Abstract

These data represent the model namelists and source codes used to generate perturbed parameter ensemble simulations using the Regional Atmospheric Modeling System (RAMS) version 6.2.08. These data are associated with the manuscript:

Park, J. M., van den Heever, S. C., Igel, A. L., Grant, L. D., Johnson, J. S., Saleeby, S. M., Miller, S. D., & Reid, J. S. (2020): Environmental Controls on Tropical Sea Breeze Convection and Resulting Aerosol Redistribution, *Journal of Geophysical Research-Atmospheres*, 125, e2019JD031699. https://doi.org/10.1029/2019JD031699

The abstract from this submitted manuscript is as follows:
Sea breeze fronts propagate inland from the coastline, driving convective initiation and aerosol redistribution. Forecasting sea breezes is challenging due to uncertainties in the initial conditions, as well as the covariance and interaction of various meteorological and surface parameters. Using the Regional Atmospheric Modeling System (RAMS) coupled to an interactive land-surface model, we conduct an ensemble of 130 idealized cloud-resolving simulations by simultaneously perturbing six atmospheric and four surface parameters describing the initial conditions. To identify the key parameters impacting the inland characteristics and the intensity of the sea breeze convection in a tropical rainforest, we apply statistical emulation and variance-based sensitivity analysis techniques. This study extends a previous study which explored the impacts of various parameters on sea breeze characteristics in arid environments devoid of moist convection. Wind speed is identified as the main contributor to the inland extent, similar to the arid environment study. However, the relative impacts of surface properties on the inland extent are less significant in the moist environment where land-surface heating can be suppressed via moist convective processes and vegetation-atmosphere interactions. Two sea breeze-initiated convection regimes are also identified: shallow and deep. Over the shallow regime, where convective available potential energy (CAPE) is limited, the inversion layer strength is the primary control of the convective intensity. Over the deep regime, boundary layer temperature exerts a robust control over the CAPE and hence the convective intensity. The potential vertical redistribution of aerosols is closely related to the convective intensity.

Description:

- MURI.RAMSINs: Namelist
- rams_5min_40npts: Source codes

The RAMS documentation and detailed user guides are available on the RAMS website: https://vandenheever.atmos.colostate.edu/vdhpage/rams.php