



Oasis Breeze Circulation for the Desert Oasis Self Preservation

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Oasis self-preservation mechanisms due to oasis breeze circulation (OBC) are proposed and simulated numerically in this study using coupled mesoscale and land surface model. Excessive evaporation from the oasis makes the oasis surface colder than the surrounding desert surface. The sensible heat flux gradient from oasis to surrounding desert drives the OBC with downdraft over the oasis and updraft over the desert. The horizontal length scale of the OBC is around 4 times as large as the oasis scale. This secondary circulation creates two mechanisms to reduce heat and moisture exchange between the oasis and the surrounding desert: (1) the updraft over the desert acts as a wall to prevent low-level hot, dry air flowing from the desert into the oasis (protection-wall mechanism); and (2) the downdraft increases the atmospheric stability that reduces the oasis evaporation (stability mechanism). Reduction of the oasis scale weakens the oasis self-preservation mechanisms through the decrease of the OBC associated with the increase of the oasis surface evaporation and decrease of the atmospheric stability over the oasis.

Oral presentation is requested.