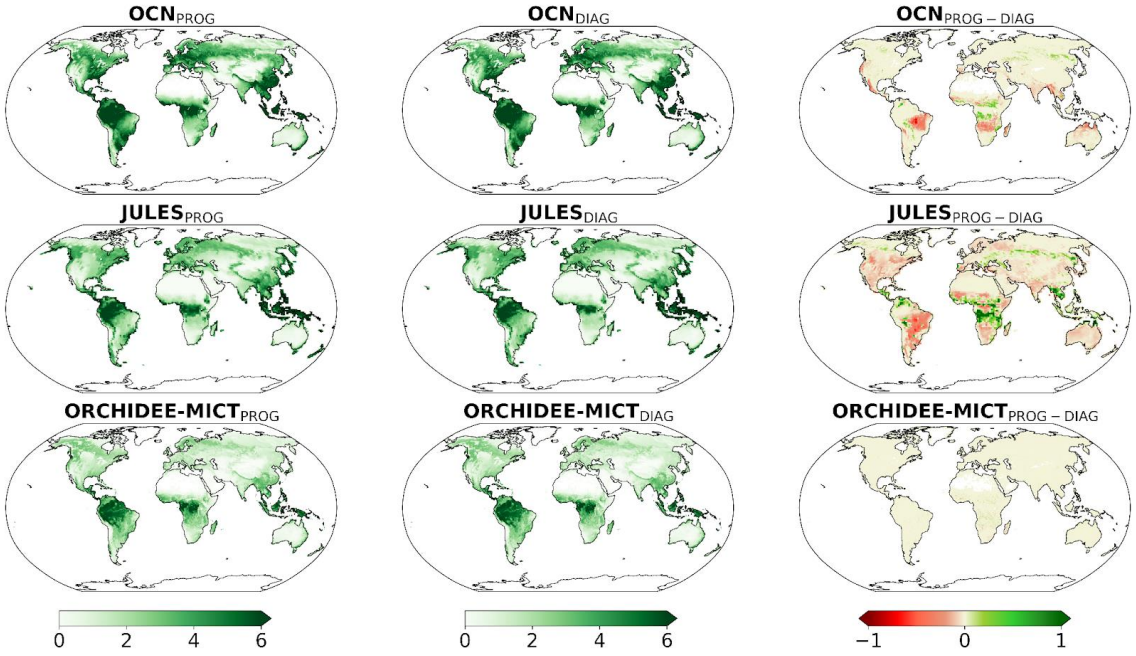


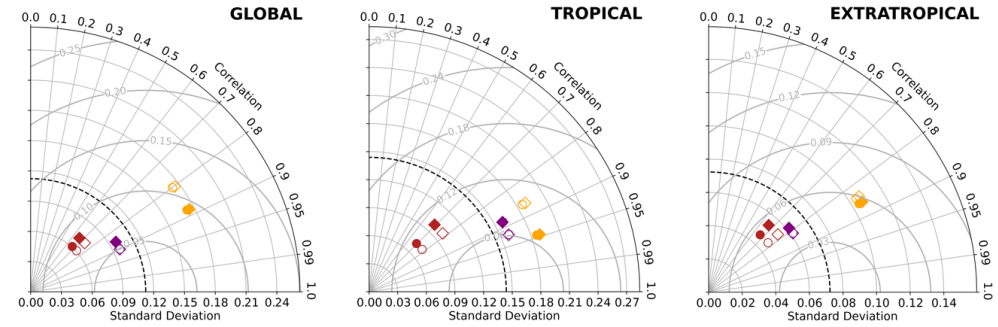
FIRE EMISSIONS



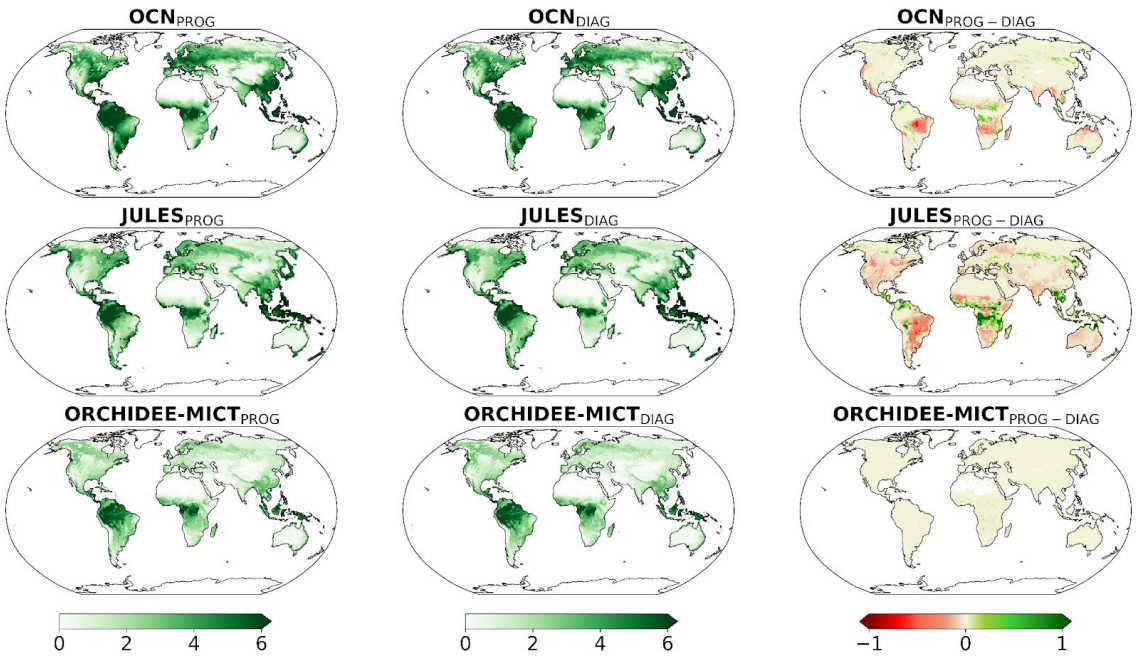


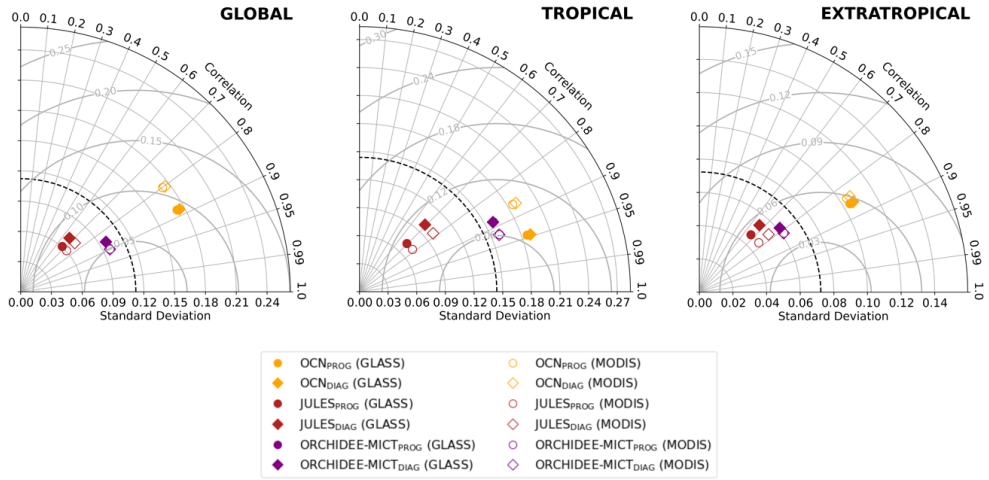
LAI



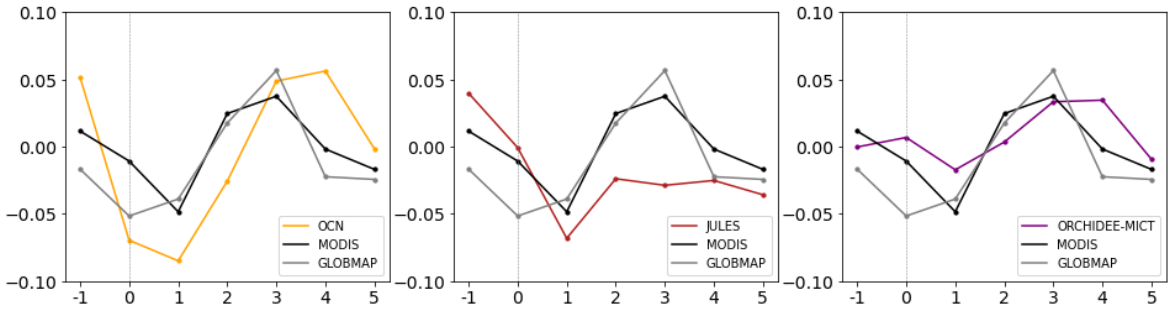


LAI

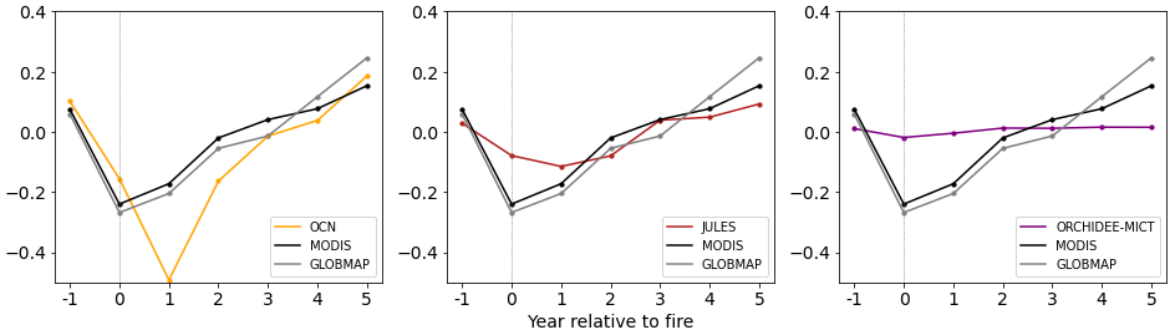




PORTUGAL



AUSTRALIA



FINAL REMARKS

- Vegetation tends to recover faster after the second event than the first event, although large contrasts between recovery rates are explained by regional differences in vegetation-type, as well as fire severity and post-fire climate conditions.
- Recovery rates dependent on fire severity, especially for higher severity values.
- High levels of pre-fire greenness can promote extreme fire severity, due to fuel/biomass availability to burn.
- Precipitation availability, associated with normal to above-mean temperatures in the growing season, seems to favour vegetation greenness recovery.

TASK 1

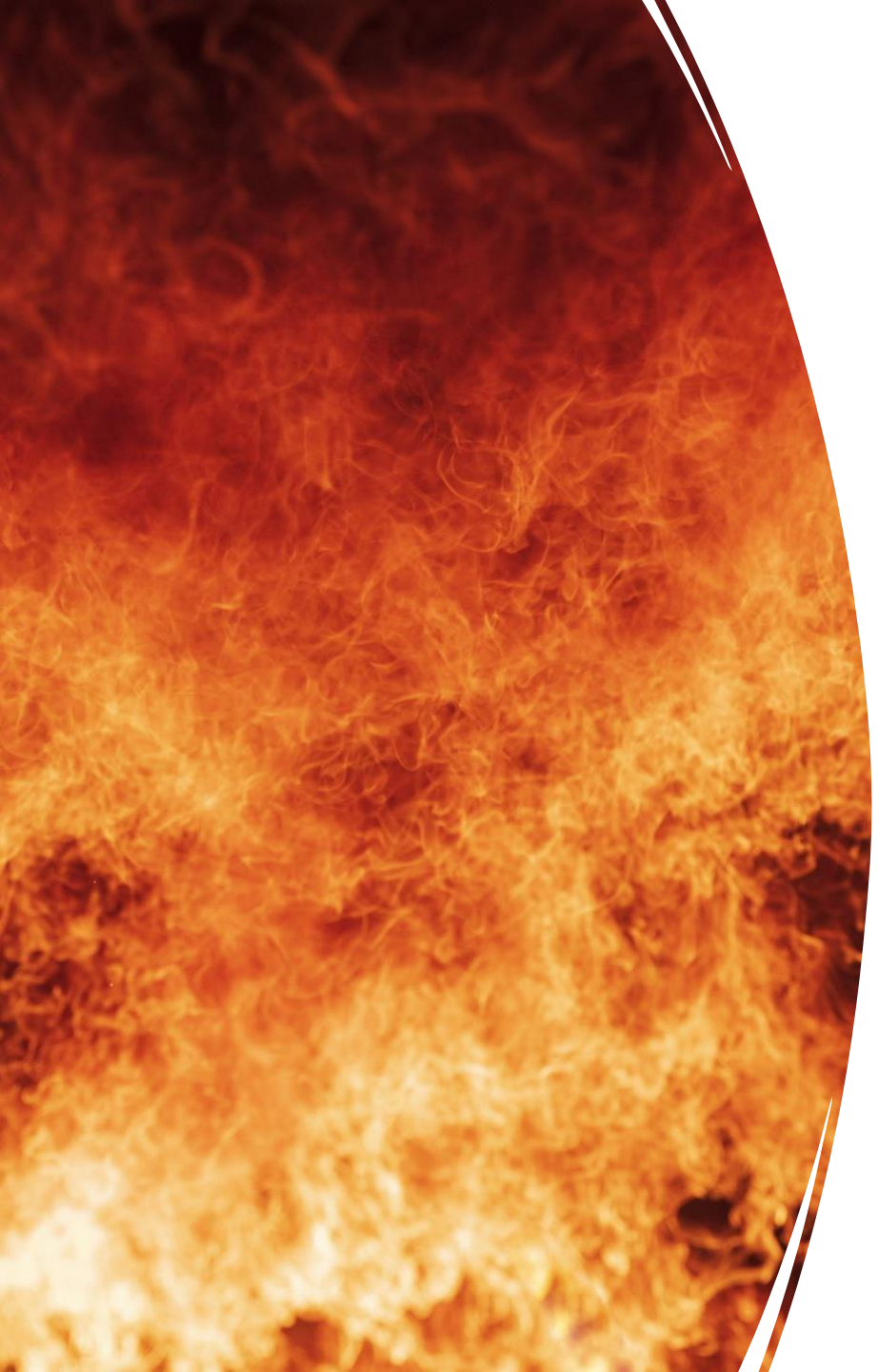
TASK 2

FINAL REMARKS

- Prescribing BA from FIRECCI can **improve** the bias, the interannual variability, and the spatial distribution of fire emissions.
- Moderate improvements in the spatio-temporal variability of AGC, LAI, and GPP when prescribing BA, possibly due to factors such as limitations in the protocol, short common period of analysis among DGVMs and EO-based datasets, or **unrealistic recovery dynamics** by DGVMs.

TASK 1

TASK 2



THANK YOU