

Addressing the Air pollution in Marseille

Bousquet A^a; Menghal PS^{a,b}; Fouladirad M^b; Anselmet F^a; Boiron O^a

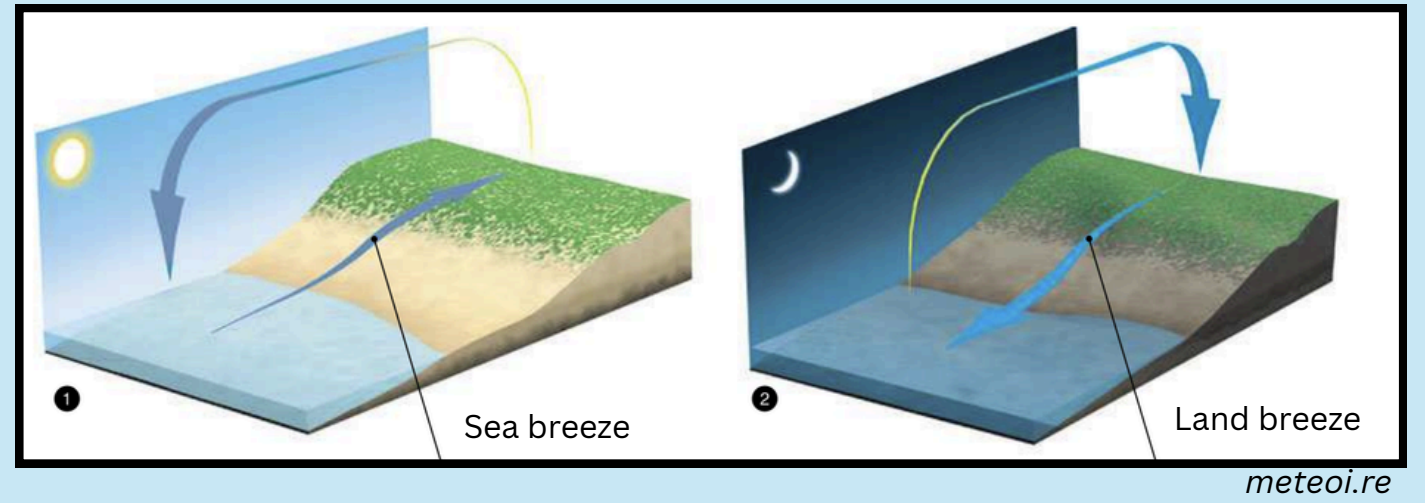
Institut de Recherche sur les Phénomènes Hors Equilibre, amU, CNRS, Centrale Méditerranée^a
 Laboratoire de Mécanique, Modélisation, et Procédés Propres, amU, CNRS, Centrale Méditerranée^b

Objectives

Having a better understanding of the air pollution events occurring in Marseille in low wind condition by:

1. Exploring sea-breeze modeling in the complex area of Marseille and its effect on pollution.
2. Accurately simulating the above for better air pollution forecasting including warming scenarios.
3. Using data assimilation tools to integrate real-time pollution information from low-cost sensor network and LiDAR.

The land-sea breeze phenomena



How to recognize a sea-breeze?

Sea-Breeze Index (SBI) by Frysiner et al. (2002)

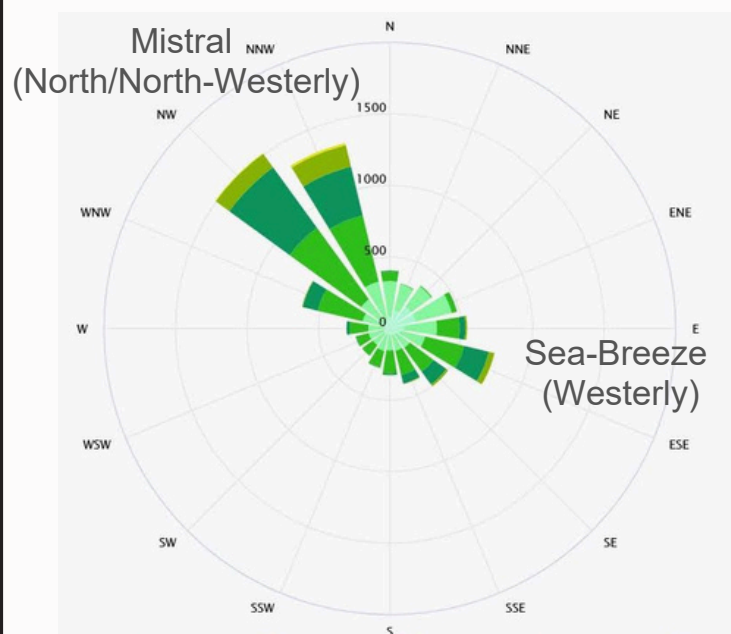
$$SBI = \pm \frac{U^2}{\Delta T}$$

$$\Delta T = T_{overland} - T_{oversea}$$

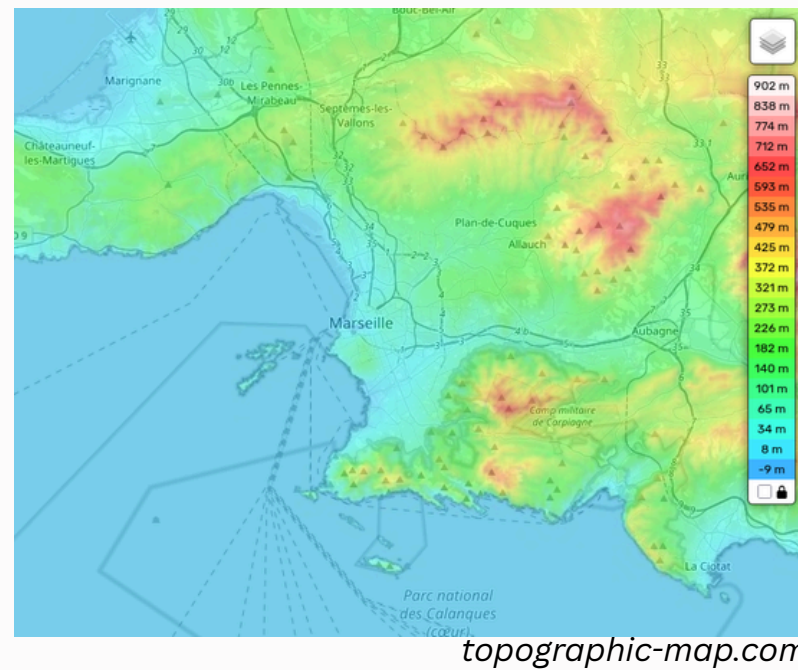
U : offshore wind speed (m/s)

$$SBI_{breeze} < SBI_{crit}$$

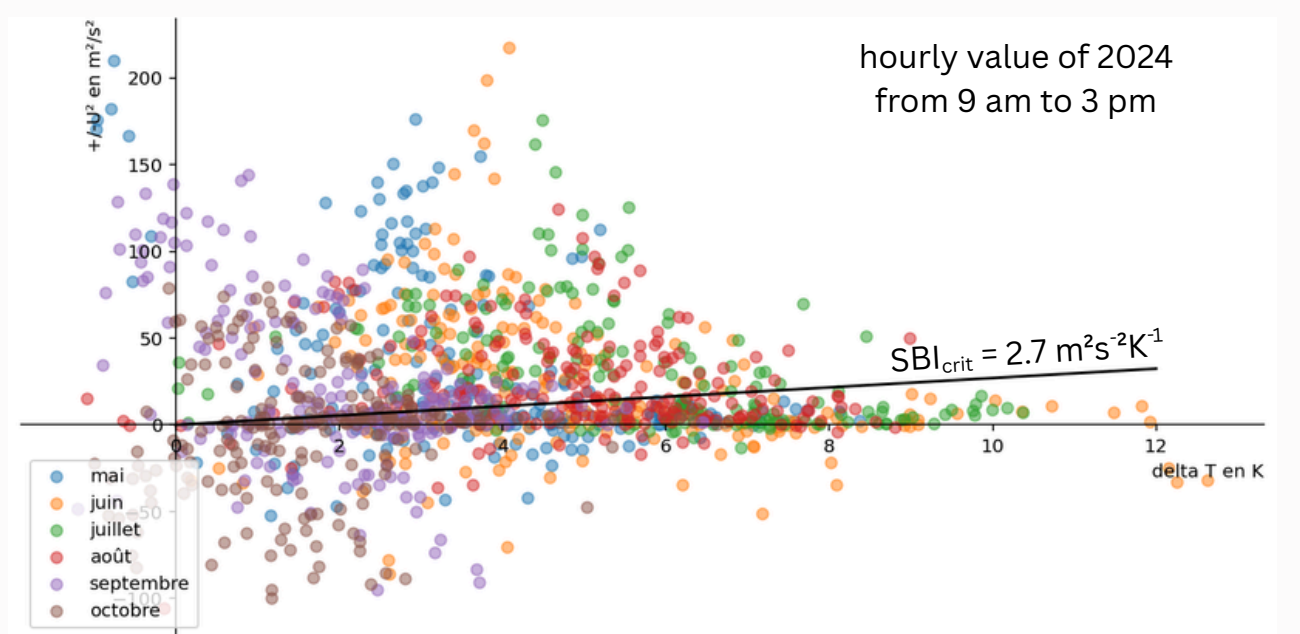
Wind Rose in Marseille area



Topographic map of Marseille

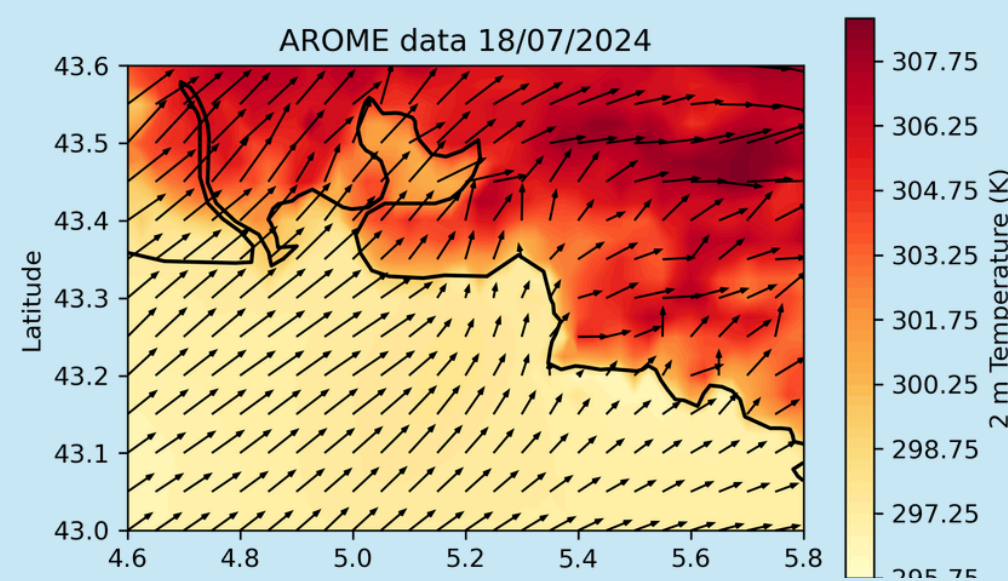
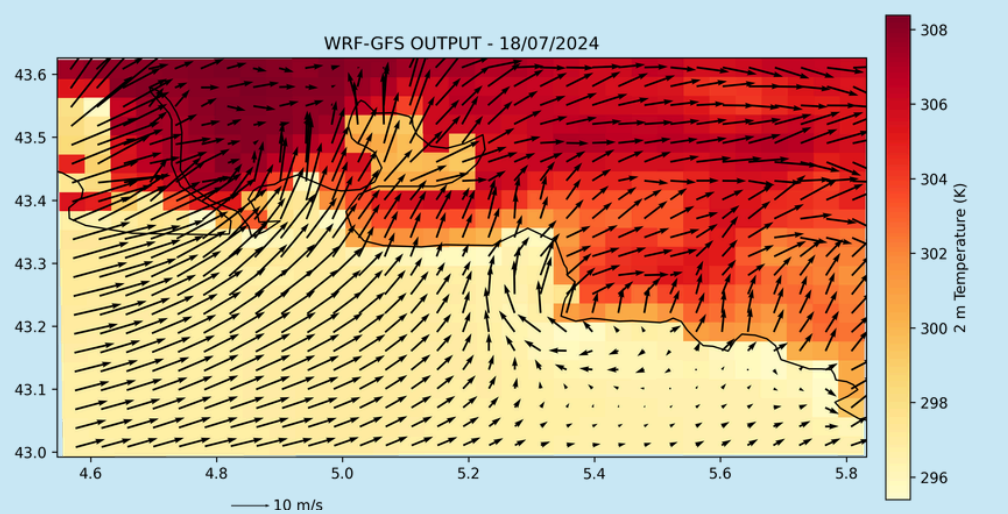


AROME data in Vieux Port (Marseille)



What are the simulations saying?

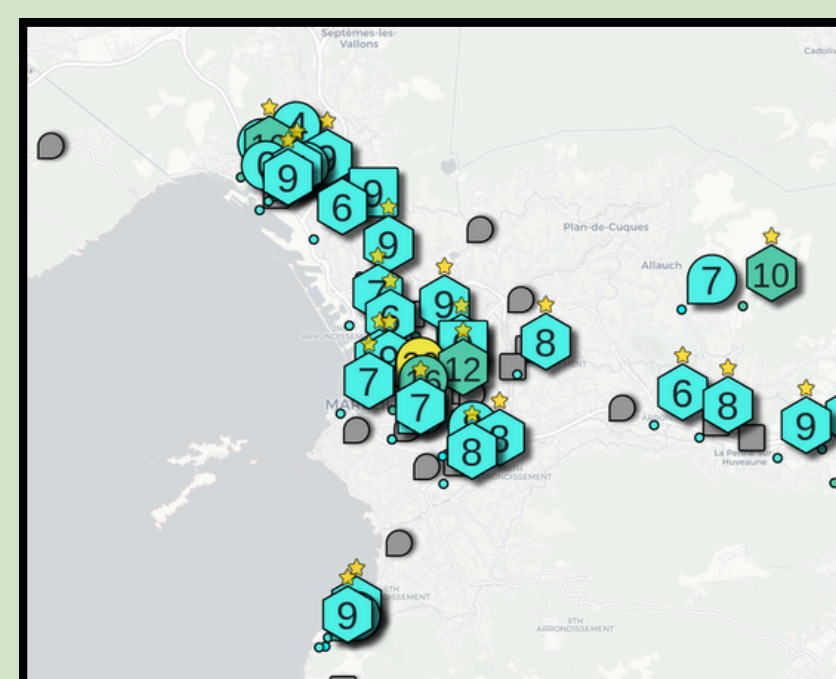
GFS forced simulation under/over represent the sea breeze intensity with WRF compared to AROME data.



Looking Forward

- Validation of the data with 3D LIDAR data - to be installed soon.
- Low Cost sensor network to track the particulate matter concentration under different conditions in Marseille.
- Highly accurate meteo data from ATMOSUD.

Sensor network in Marseille for PM2.5



Open air map

