

# RESEARCH QUESTIONS RESULTING FROM THE KICK- OFF MEETING



Anonymous:

- 1) Comparison of insect outbreaks in Pyrenean forests and boreal forests. Do the same with fires. Can we detect interactions between those disturbances within each place? Are there similar processes?
- 2) Does it exist a threshold in fire frequency beyond which insect outbreaks behave differently?

Changhui Peng:

- 1) What are key climate drivers for controlling the tree mortality in Canadian boreal forests and Mediterranean forests?
- 2) What are the similarity control of forest fire disturbance between boreal forests in Quebec and temperate forest in the Mediterranean?
- 3) What are ecological consequences of ecosystems disturbances (drought, fire, insects, land-use, etc.)?
- 4) Future needs for this program:
  - a. Develop a free shared database
  - b. Develop process-based ecological models.

Anonymous:

- 1) Land-uses: forest increase and forest degradation under different scenarios in both Quebec and Catalonia
- 2) Comparative post-fire dynamics in different habitats in both Quebec and Catalonia. % recovery of species.
- 3) Patterns of functional traits relationships in contrast biomass.
- 4) Carbon emissions after fires: learning from Canada

Anonymous:

- 1) Impact effects of forest management activities on biodiversity (at different levels and scales) and also affecting different organisms (animal sps, vegetal sps, fungal sps...)

- 2) Effects of climate change on forest dynamics and resilience. Establishment a comparison between boreal and Mediterranean forests.

Anonymous:

- 1) Which is the spatial and temporal dynamic of residual islands after a Mediterranean fire?

Aurélie Terrier:

- 1) Adaptation of a module based on dynamic processes of biomass and fire based on climate develop for the Canadian and Mediterranean forests.
  - a. Acquisition of data able to calibrate the model (soil moisture, climate)
  - b. Pooling existent data.

Possible results: carbon emissions for fires, landscape structure in the future, establishment of a management scenario for risk reduction.

Louis Bernier :

- 1) Role and impact of fungi in the forest ecosystem.
  - a. Pathogens (native and exotic) as disturbance agents; impact of climate change on host pathogen interaction.
  - b. Saprobies (including decay fungi)
  - c. Root symbionts and their contribution to nutrition and tolerance to abiotic and biotic stress.
  - d. Endophytes: diversity and functional roles.

Alinson Munson:

- 1) Assemblage of communities after fire, Quebec and Spain functional approach, comparisons.
- 2) Traits roots, in diversity plantation and natural forests.
- 3) Stabilizer C in soils after fire - composition and stocks

Christelle Hely:

- 1) Interested in modeling activities linking vegetation dynamics, fire regime and climate. Could be using different models and scales.
  - a. Ex: Medfire-Seles. Input the climate in format and relationships with vegetation dynamics and fire regime (including climate change).
  - b. Team involved could join: Lluís Brotons, Marie-Jose Fortin, PhD student

- 2) The SBW-TBE module implementation in LPJ-Gliess for E.Chaste PhD. with Dan Kneeshaw (modern) & H.Morin Teanis (paleo).

Adam Ali:

- 1) Nutrient responses to ecosystem disturbances from annual to multi-millennial scale → workshop?

Anonymous:

- 1) Recruit students in the next 3 years and they would be developing common targets
- 2) It is essential to think in terms of co-director and co-publication
- 3) There will be any foundations that can fund the other exchanges?

Martin Girardin:

- 1) Can we start long-term experimental designs for managing wildfire risk in dense coniferous forests? Are we there yet? If not, what are the barriers?

Alain Paquette:

- 1) Effect of biodiversity on resilience
- 2) BEF in forests:
  - a. Control and reduce intra-specific variation (phenotypic variation)
  - b. Control and vary density
  - c. Tolerance to drought

Anonymous:

- 1) Link between fire regime and plant traits such for example serotonin

Anonymous:

- 1) Compare human-driven impacts on ecosystems/landscapes under similar marked drivers
- 2) Is there a remote sensing database of forest ecosystems that could be used to compare dynamics based on the same kind of data?
- 3) Need to share expertise/knowledge in scale up/down spatial data: climatic, vegetation...

- 4) Establish standardized methods to compare structure, functionality... of ecosystems to achieve the final goal of the project.

Anonymous:

- 1) Better understanding of the traits that promote forest resilience to disturbances and how management can promote them (are there different across systems?)
- 2) Interactions between natural disturbances (insect outbreaks, windthrow) and management
- 3) Use of scenarios to assess the dynamics of forests under different drivers of change
- 4) At landscape level: is forest connectivity (which I assume greater in Quebec) determinant to drive the response of forests to climate change?
- 5) Assisted migration: implications of a latitudinal (Quebec) vs. altitudinal (Europe) responses to climate change
- 6) How can species plasticity "buffer" the effect of climate change in both systems?

Anonymous:

- 1) Effects of landscape fragmentation on diversity

Anonymous:

- 1) Quebec has two breeding bird atlas, and lots of long-term data on bird trends with "Etude des populations d'oiseaux au Québec" checklists. Given the expertise of CTFC in modelling bird distribution under different climate change/burnt rate, we could work in collaboration to put into good use already available data in Quebec.
- 2) Some CEF researchers use nest-boxes to get reproductive and demographic parameters of various animal species, perhaps the same in Europe?
  - a. Imbeau/Betiste – Camprodon/others?
- 3) Possible collaboration on data monitoring, analyses, and collaborative research

Anonymous:

- 1) Gap dynamics between shrubs and forests with different management histories.
- 2) Function traits associated to response to disturbances
- 3) Effects of climate change on the resilience of forests to main disturbances

Mario Buitrago:

- 1) Functional diversity:
  - a. Which was the functional role of species in the past?
  - b. Could this information be used to model present and future species role?
- 2) Phenological difficulties of current species
  - a. How does climate change will affect their distribution patterns?

Mahbubul Alam:

- 1) Use of ecosystem service framework for understanding stock and flow dynamics both spatially and temporally
- 2) Forest economics: Productivity and value-chain assessments/optimization for forest industries and industrial plantations

Lluís Brotons:

- 1) Common framework to develop scenarios of future forest changes using different forest attributes but common drivers.
- 2) Discussion of pros/cons of present forest management strategies and socioeconomic/ecological contexts where they may prove useful. Integrative new approaches.
- 3) Use of Newforests as a platform to collaborate further with Europe-North America for North Americans and Europeans

Pierre Drapeau:

- 1) Potential project linking WP2 and WP3. Modelling fire frequency in human disturbed landscape under future climate change and the response of fire specialist.

Rebecca Tittler:

- 1) Can an ecosystem management approach be applied in Europe? What can we learn from such an application?
- 2) What does "managing for complexity" mean in a European vs. Canadian context?
- 3) What does land abandonment mean for connectivity of the landscape? Can we use the same methods to look at connectivity for forest birds in Canada and open-area birds in Europe?

- 4) What are the effects of forest management and ecosystems services in Europe Vs. Canada? Under climate change scenarios? Can practices designed to maximize ES here be applied in Europe and vice versa?
- 5) A question for Dan/Yves: How will changes in growth rate under climate change scenarios affect the relationship between fire frequency and timber availability?

Anonymous:

- 1) Studying the role of time since the last disturbance to assess the trajectories and patterns of species diversity in mountain ecosystems. Disturbance: fire, avalanche, windthrow. And their interactions.
- 2) Organize a workshop on disturbances in mountain ecosystems (a result of 2007 in Trento, Italy). Why we talk about "Natural disturbances in boreal forests" ?
- 3) Explore the relation between glacier refuges and the genetic structure of tree populations.