

Response to Comments from Referee #1

We thank this reviewer for his/her detailed and insightful comments which are very helpful in our revision of the manuscript. We have made every effort to address all the concerns raised by this review and we hope our efforts will bring our manuscript closer to being accepted for publication on ACP. Our point-by-point response is given below.

This work describes the seasonal and diurnal cycle of rainfall over Hainan island in the South China sea. Firstly it uses both rain gauge station data and satellite retrievals (CMORPH) of rainfall to describe the seasonal changes in rainfall associated with the arrival and retreat of the Asian monsoon as well as analysing the proportion of rainfall occurring due to the diurnal cycle across the year. The peak rainfall period is then analysed further using Weather Research and Forecasting (WRF) simulations of varying idealisations. The simulations highlight the roles of different meteorological features and ultimately determine the importance of the sea- and land-breeze circulations and the production of downdraughts from convective storms in the production of the diurnal cycle of rainfall.

The manuscript has been modified significantly since I first reviewed it. There are fewer figures, the methodology has become clearer and results are discussed in a more coherent manner. This has greatly improved the way in which this work reads and emphasises the findings of the work much more than in its previous incarnation. As such I believe that this work is publishable after only a few minor technical corrections.

Specific recommendations

14-20 Sentence too long. Maybe change line 17 to "...as well as numerical simulations. The simulations are the first to use climatological ..."

R: Revised as suggested.

18 delete "periodic", the boundaries are not periodic as features propagating out of one side are not forced to appear in the lateral boundary conditions on the other side of the domain.

R: As suggested, we revised the statement as "The simulations are the first to use climatological mean initial and lateral boundary conditions to study the ...". Similar changes were made in Lines 101 and 480.

23 delete "as well"

R: Deleted as suggested.

27 change to "simulations have a slight overestimation..."

R: Revised as suggested.

49 change to "(Dai 2001), tropical convection is also well..."

R: Revised as suggested.

73-74 change to “gulf and island areas respectively.”

R: Revised as suggested.

81 change to “This work is...”

R: Revised as suggested.

103 change to “We also highlight...”

R: Revised as suggested.

141 do you need to put 0000 UTC in twice?

R: The last 0000 UTC may be not necessary. This sentence has been revised as “cycled from 0000 to 0600, 1200, and 1800 UTC.”

197-202 What you define is not a percentage. It needs to be multiplied by 100 to be a percentage, this is clear in the range in figure 4 being 0 to 1, not 0 to 100.

R: We changed all “percentage” to “fraction” throughout the manuscript. Thank you very much for this correction.

277 -278 I am not convinced that they look very similar, certainly diurnal behaviour is similar but the mean values look quite different!

R: We meant that the pattern of the precipitation distribution was generally similar. For example, high precipitation were mainly located in the northeast part of the island (Fig. R1). We agree that the mean values are somewhat different. This sentence was revised as “The horizontal distribution of precipitation averaged in REAL (Fig. 8a), especially the location of the high precipitation area, also has reasonably good agreement with that of the CMORPH data at all hours (Fig. 6a), although the simulated precipitation is somewhat larger.”

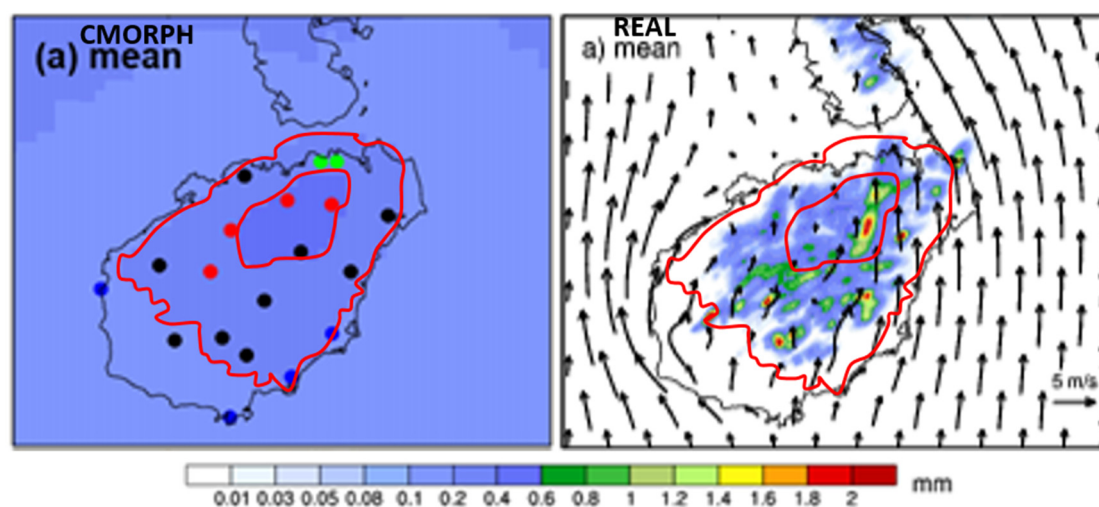


Fig. R1 The mean precipitation of CMORPH (a) and REAL experiment (b),

adapted from Fig. 6a and Fig. 8a. The two red contours denote the high precipitation area in CMORPH.

320-321 add numbers before each stage e.g. “The stages are: (1) the establishment of a sea breeze (0600-1200 LST), (2) the peak sea breeze...”

R: As suggested, the relevant sentences were revised as “The stages are: (1) the establishment of a sea breeze (0600–1200 LST), (2) the peak sea breeze and peak precipitation (1200–1800 LST), (3) the establishment of a land breeze (1800–0000 LST), and (4) the peak land breeze phase (0000–0600 LST).”

449 It is more usual to say “not shown” rather than “figures omitted”.

R: Revised as “not shown”.

458 change to “over tropical areas is poorly...”

R: Revised as suggested.

465 change to “Most precipitation falls during the warm season...”

R: Revised as suggested.

467 change to “Precipitation is at a maximum...”

R: Revised as suggested.

472 change to “The analysis of CMORPH data shows that...”

R: Revised as suggested.

485-486 change to “Even with an idealized elliptical and flat island, located at...”

R: This sentence was revised as “Even with an idealized elliptical and flat island covered by only grassland, located at the same place with similar area and orientation, the diurnal cycle characteristics can still be fairly well captured.”

Response to Comments from Referee #2

We thank this reviewer for his/her detailed and insightful comments which are very helpful in our revision of the manuscript. We have made every effort to address all the concerns raised by this review and we hope our efforts will bring our manuscript closer to being accepted for publication on ACP. Our point-by-point response is given below.

I have one minor technical suggestion for the revised manuscript. It is stated in Lines 481-482 that the lateral boundary conditions are cyclic and they are generated using 10-year (2006–2015) average of ERA-interim data. However, one can either use cyclic conditions or climatology at lateral boundaries, but not both. It seems that using climatology is more appropriate here since the numerical domains are located at subtropical latitudes.

R: We removed “cyclic” in Line 480. Similar changes were made in Lines 18 and 101.