EGU22-8737
https://doi.org/10.5194/egusphere-egu22-8737
EGU General Assembly 2022

Fire variability in the southeastern France over the past 8500 years

Marion Genet[1], Anne-Laure Daniau[1], Maria-Angela Bassetti[2], Bassem Jalali[3], Marie-Alexandrine Sicre[4], Julien Azuara[5], and Serge Berné[2]

[1]University of Bordeaux, EPOC, Paléoclimat, PESSAC, France (marion.genet@u-bordeaux.fr)
[2]CEFREM UMR5110 CNRS, Université de Perpignan Via Domitia, Perpignan, France
[3]Key Laboratory of Marine Ecosystem Dynamics, SOA & SIO, MNR, Hangzhou 310012, P. R. China
[4]LOCEAN Laboratory, Sorbonne Universités (UPMC, Univ Paris 06)-CNRS-IRD-MNHN, Paris, France
[5]MNHN, Museum National d'Histoire Naturelle, UMR CNRS 7194, 75013 Paris, France

The Mediterranean region is strongly impacted by fires at present day. Projected warming scenarios suggest increase fire risk in the Mediterranean region (Pechony et Shindell, 2010). However, models based on modern-day statistical relationships do not consider interactions between climate, vegetation, and fire. In addition, process-based models must be tested not only against modern observations but also against climate observations different from today to cover the range of climate variability projected for the next centuries. Here, we present a new biomass burning record for the last 8,500 years in southeastern France with a mean temporal resolution of 45 years based on a marine sedimentary microcharcoal from the Gulf of Lion, located in the Rhone River prodelta. Periodicities of 500 and 1,100 years emerge from this record. Most of the peaks coincide with cold and dry periods of several century duration reflecting enhanced burning of open evergreen sclerophyllous Mediterranean forests. Among the 15 peaks of biomass burning, 7 are associated with negative North Atlantic Oscillation (NAO) phase, 8 with cold events, and 13 with low solar activity. We suggest that cold and wet conditions during negative NAO led to the accumulation of biomass while dry and cold winds during negative East Atlantic (EA) phase favored fuel flammability resulting in peaks in biomass burning. Today, large fires in southeastern France occur during negative NAO or during the Atlantic Ridge weather regime, the latter being similar to the EA (Ruffault et al. 2017). The frequency of heat-induced fire-weather favoring the largest wildfires observed in recent years in the Mediterranean region is projected to increase under global warming (Ruffault et al., 2020). Our study suggests also that the French Mediterranean region might be affected by large wind-driven fires developing in the event of negative NAO and EA modes.

References

Ruffault et al., 2017 Daily synoptic conditions associated with large fire occurrence in Mediterranean France: evidence for a wind-driven fire regime. https://doi.org/10.1007/s10584-012-0559-5

Ruffault et al., 2020. Increased likelihood of heat-induced large wildfires in the Mediterranean Basin. https://doi.org/10.1101/2020.01.09.896878

Pechony et Shindell, 2010. Driving forces of global wildfires over the past millennium and the forthcoming century. https://doi.org/10.1073/pnas.1003669107