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Air-sea interactions in sea surface temperature frontal region

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Representation of air-sea exchanges in coastal, regional and global models represent a challenge firstly due to the small scale of acting turbulent processes comparatively to the resolved scales of these models.
Beyond this subgrid parameterization issue, a comprehensive understanding of air-sea interactions at the turbulent process scales is still lacking. Many successful efforts are dedicated to measure the energy and mass exchanges between atmosphere and ocean, including the effect of surface waves. In comparison less efforts are brought to understand the interactions between the atmospheric boundary layer and the oceanic mixing layer. In this regard, we are developing research mainly based on ideal and realistic numerical simulations which resolve very small scales (horizontal resolutions from 1 to 100 meters) in using grid nesting technics and coupled ocean-wave-atmosphere models.

As a first step, the impact of marked gradients in sea surface temperatures (SST) on air-sea exchanges has been explored through realistic numerical simulations at 100m horizontal resolution. Results from simulations of a case observed during the FROMVAR experiment will be shown. The talk will mainly focus on the marked impact of SST front on the atmospheric boundary layer (stability and winds), the air-sea exchanges and surface parameters (rugosity, drag coefficient)
Results will be also shown on the strong impact on the simulated atmosphere of small scale variability of SST field.