Thursday 19 March
10:00 – 11:00 (Paris time)

Seminar EUBURN

Current advances and perspectives on wildfire atmospheric emissions and exposure over France

Speaker : **Florent Mouillot (IRD – Institut de Recherche pour le Développement)**

Large fire events have affected forested ecosystems across France in recent years, spreading wildfire concerns throughout the country. This raises not only the question of the increasing likelihood of such events in the near future, but also the need for a better characterization of exposed assets and their vulnerability to disturbance. The 2022 fire season revealed an unexpected contribution of soil carbon smouldering to the national wildfire carbon emission budget, as evidenced by CO/CO_2 ratios measured at atmospheric monitoring towers. These time series highlighted important knowledge gaps regarding the national variability of combustion factors across carbon pools and combustion phases (flaming vs. smouldering).

To address these issues, we developed a revised version of the global GFAS fire emission system, commonly used as a reference framework. This approach integrates soil combustion in temperate forests (not currently represented in GFAS), accounts for the time-varying contributions of smouldering and flaming phases along fire trajectories, and includes emission factors (EF) specific to the dominant forest types. The resulting emission estimates can then be translated into territorial maps of smoke exposure hazards, which are still lacking at the national scale. These hazards increasingly threaten emergency healthcare capacities, particularly when combined with intensifying summer heatwaves that exceed human tolerance thresholds and expose rapidly growing seasonal tourist populations in fire-prone regions. In this seminar, I will present recent advances in wildfire emission characterization over France and discuss ongoing research activities within the QWERTY project (2025–2029) of the PEPR FORESTT France 2030 initiative.

Florent Mouillot is a Research Director at the French National Research Institute for Sustainable Development (IRD), based at the Centre for Functional and Evolutionary Ecology (CEFE-CNRS) in Montpellier. His research focuses on wildfire ecology and the interactions between climate, vegetation, and human activities, combining ecological modelling, remote sensing, and spatial analysis to study fire regimes and ecosystem dynamics.

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Contact : *euburnrisk_projectcoord@meteo.fr*

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