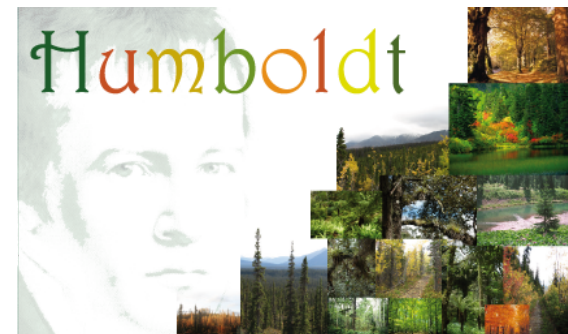


Interactions between biodiversity & climate

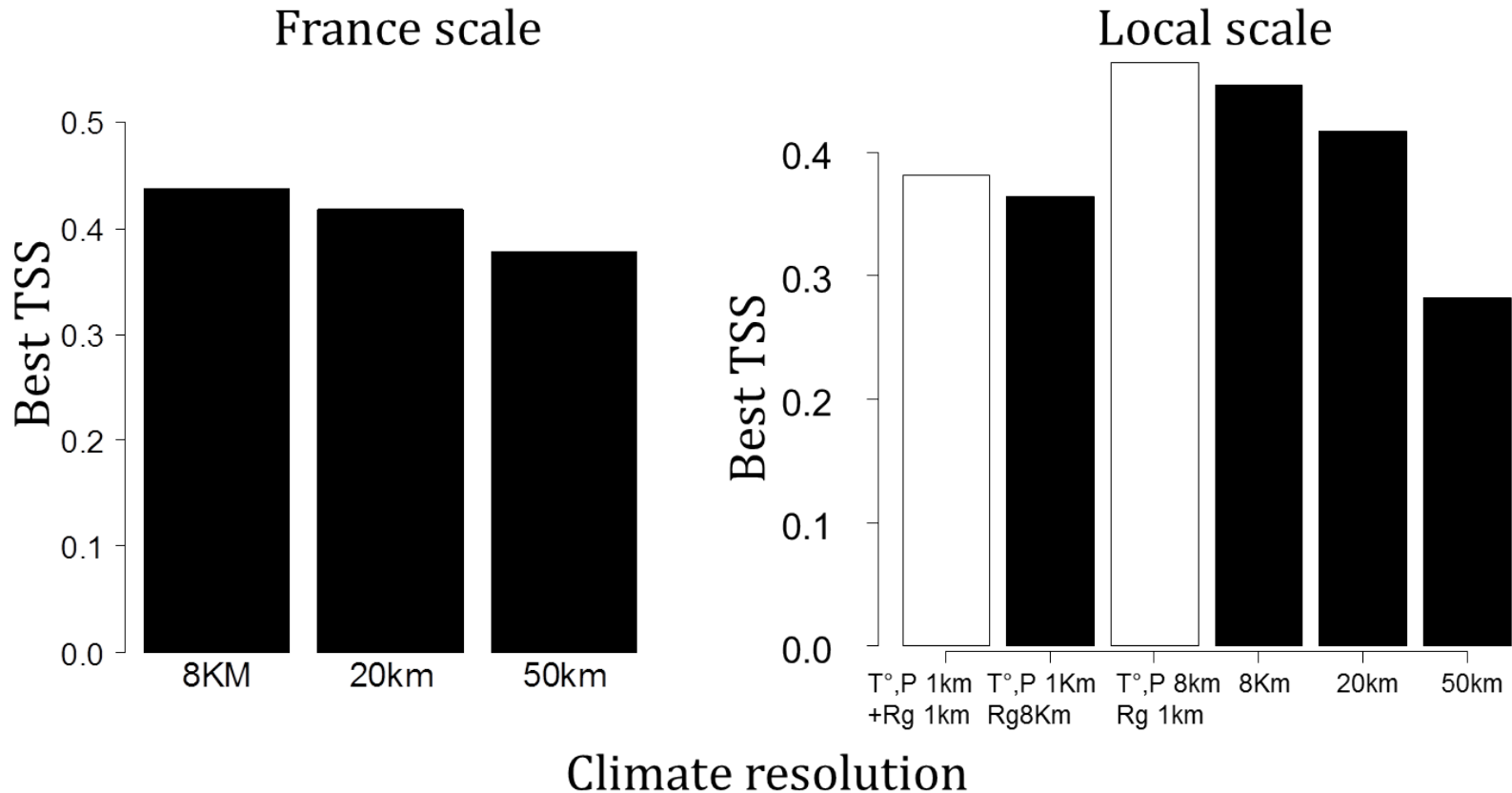
Atelier ClimEcol : Du climat à l'écologie, un dialogue entre communautés

12 et 13 Novembre 2013
Meudon

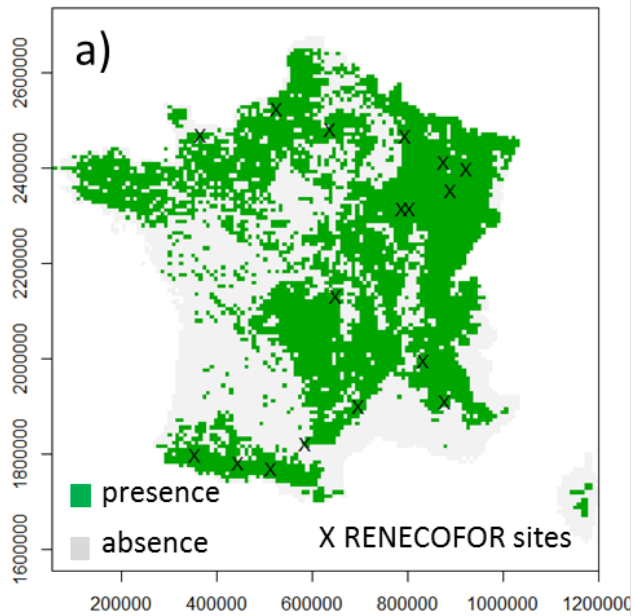


Downscaling and impacts of climate and climate change on biodiversity

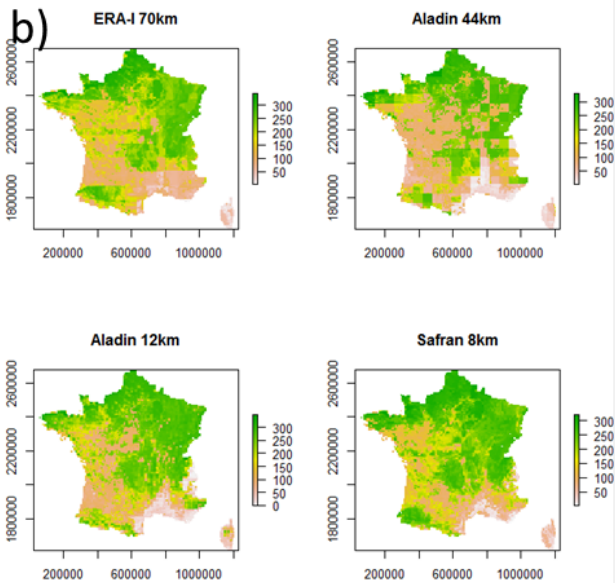
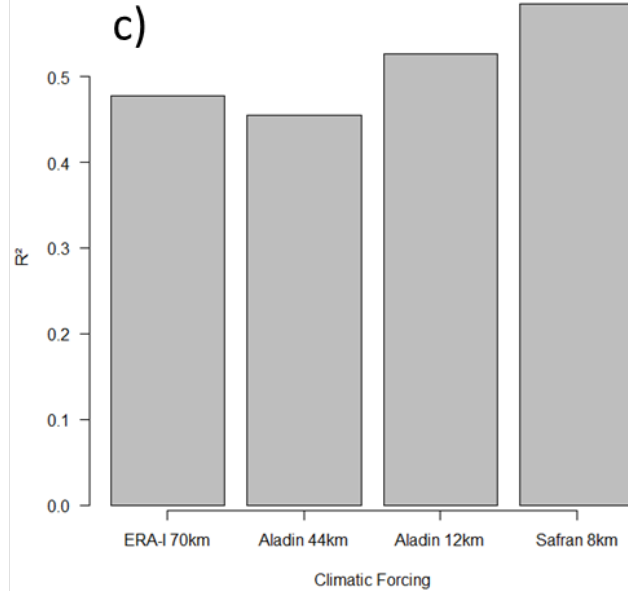
Moderate to high climate resolution is needed to improve model based estimates of current species distributions



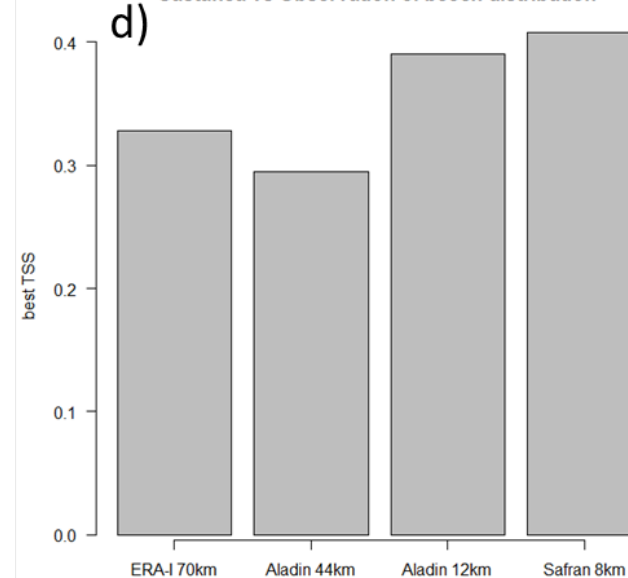
SAFRAN 8 km reanalysis aggregated to 20 and 50 km and statistically downscaled to 1km (only at local scale using fine scale meteo for Med. region)



Castanea vs Observation (beech growth 17 sites)



Castanea vs Observation of beech distribution



Moderate to high climate resolution is probably needed to improve simulations of impacts of climate change on future species distribution

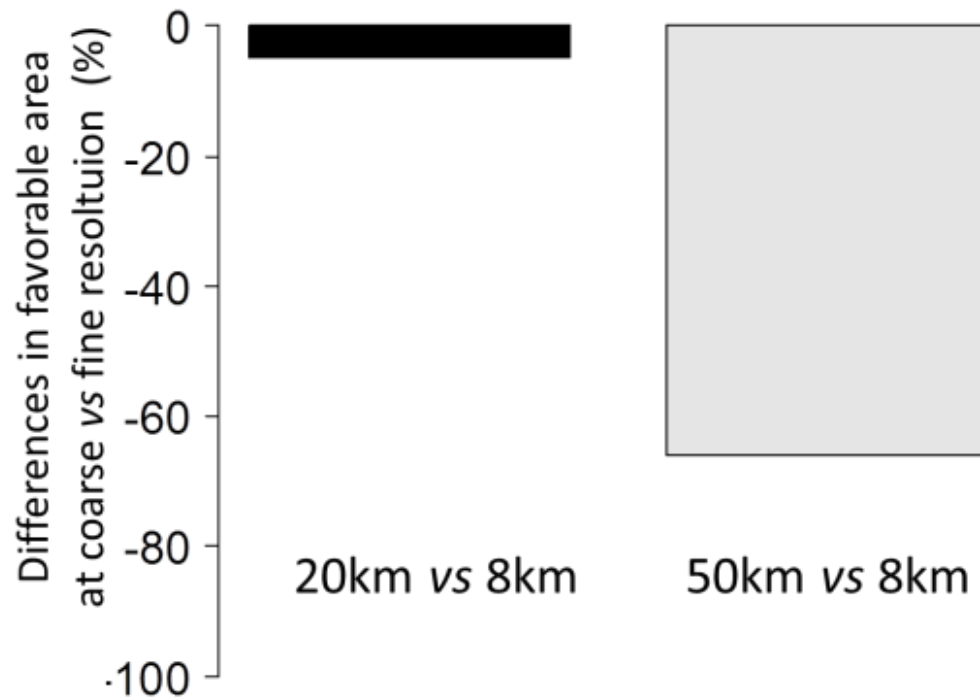
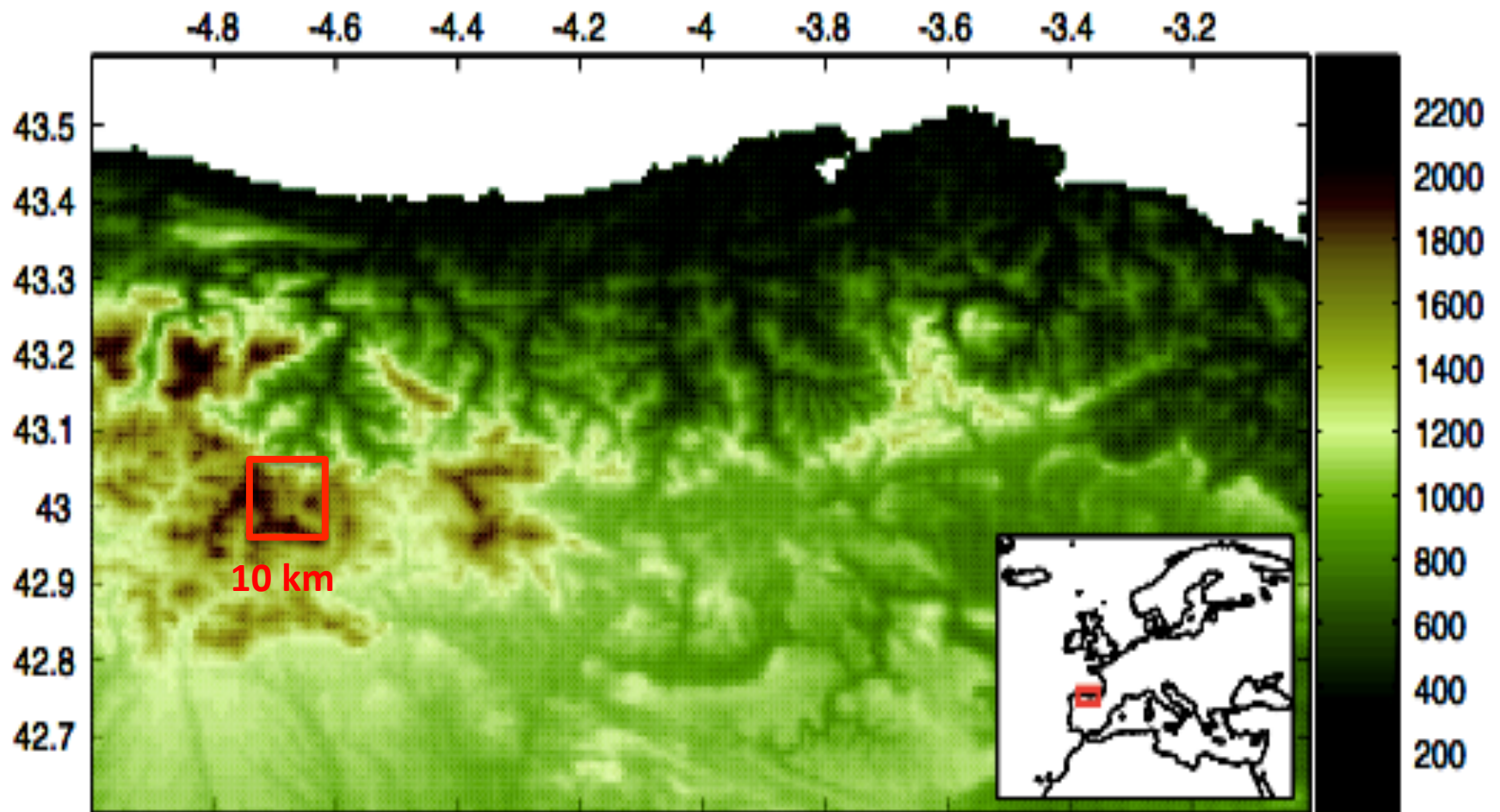
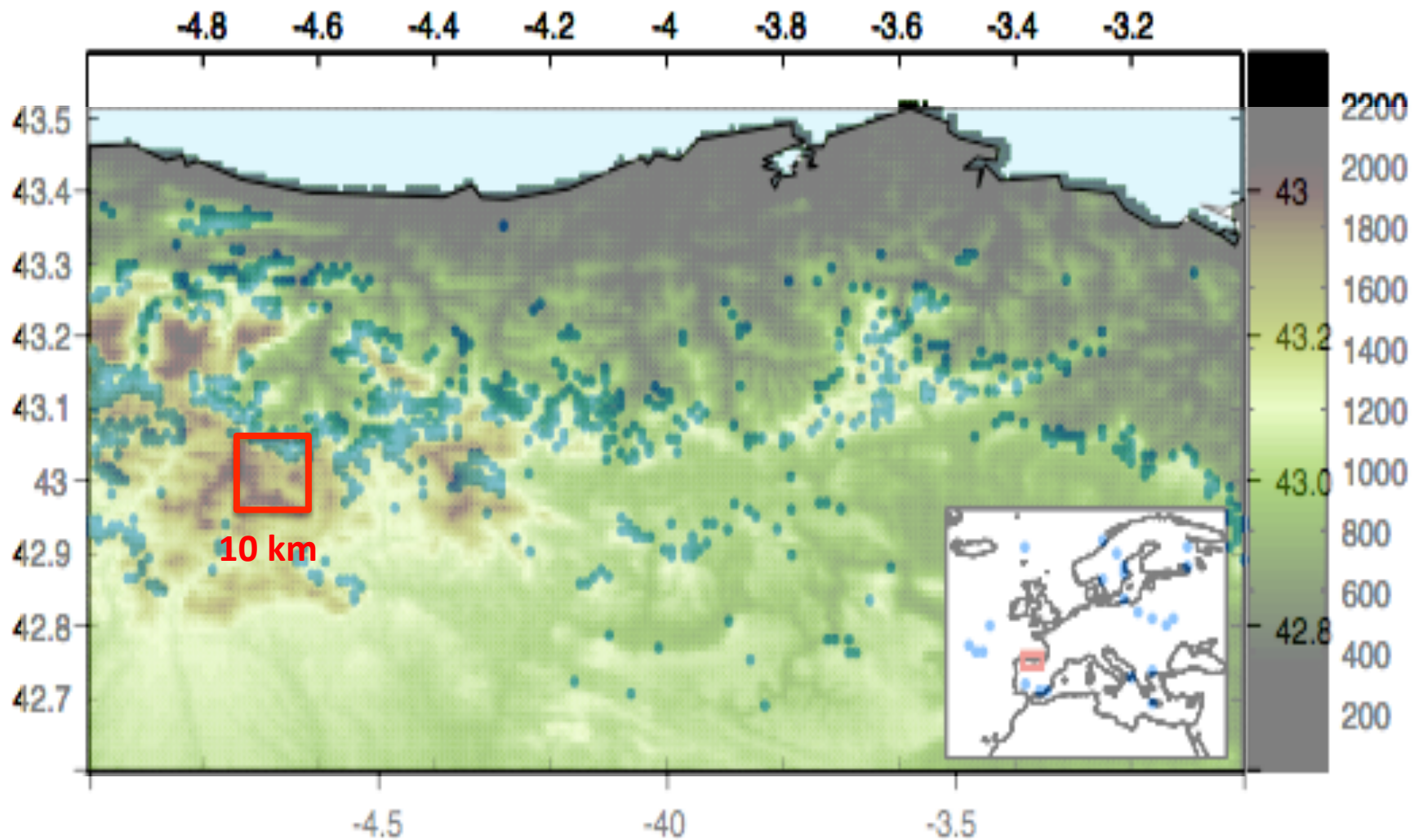


Fig 6. Difference in favorable climatic area for European beech (Fagus sylvatica) projected for the end of the century (2079-2099) using climate at coarse (50 or 20km) vs. fine resolution (8km). The CASTANEA model was forced with climate projection of the GCM ARPEGE under A1B scenario.

Beech distribution in Northern Spain



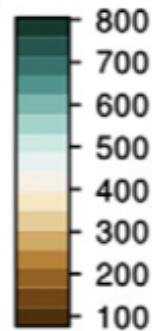
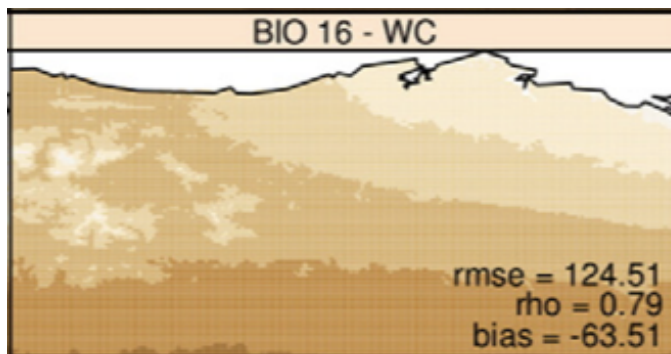
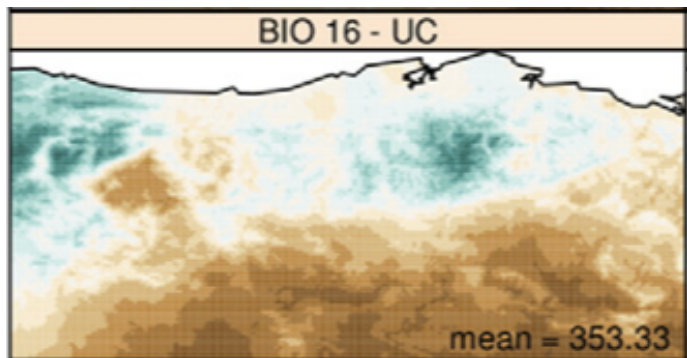
Beech distribution in Northern Spain



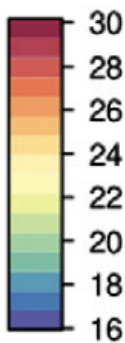
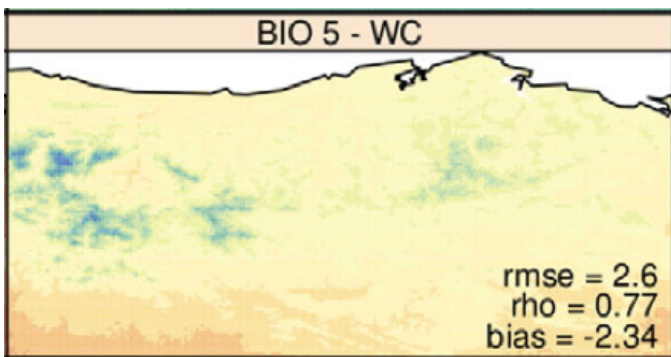
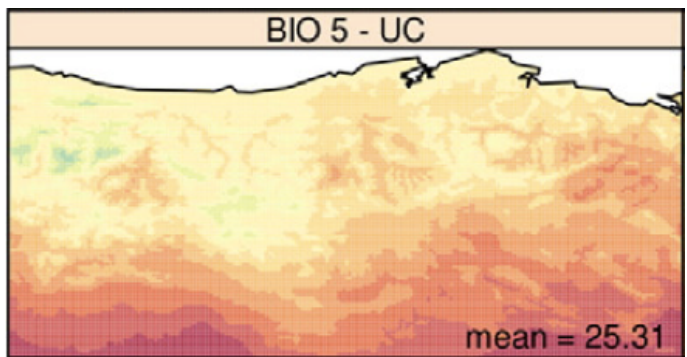
Regional climatology

WorldClim

Wet season precip



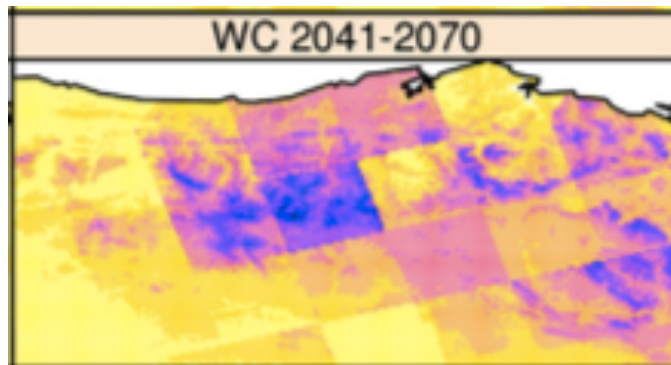
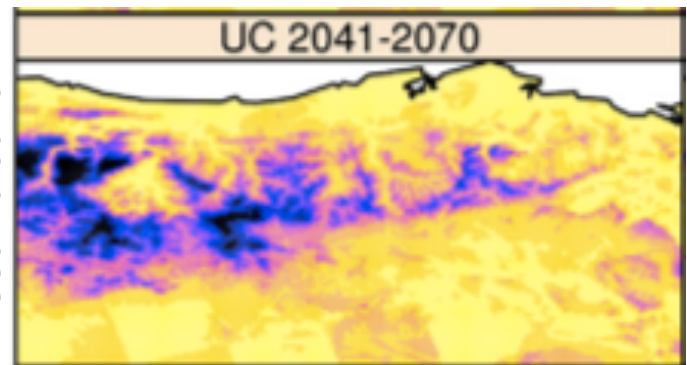
Max montly temp



ENSEMBLES + bias correction

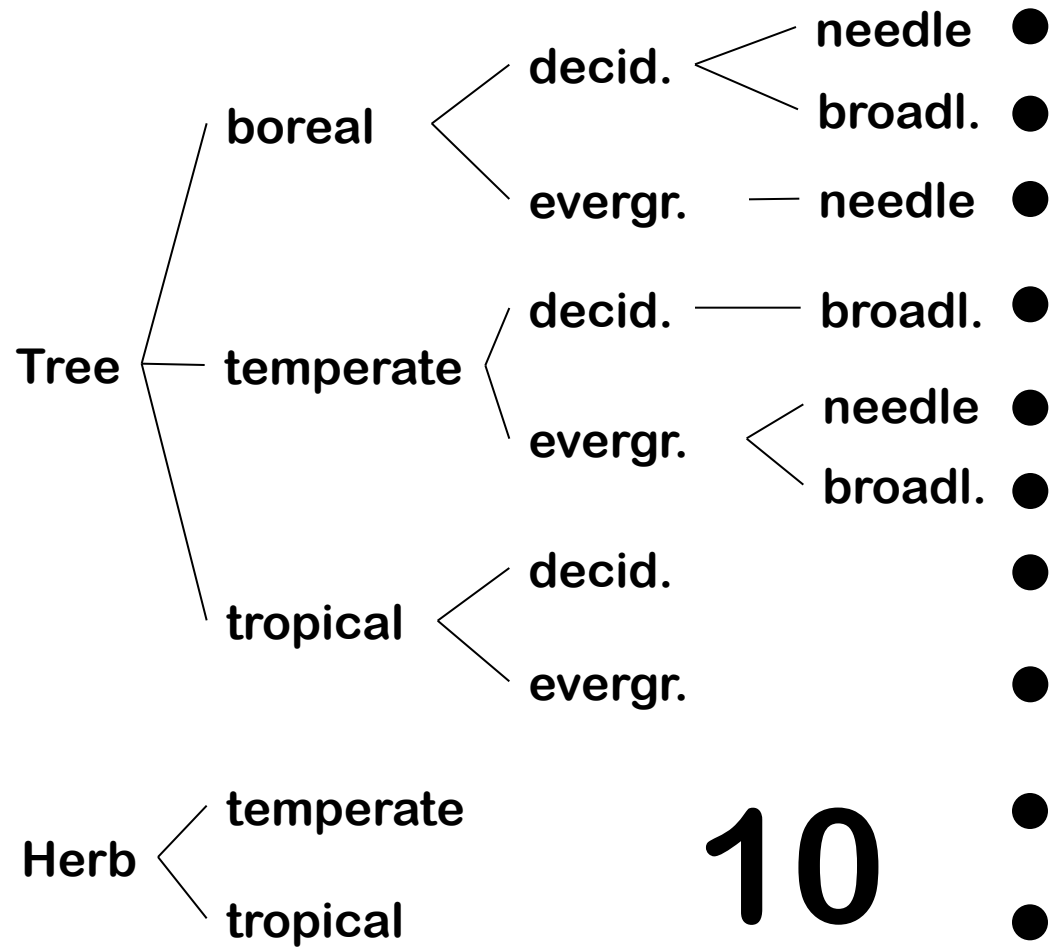
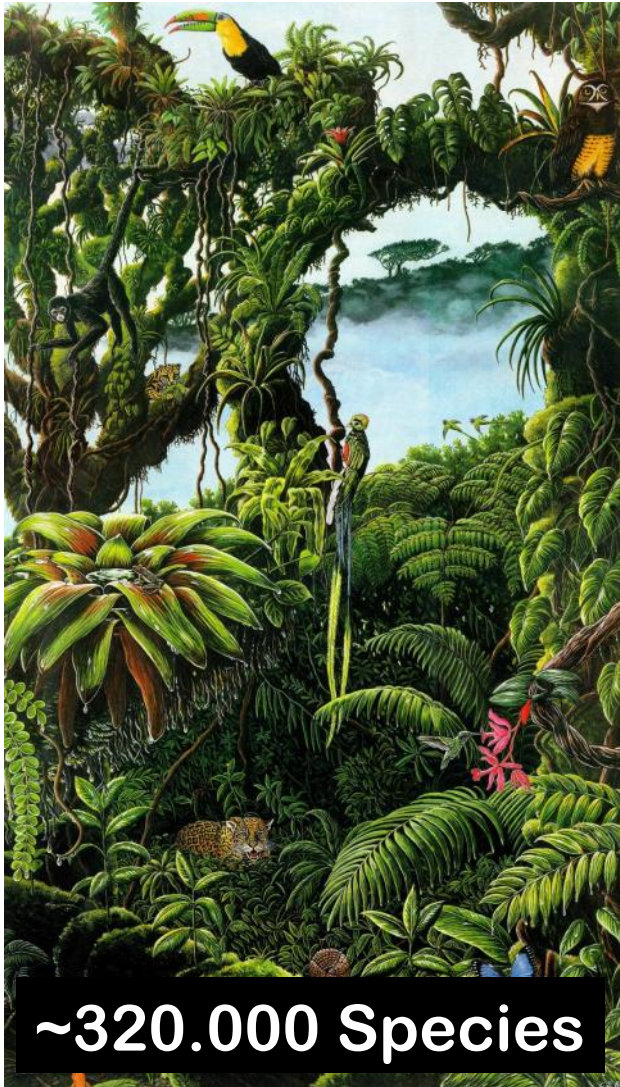
WorldClim + ΔT

Projected Beech distrib.



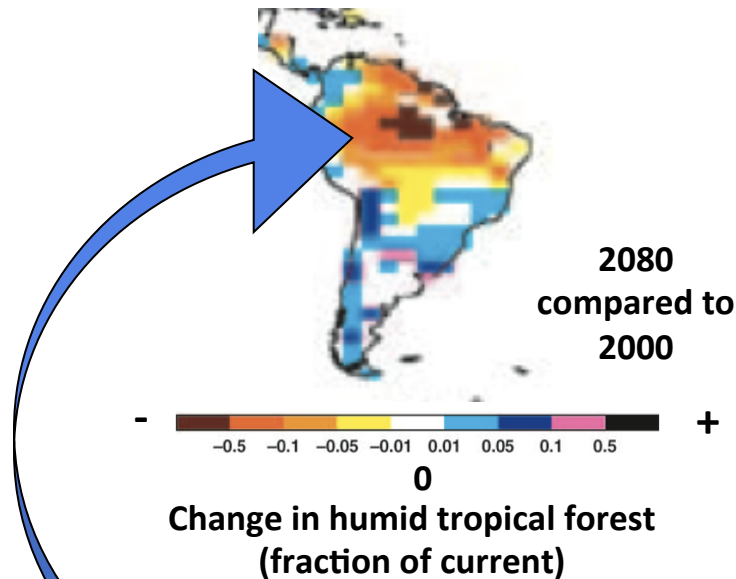
**Dynamic regional scale coupling of
models of climate and vegetation:
what is the role of biodiversity?**

Diversity and DGVMs

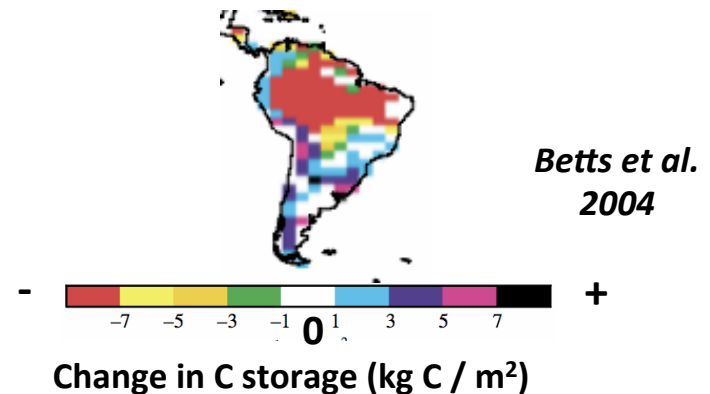
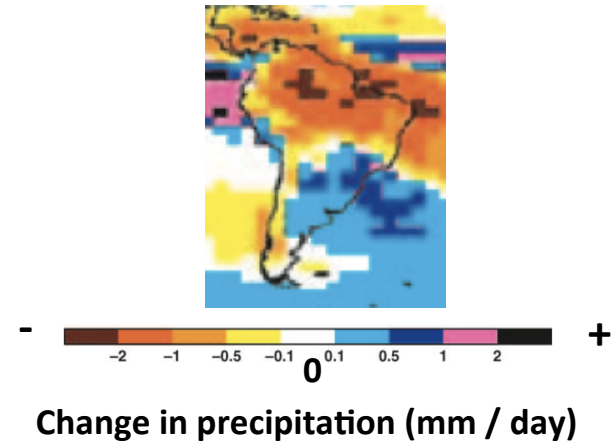


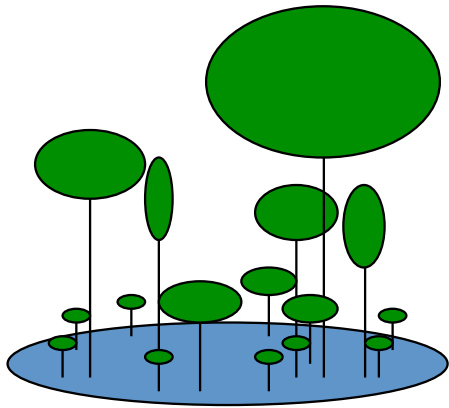
Why change plant functional classifications? the Amazon example

A potential tipping-point of global importance caused by fire, deforestation, changes in regional climate and global climate change

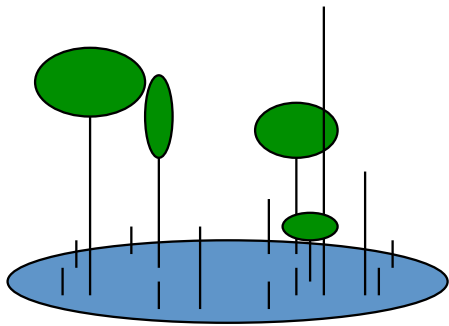


= 1 PFT
in most DGVMs



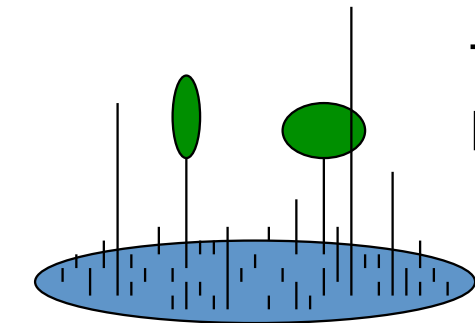


Intact Forest



Burned Forest

50% > 5 m
100% < 5 m



Twice-Burned Forest

50% > 5 m
100% < 5 m



Source: Barlow & Peres 2008

Trait-based version of ORCHIDEE

TRY – a global plant trait initiative

A growing database and user base

- >3 million trait records for about >70 thousand plant species
- >20 participants from >100 scientific institutes worldwide
- >200 scientific projects using plant trait data via TRY

A paper of reference

- Kattge et al. 2011

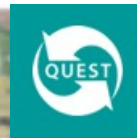
Global Change Biology

Global Change Biology (2011) 17, 2905–2935, doi: 10.1111/j.1365-2486.2011.02451.x

TRY – a global database of plant traits

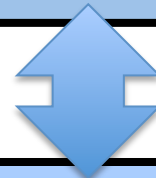
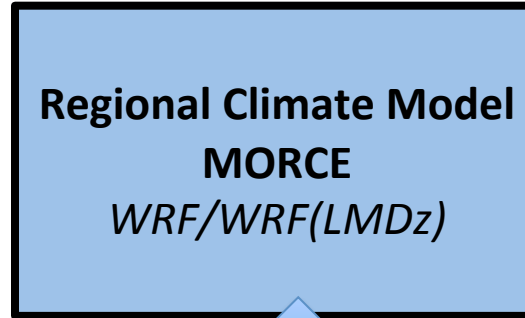
A dynamic network

- more than 50 senior and young scientists for the TRY/BBS meeting in Paris, March 2011 (Alicante 2007, Cape Town 2009)
- 4th meeting planned in Leipzig for September 3-5, 2013
- New major partner - iDiv center of excellence



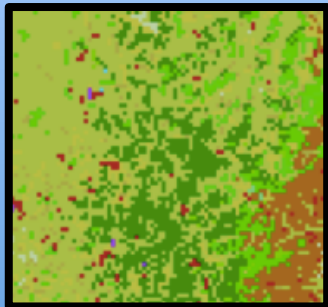
Does tree diversity alter feedbacks to regional climate during climate extremes?

Test the effects of land use and tree diversity on regional climate. e.g., during the 2003 drought

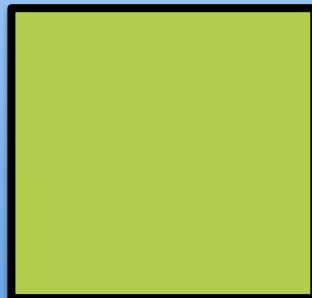


Dynamic coupling

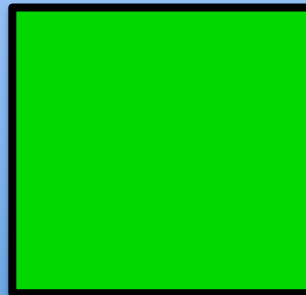
Process-based vegetation model
CASTANEA



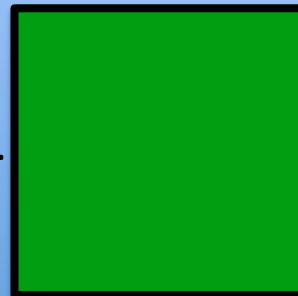
vs.



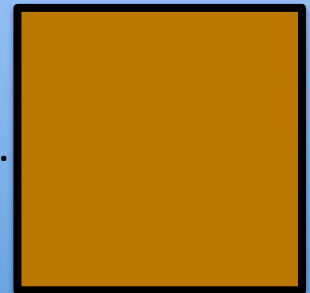
vs.



vs.



vs.



Current
land cover

Forest =
beech

Forest =
sessile oak

Forest =
Scots pine

Crops

Thanks!

Tree species richness promotes productivity in temperate forests through strong complementarity between species

