Correction to "Rain on small tropical islands"

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Received 26 December 2012; revised 26 July 2012; accepted 3 January 2012.

Citation: Sobel, A. H., C. D. Burleyson, S. E. Yuter, and M. Biasutti (2013), Correction to "Rain on small tropical islands," *J. Geophys. Res. Atmos.*, *118*, doi:10.1002/jgrd.50205.

[1] In the paper "Rain on small tropical islands" by Sobel et al. (*Journal of Geophysical Research*, *116*, D08102, doi:10.1029/2010JD014695, 2011), there were errors in the calculations, tables, and figures. M. Biasutti, who helped find and correct the errors, has been added as an author to this correction. Below find an explanation of the errors and the revised tables, which showed summary statistics. Revised figures are included as auxiliary material since the differences between the original and corrected figures are not discernible without careful inspection.

[2] In *Sobel et al*. [2011], the authors used a climatology of observations from the Precipitation Radar (PR) aboard NASA's Tropical Rainfall Measuring Mission (TRMM) satellite to study precipitation over small tropical islands. However, the authors discovered an error in the initial processing of the PR data. All the calculations in the paper have been redone after removing the negative values, described below, and figures and tables containing errors have been adjusted.

[3] When a pixel is within the swath of observation but good data are not obtained, the rain rate for that pixel (otherwise given in mm h^{-1}) is set to a missing value of −99. A small fraction of the data—on average about 4% of the points with nonzero rain rates—take on this value, even though the "rain certain" flag on these data is set to 1, indicating observation of rain. These data were bad, and the nonphysical negative values were incorporated into the computations. Computing climatological rain rates at each grid point and excluding resulting negative values described below, eliminated some, but not all, of the problem.

[4] The error can be described as a modest negative bias in the spatial mean climatological rain rate (of order 10% in rainy regions) plus a spatially variable, apparently largely random error. The error in intensity (conditional rain rate) was somewhat larger than that in total rain rate, while the climatological frequency was affected negligibly.

[5] The erroneous values in the climatological grid point values appear to have occurred largely randomly in space, without any strong bias toward either islands or ocean. In the difference statistics, they appear to have been a source of approximately random error. Since the number of points involved in the computation of each statistic increases with island size, the influence of this error decreases with island size.

[6] For rain frequency, the difference is essentially negligible for the entire range of island sizes. In the corrected scatter plots of intensity, the scatter is reduced near the y axis (islands whose area or orographic height are small, with the latter measured by the 75th percentile of altitude at 0.05° resolution). The differences in all statistics are for the most part small in the Pacific, while the intensity changes in particular are greater in the Caribbean.

[7] To the extent that eliminating the error makes any difference in the results, they become overall more statistically significant, without changing our overall interpretation or conclusions.

[8] The enhancements of precipitation intensity and total precipitation over islands which are small in area and low relief were previously statistically insignificant but are now significant.

[9] Our original study was intended to address how large (in either area or elevation) an island need be to have a detectable influence on tropical precipitation. After correction of the error, we cannot rule out that islands smaller than 315 km^2 and relief lower than 50 m as the 75th percentile of elevation—our arbitrary cutoffs for the definition of "small" and "flat"—are still large enough to have a detectable influence.

Table 1. Mean Percentage Island Enhancement (Small, Large)[a]

Region (time)	Total rain rate	Frequency	Intensity
Pacific (all)	−0.1, **23.9**	**2.2**, **13.2**	−2.3, **9.0**
Pacific (0–12)	0.1, **33.5**	**2.4**, **22.1**	−2.5, **8.7**
Pacific (12–24)	0.4, **13.1**	**2.0**, **3.6**	−2.3, **9.1**
Caribbean (all)	−8.6, **29.1**	−16.6, **17.6**	**11.7**, **10.0**
Caribbean (0–12)	−9.4, **23.6**	−18.8, **13.7**	**15.4**, **8.0**
Caribbean (12–24)	−7.4, **34.1**	−14.1, **21.4**	8.4, **11.5**

[a]Table summarizing statistics computed from the data in Figures S1–S10, focusing on the role of island size. For the total rain rate, frequency, and intensity, the averaged percentage island enhancement is shown for the Indo-Pacific Maritime Continent and Caribbean regions, for the total daily mean and both phases of the diurnal cycle (hours shown in parentheses). Results are shown for both islands with areas less ("small," left entry in each column) and greater ("large," right entry in each column) than 315 km^2. Bold typeface indicates values that are both positive and significantly different from zero at the 95% confidence level.

All supporting information may be found in the online version of this article.

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2169-897X/13/10.1002/jgrd.50205

Table 2. Mean Percentage Island Enhancement (Short, Tall)[a]

Region (Time)	Total Rain Rate	Frequency	Intensity
Pacific (all)	**16.0**, **24.3**	**8.5**, **13.6**	6.5, **9.0**
Pacific (0–12)	**28.6**, **34.8**	**17.3**, **23.5**	**9.0**, **8.6**
Pacific (12–24)	4.0, **12.8**	−0.4, 3.1	4.9, **9.1**
Caribbean (all)	**17.1**, **42.0**	**5.5**, **30.6**	**11.2**, **8.8**
Caribbean (0–12)	**9.2**, **38.9**	0.7, **27.5**	**7.9**, 8.1
Caribbean (12–24)	**24.2**, **44.8**	**9.5**, **34.0**	**14.1**, **8.6**

[a]Table summarizing statistics computed from the data in Figures S1–S10, focusing on the role of orography. For the total rain rate, frequency, and intensity, the averaged percentage island enhancement is shown for the Indo-Pacific Maritime Continent and Caribbean regions, for the total daily mean and both phases of the diurnal cycle (hours shown in parentheses). Results are shown for both islands whose 75th percentile of surface elevation is less ("tall," left entry in each column) and greater ("short," right entry in each column) than 50 m. Bold typeface indicates values that are both positive and significantly different from zero at the 95% confidence level.