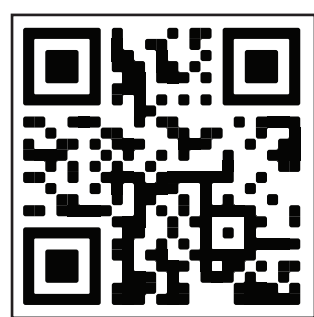


What Is the Importance of Advective Heat Fluxes in Mountain Lakes?

Introduction

Due to mountain lake’s small size, small catchment areas and steep surrounding slopes, mountain lakes respond rapidly to changes in their catchment and inflow. This suggests a greater impact on their heat flux due to advection than their low altitude counterparts. But what is this impact?

Methods



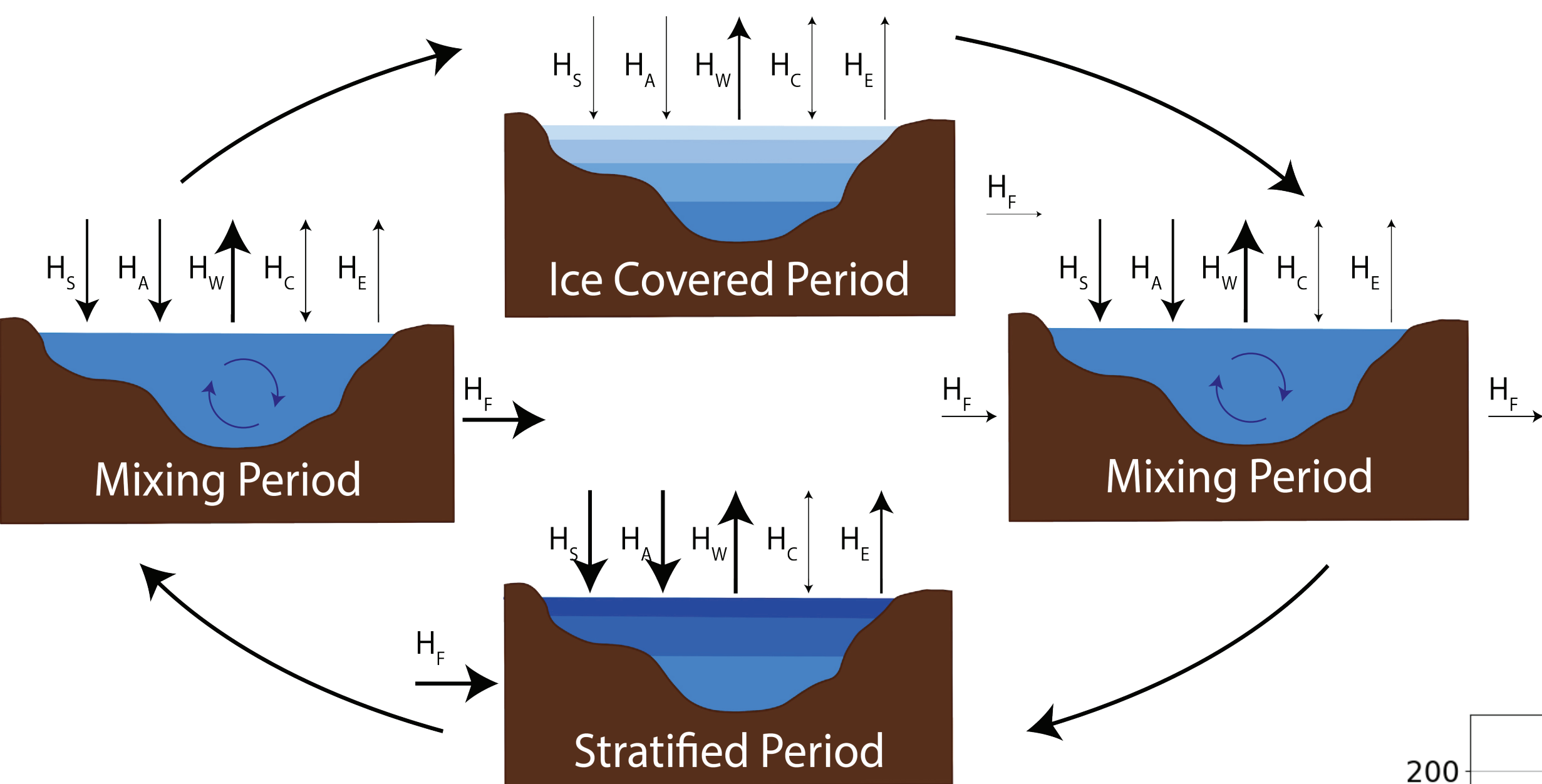
Scan for codes

What is ΔHC ?

ΔHC is the daily difference in heat content of the lakes. These were calculated with approximate volumes for layers of water and summed over the depth of the lake.

What is $HF_{vertical}$?

$HF_{vertical}$ is the sum of heat fluxes between lakes and the atmosphere listed below. These were calculated based on CROCUS meteo model data and equations described by Fink 2014.



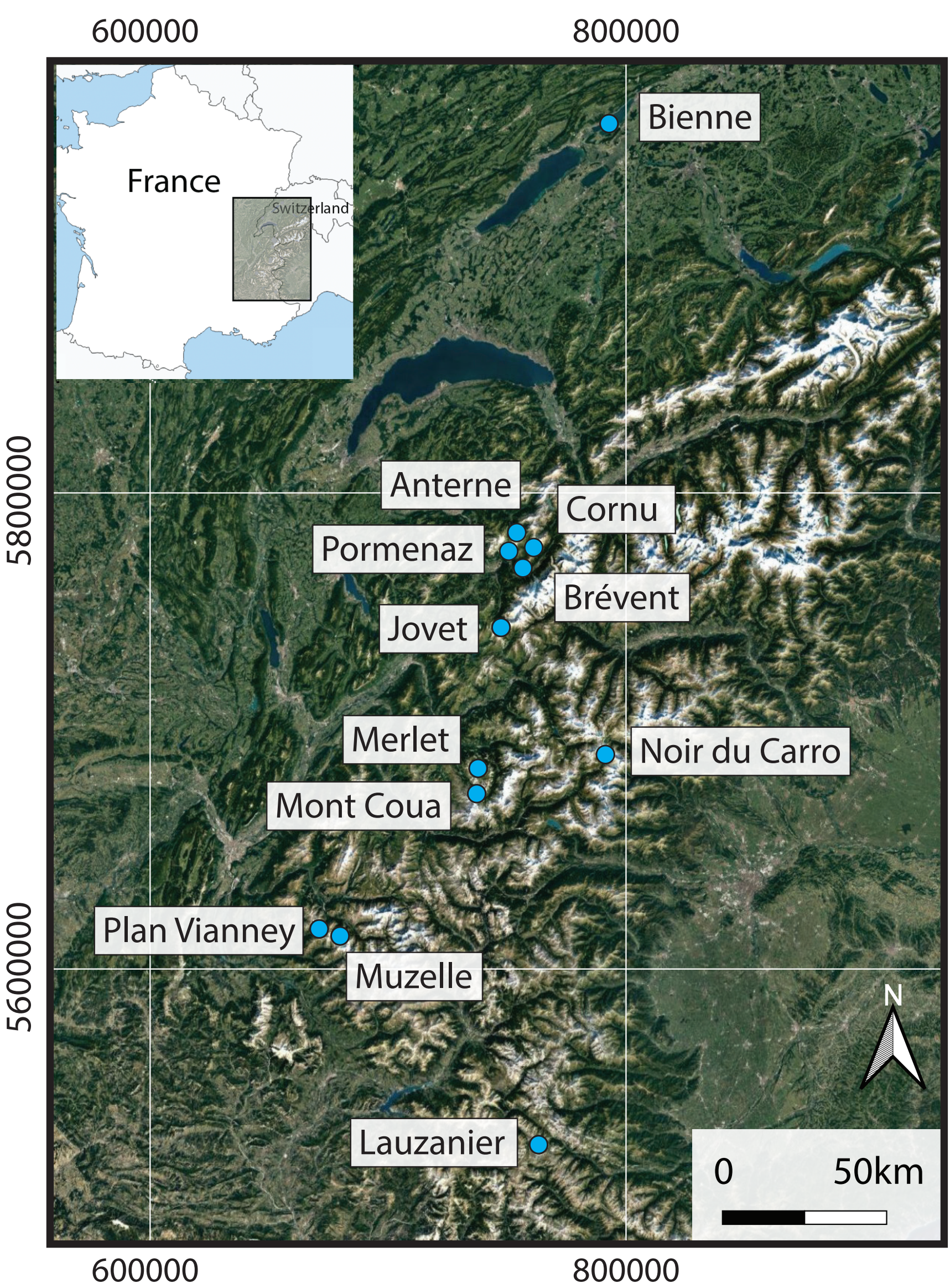
H_s : shortwave absorption
 H_a : longwave absorption
 H_w : longwave emission
 H_e : evaporation or condensation
 H_c : free and forced convection

Discussion

- Lakes heat content change is not fully explained by vertical heat fluxes.
- These missing components add a lot of variability to lake’s heat content
- However these are hard if not impossible to measure in the field.
- Thus it is important to further investigate the impact of horizontal heat fluxes in order to model mountain lakes

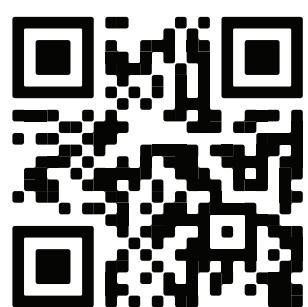
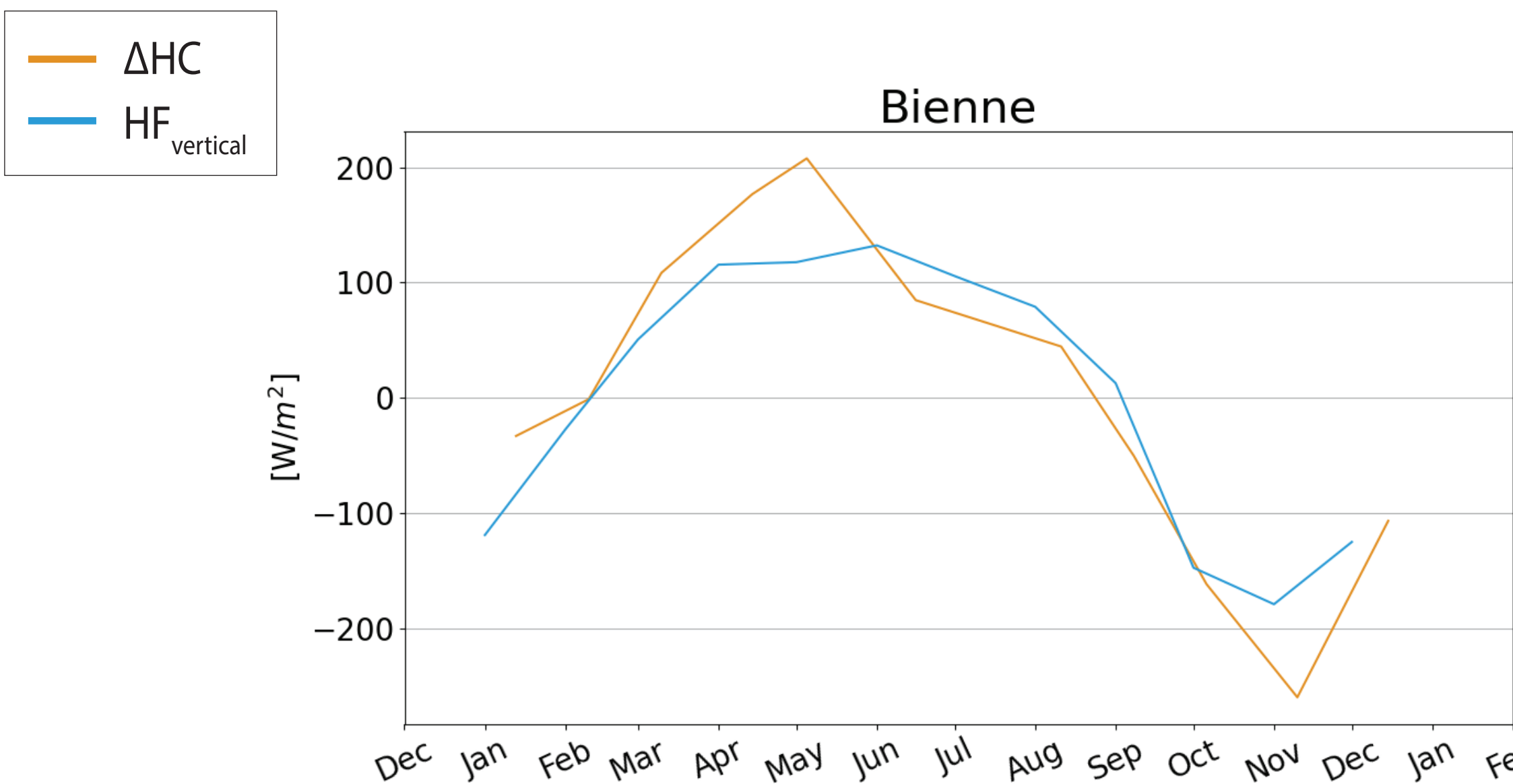
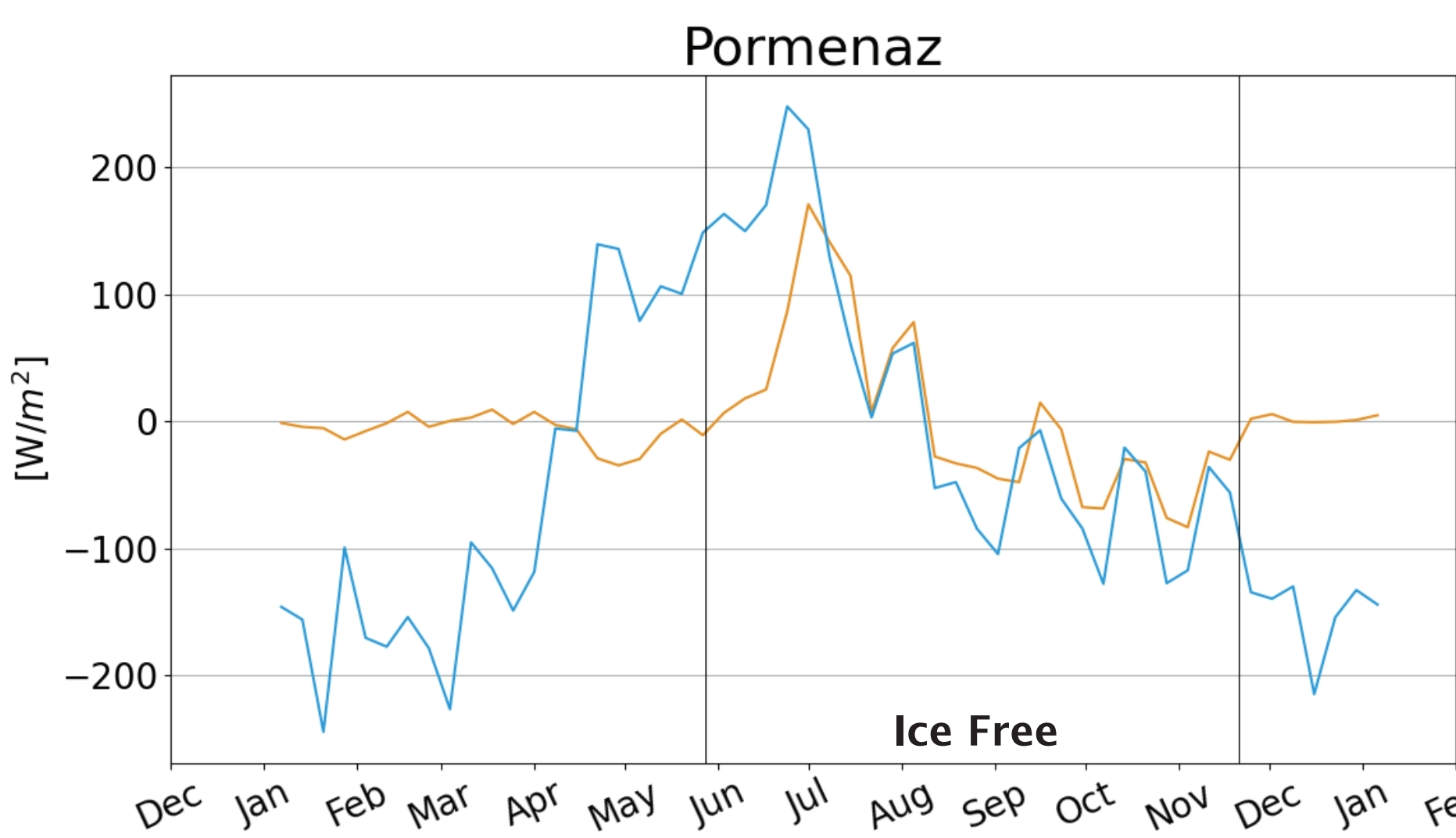
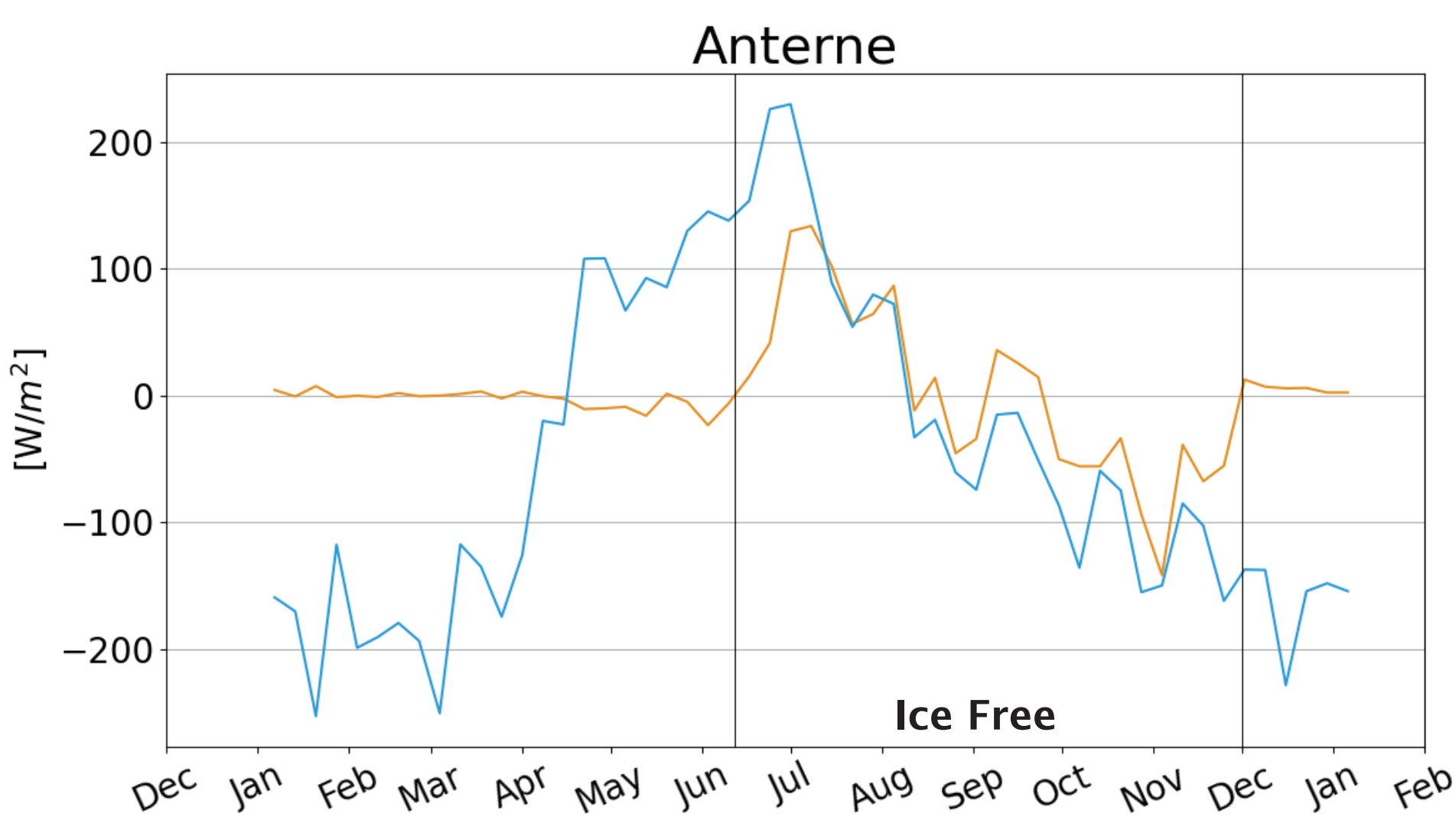
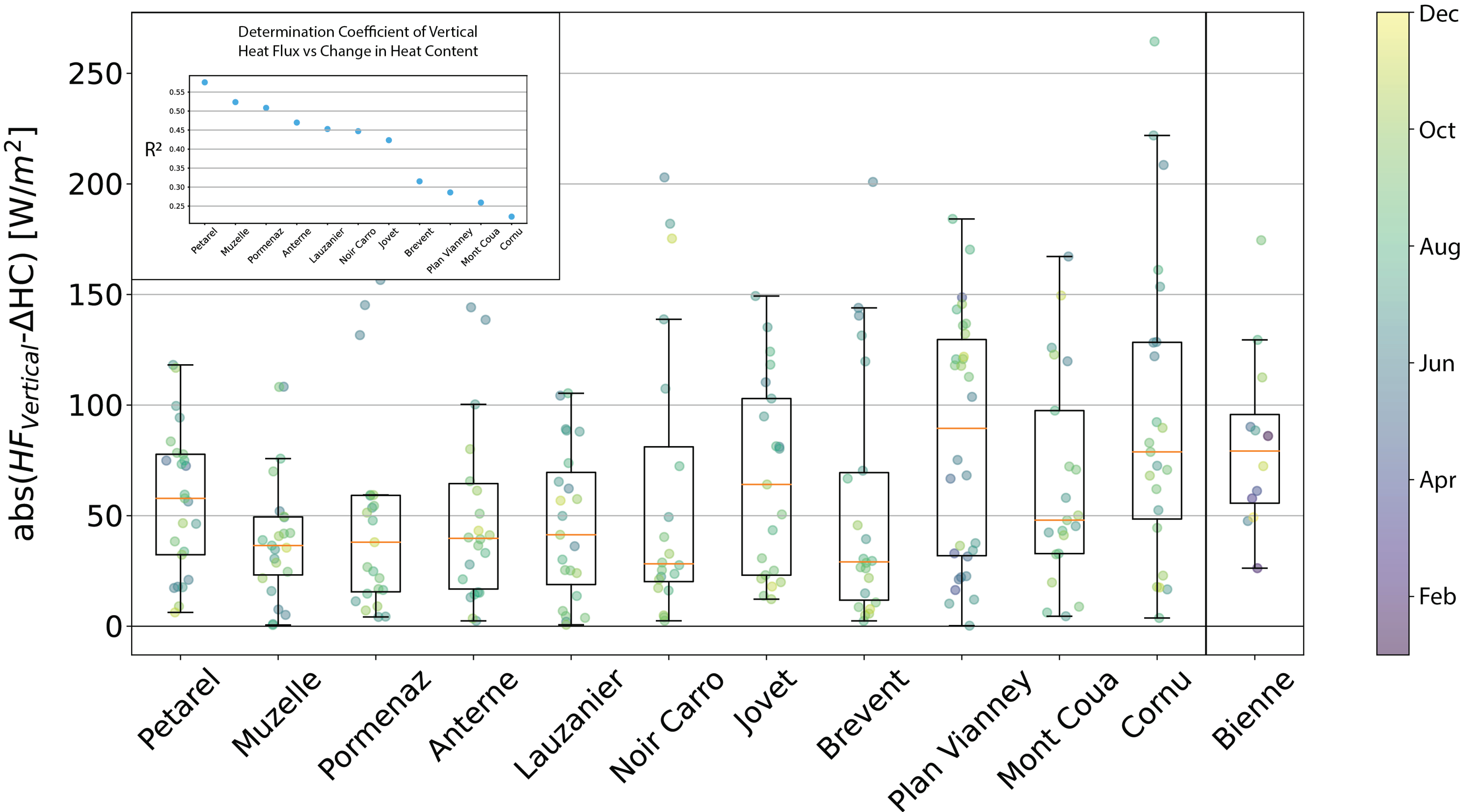
Study Sites

The lakes analyzed in this study are part of a network of mountain Lakes in the French Alps “Lacs Sentinelles”. They are equipped with a mooring and temperature sensors at a resolution of 1 to 8 meters depending on their depth.



Results

Absolute Difference between Weekly Vertical Heat Flux and Change in Heat Content



Me