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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Scaling the sea breeze depth and strength including diurnal variability, moisture effects and interaction land surface-atmosphere.

R. Méndez-Gómez and J. Vilá-Guerau de Arellano
Wageningen University Research, The Netherlands (ramon.mendez.gomez@gmail.com)

We investigate the scaling laws that drive the sea-breeze circulation. Previous scaling laws (Antonnelli & Rotunno, 2007) have shown that scaling laws depend on the synoptic setting and the surface conditions. We extend this study by including diurnal heating, the effects of humidity and a land surface setting that interacts with the atmosphere.
Our methodology is based on idealized experiments. By using the mesoscale model MM5, we design idealized numerical experiments to determine the dependence of sea breeze depth and strength on the external parameters that determine the synoptic setting (N) and the surface conditions (Q). Model set-up with idealized surface characteristics, boundary and initial conditions. By using cumulative surface buoyancy heat flux (Q) as the external parameter which represents the surface conditions we include diurnal heating, moisture effects and a land surface representation that interacts with the atmosphere.
We performed temporal scaling of sea breeze depth and strength at two locations: near the coastline (x = 0) and an inland location (x = 12 km). The scaled results reveal that scaling of the sea breeze strength is valid at both locations whereas scaling of the sea breeze depth is only valid at the coastline. Furthermore spatial scaling in the vertical and horizontal distances confirms that this scaling captures the dependence of sea breeze depth and strength on the external parameters that determine the synoptic and surface conditions.