

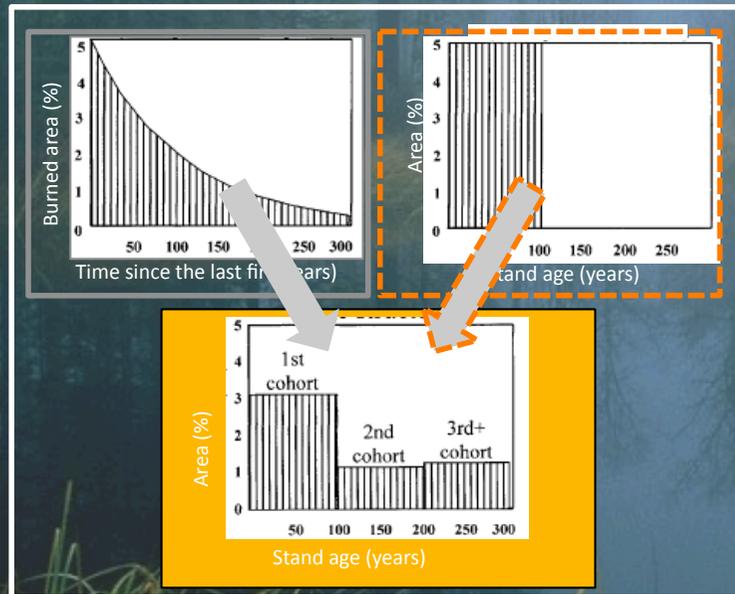
*Fire and vegetation dynamics in
boreal forests: processes and
integrative proxy-model
approaches*

Adam ALI and Christelle HELY

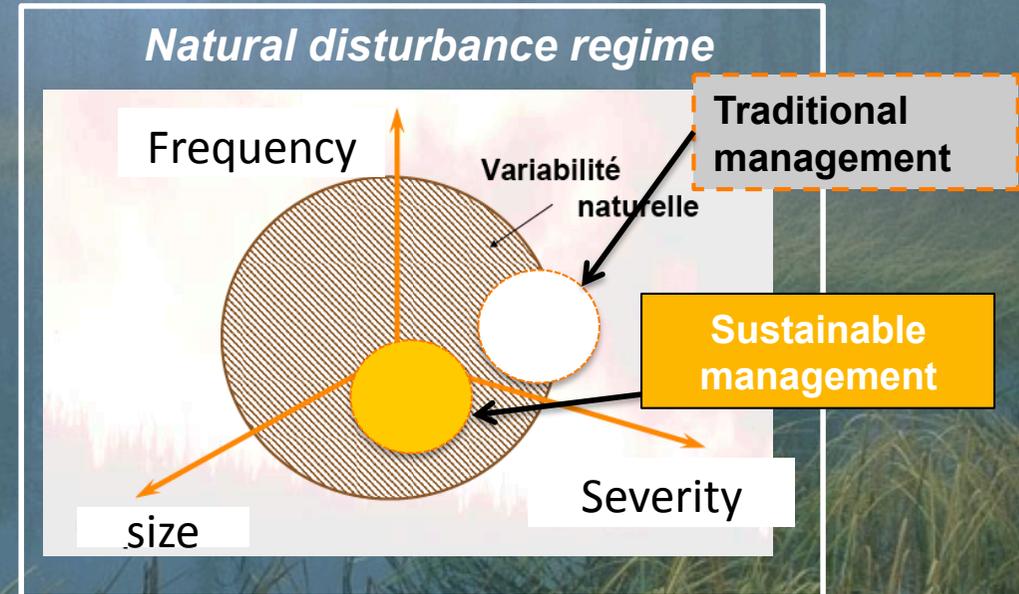
CBAE

Université Montpellier 2 / EPHE / CNRS

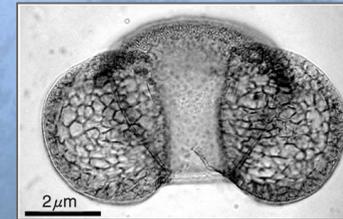
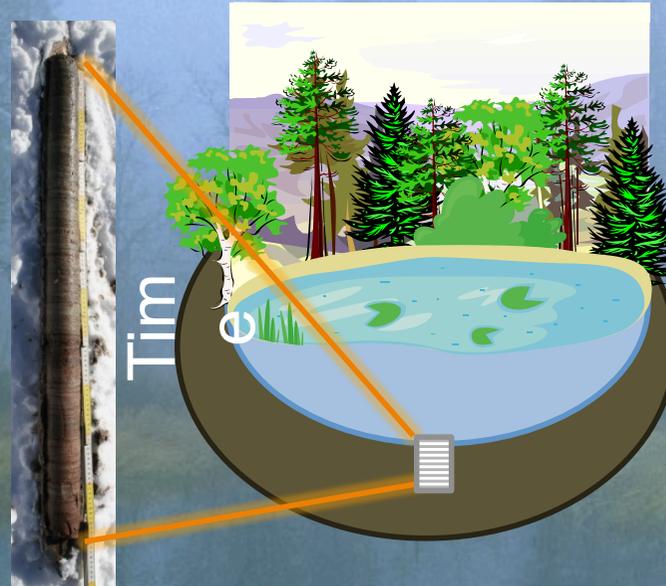
RESILIENCE & CLIMAFEUX projects



At the landscape scale



At the regional scale



Pollen



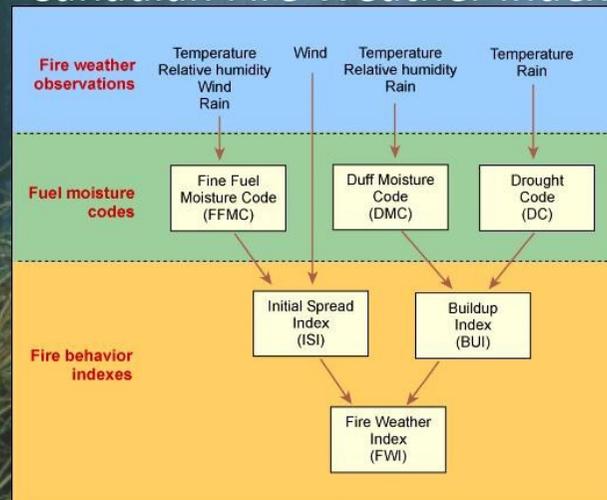
Macroremains



Charcoals

Canadian Fire Weather Index

GCM
Climate data

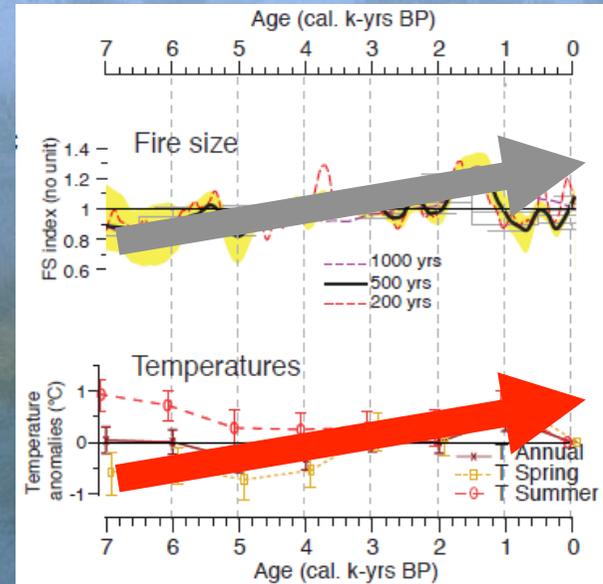
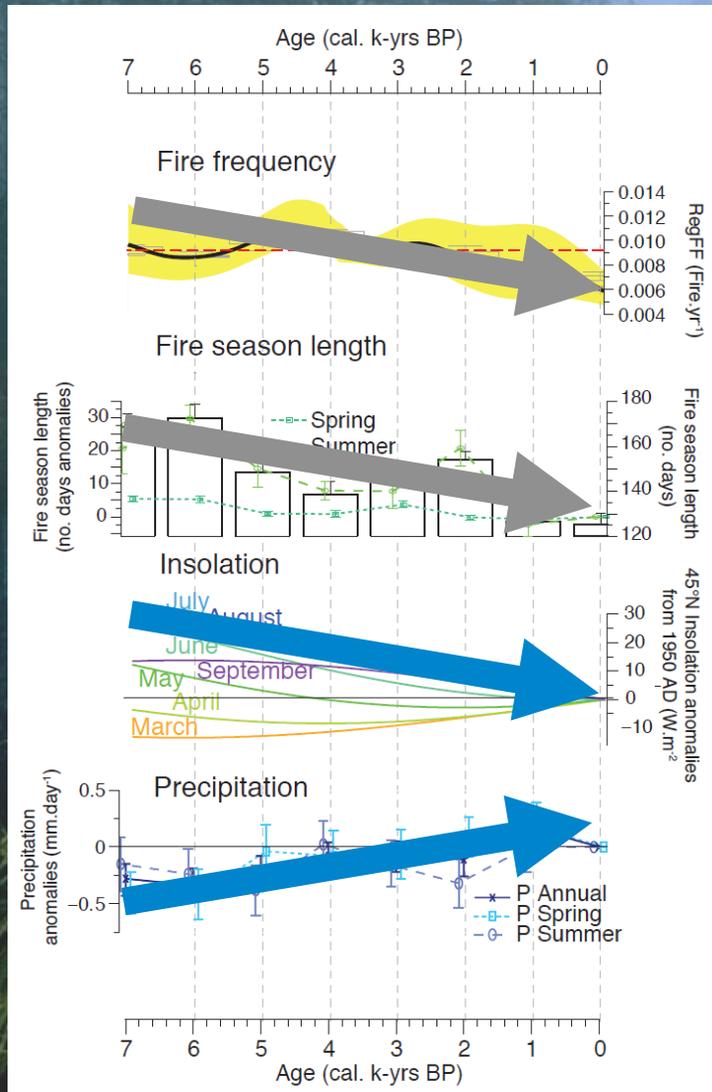


Fire season length
Drought intensity

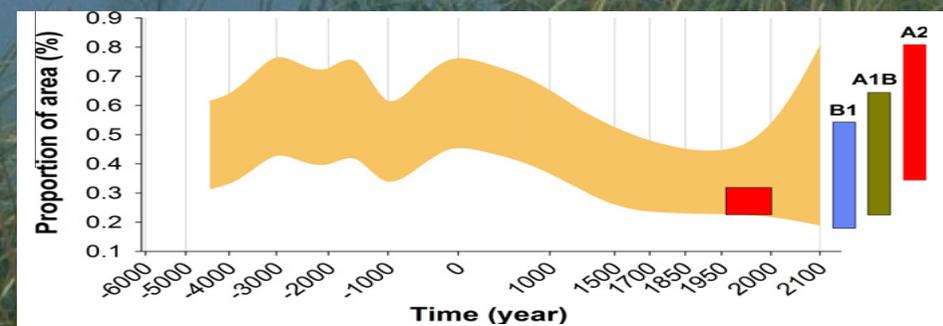
Some results ...

International cooperative
project CLIMAFEU

June temperature
increment of 1°C
triples the total
area burned
(SOPFEU 1973-2003)



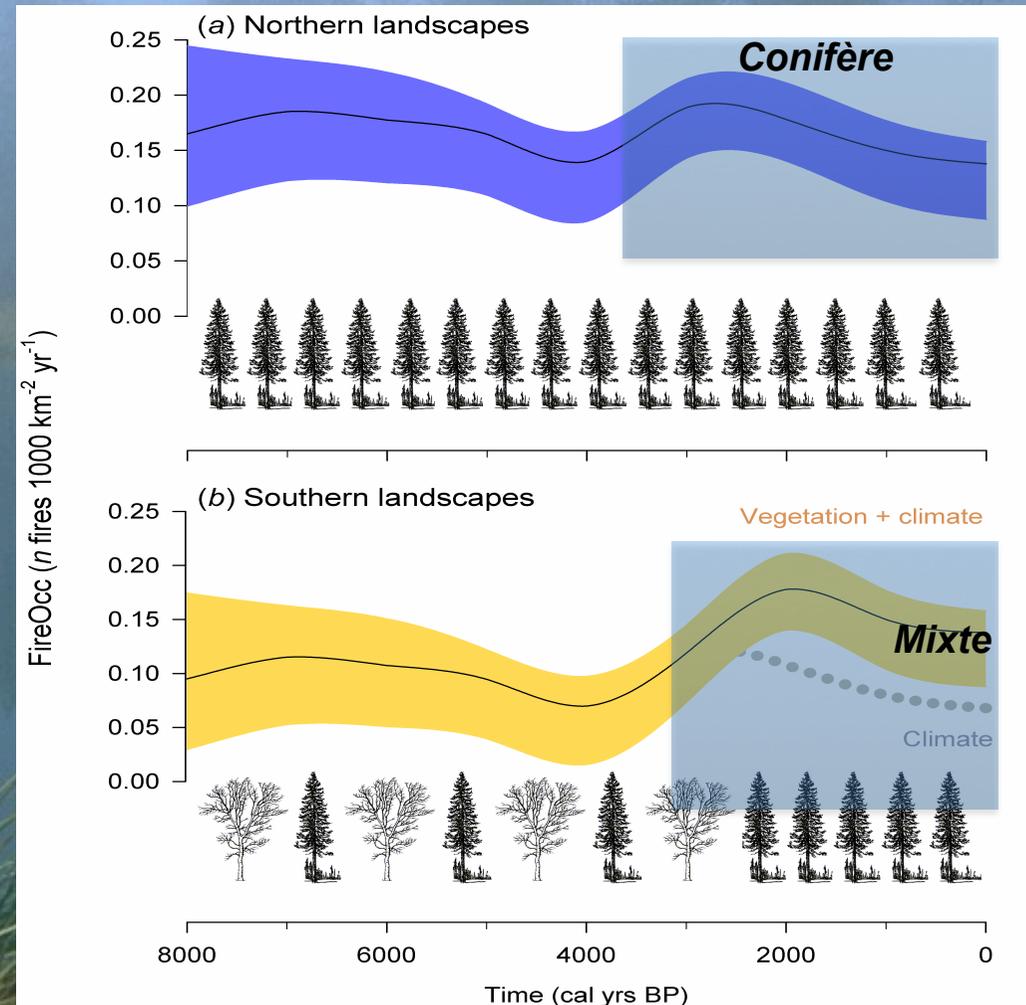
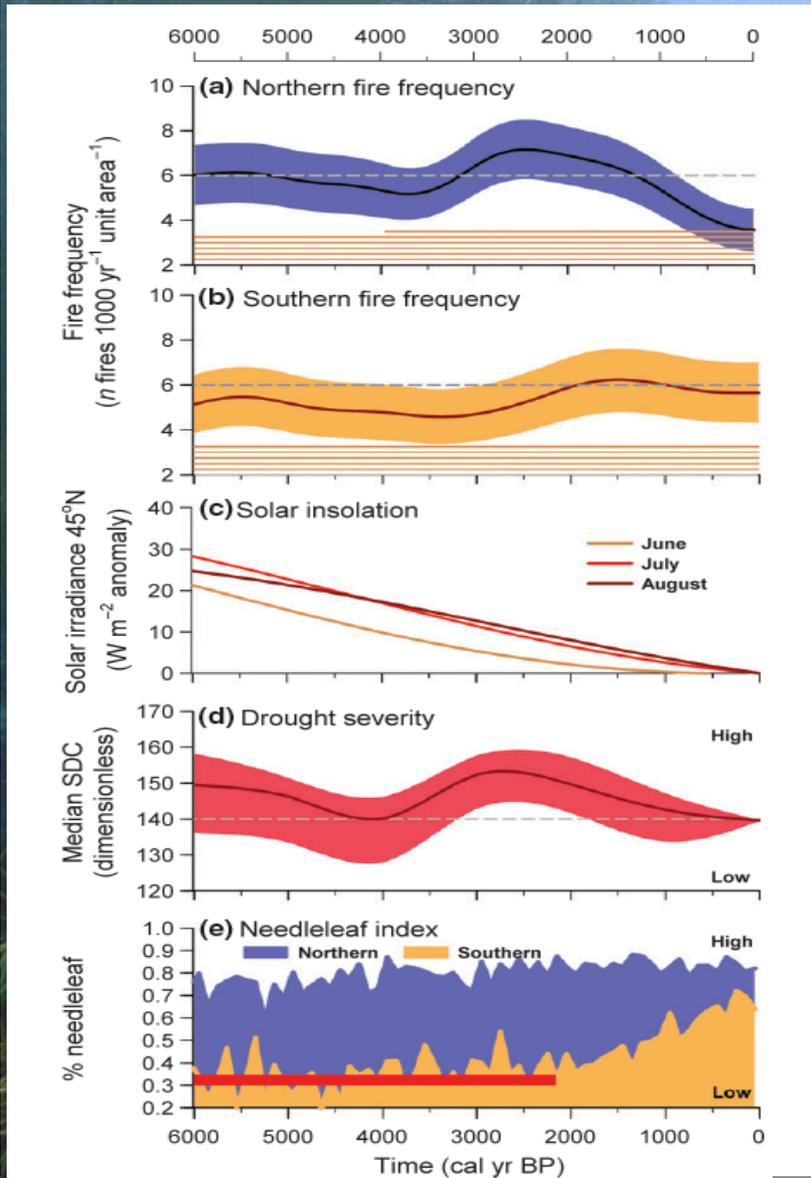
More favorable to large fires



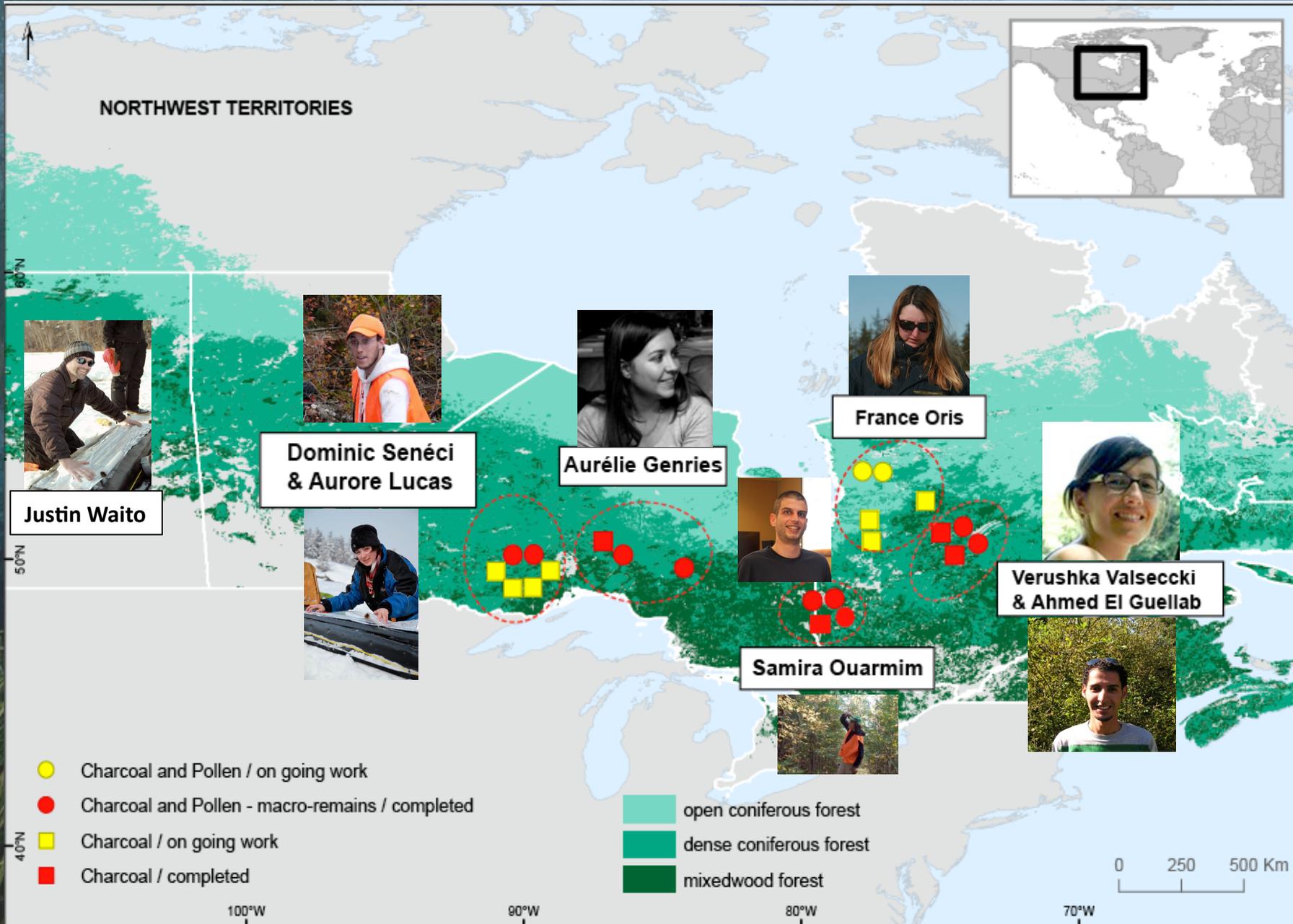
Future larger burned areas expected

Less favorable to fire ignition

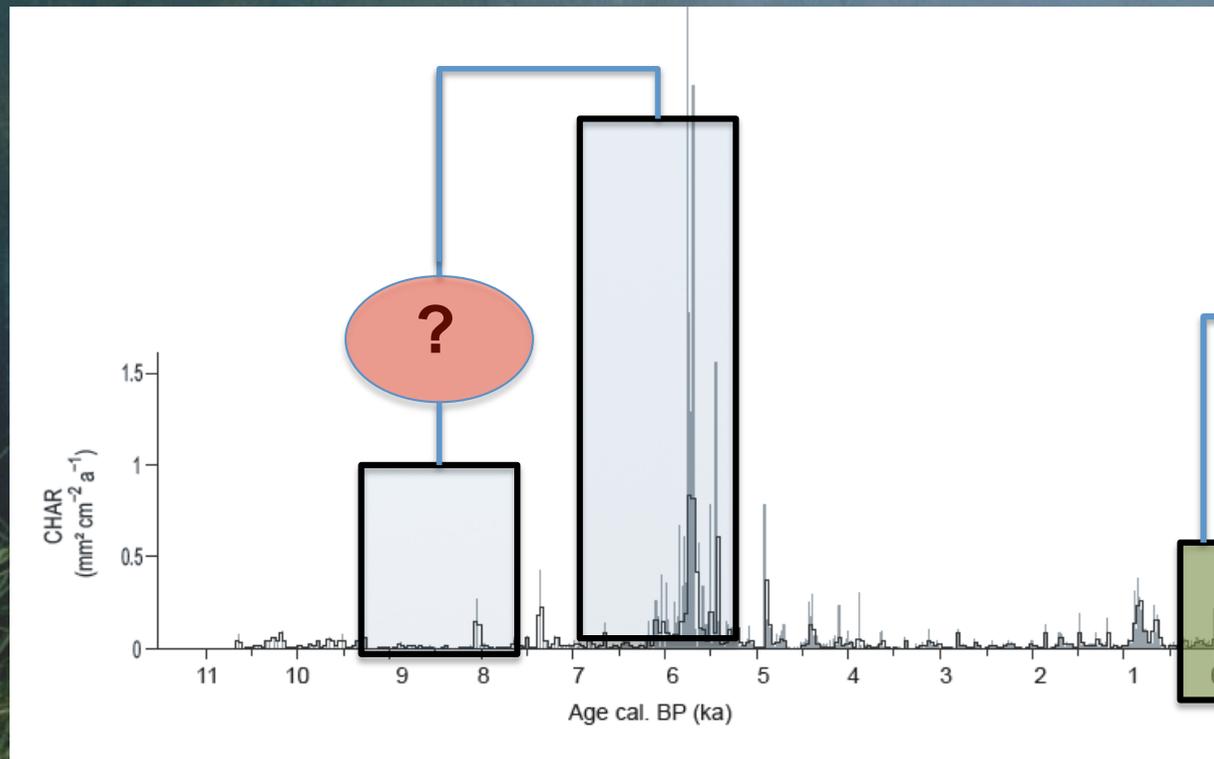
Some results ...



Vegetation composition change effect



Calibration of fire signal: DendroLake project F. Oris (PhD), J. Waito (Ms) & C. Rémy (PhD)

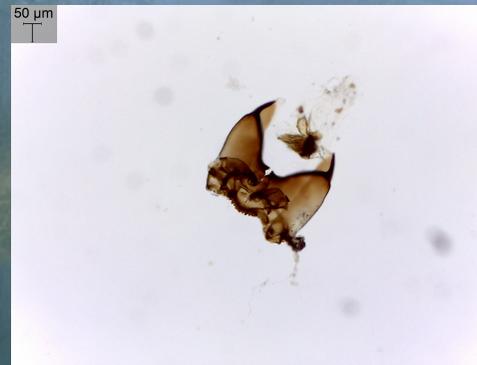


Tree ring fire scars
(CEF)

Climate reconstructions over the last 2000 years: Chiro-Theca project



*Lisa Bajolle (PhD,
UQAT & UM2)*



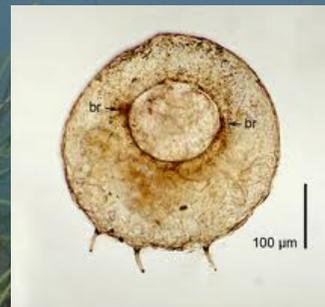
Head capsule of
Chironomidae



Summer air
temperature



*Pierre Crespin
(PhD, UM2 & UQAM)*



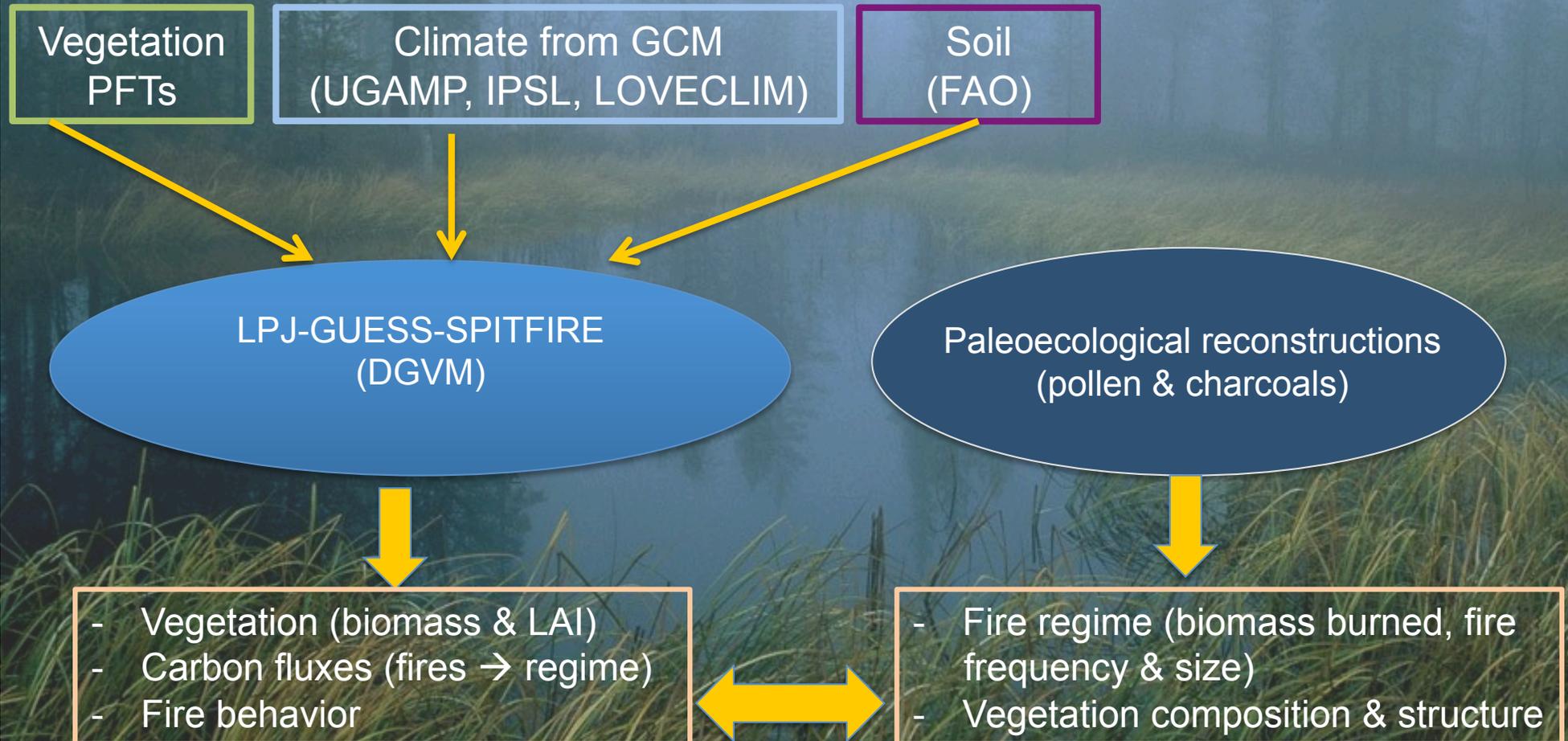
Rhizopod



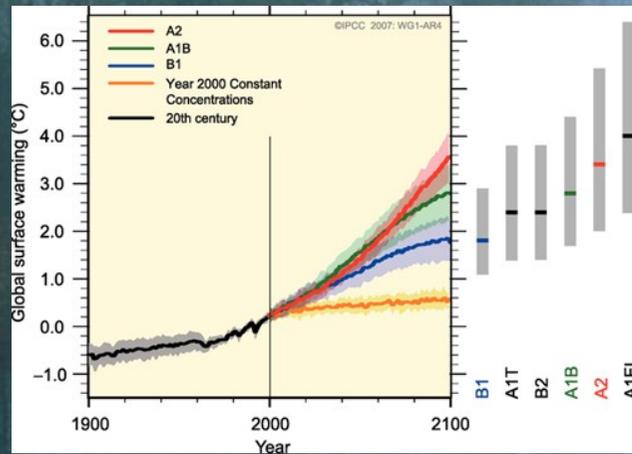
Annual precipitation
for paleohydrology

Fundings: FQRNT (2013 – 2018)

Towards an integrative approach of ecological processes



For potential ecological trajectories and management strategies ...



GCMs
UGAMP, IPSL,
LOVECLIM

LPJGUESS-
SPITFIRE

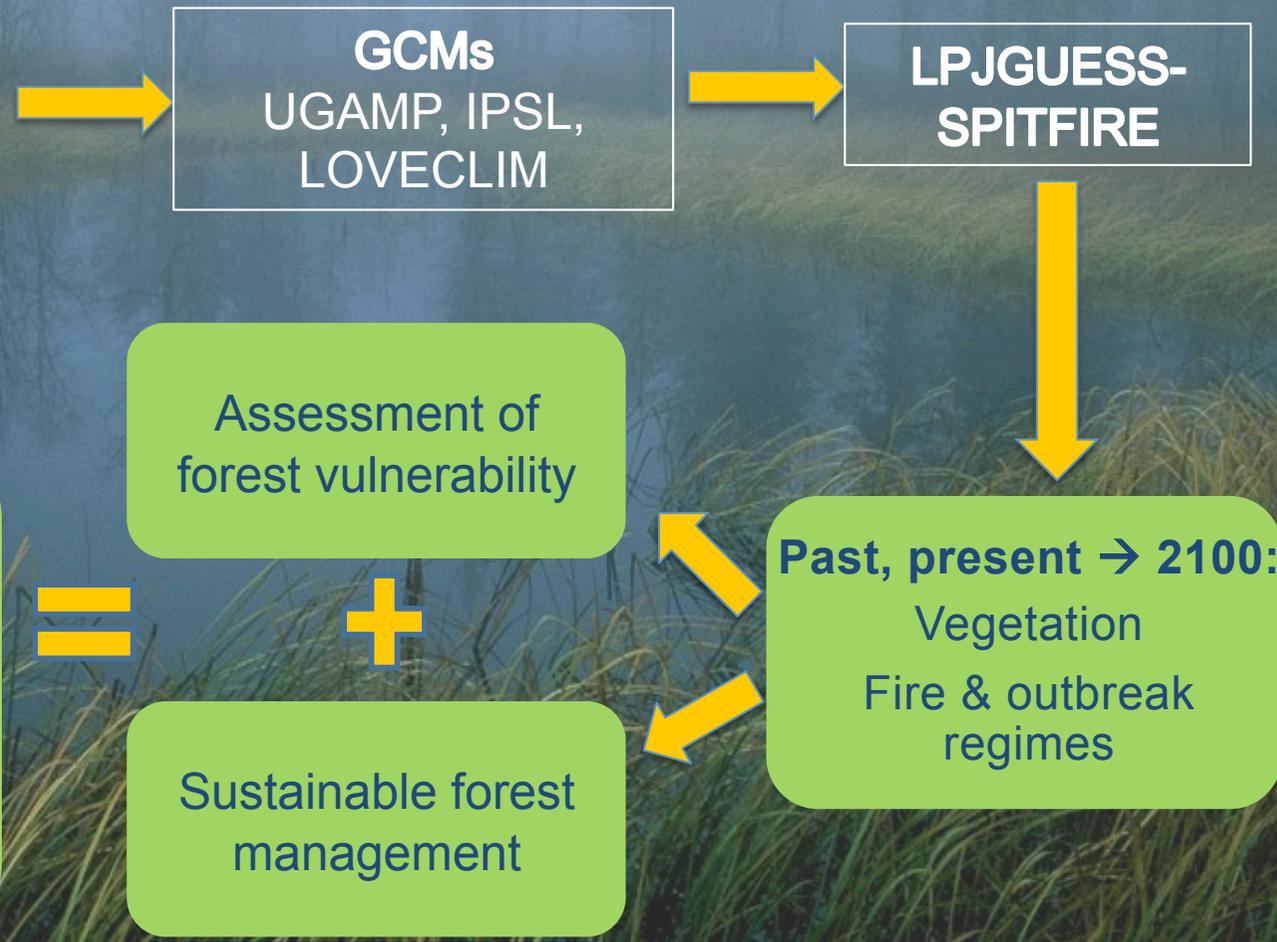
Tradeoff:
Natural disturbance & anthropogenic activities
To stay within the boreal forest natural variability
To preserve its resilience

Assessment of forest vulnerability

= +

Sustainable forest management

Past, present → 2100:
Vegetation
Fire & outbreak regimes



Ongoing and following steps



Emeline Chaste 2013 - 2016
(PhD, UQAM-EPHE)



Cécile Remy 2013 - 2016
(PhD, UM2-UQAT)

- 1. To include insect outbreaks as a natural disturbance process in the DGVM : E. Chaste*
- 2. To find the processes that induce differences in charcoal peak amplitudes within and among cores : J. Waito and C. Rémy*
- 3. To use biogeochemical proxies to evaluate the opening of the black spruce forests (feathermoss versus lichen) : Carole Bastianelli (PhD 2015-2018)*