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Sensitivity of precipitation and temperature over the Mount Kenya area to physics parameterization options in a high-resolution model simulation performed with WRFV3.8.1

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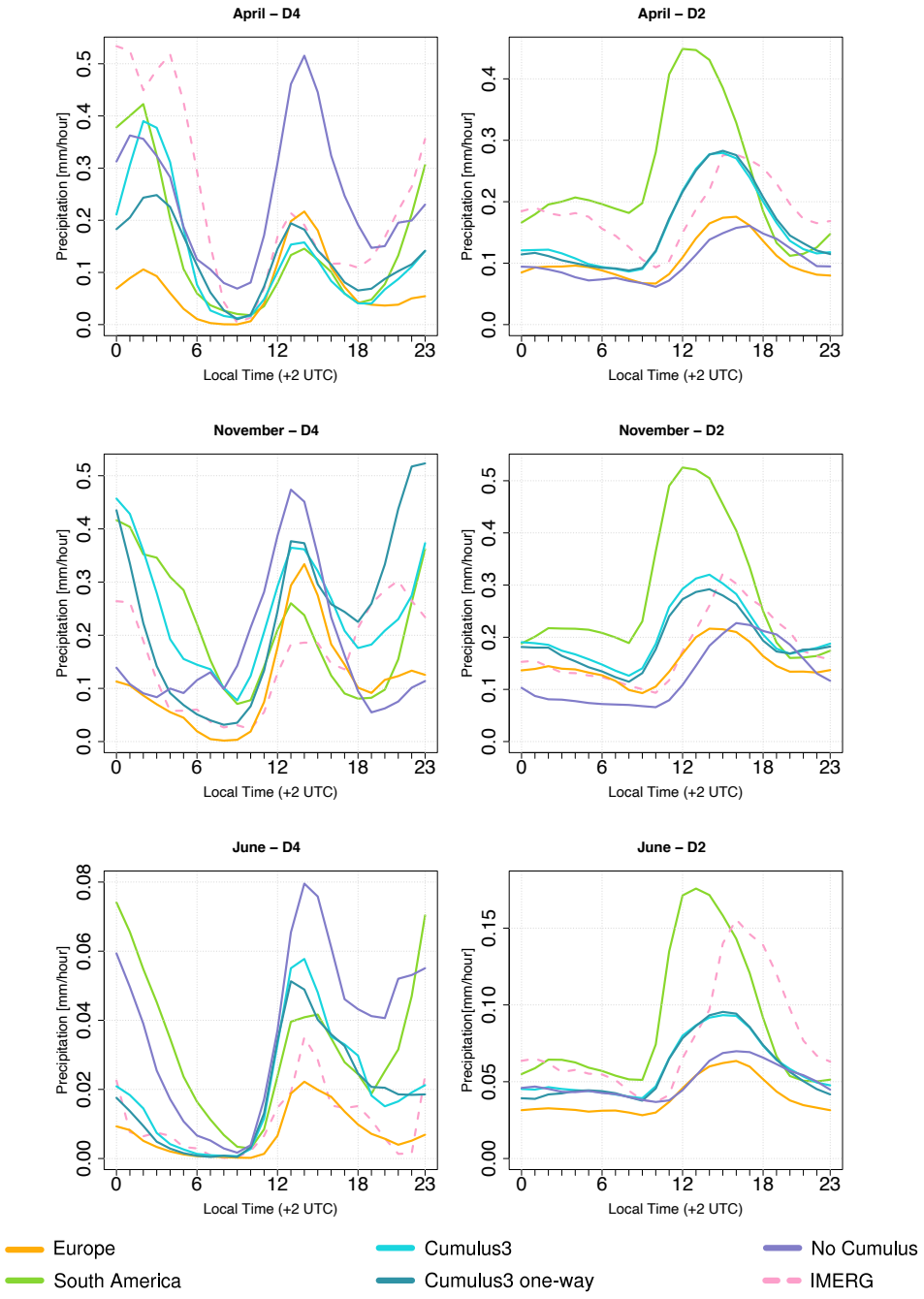

Figure S1. Daily cycle of areal mean precipitation (millimetres per hour) for April, November and June of 2008. The 1 km spatial resolution domain (D4, left column) and the 9 km spatial resolution domain (D2, right column) of the 27km_D4 setup are employed. The local time in Kenya (+2 UTC) is used in the time axis.

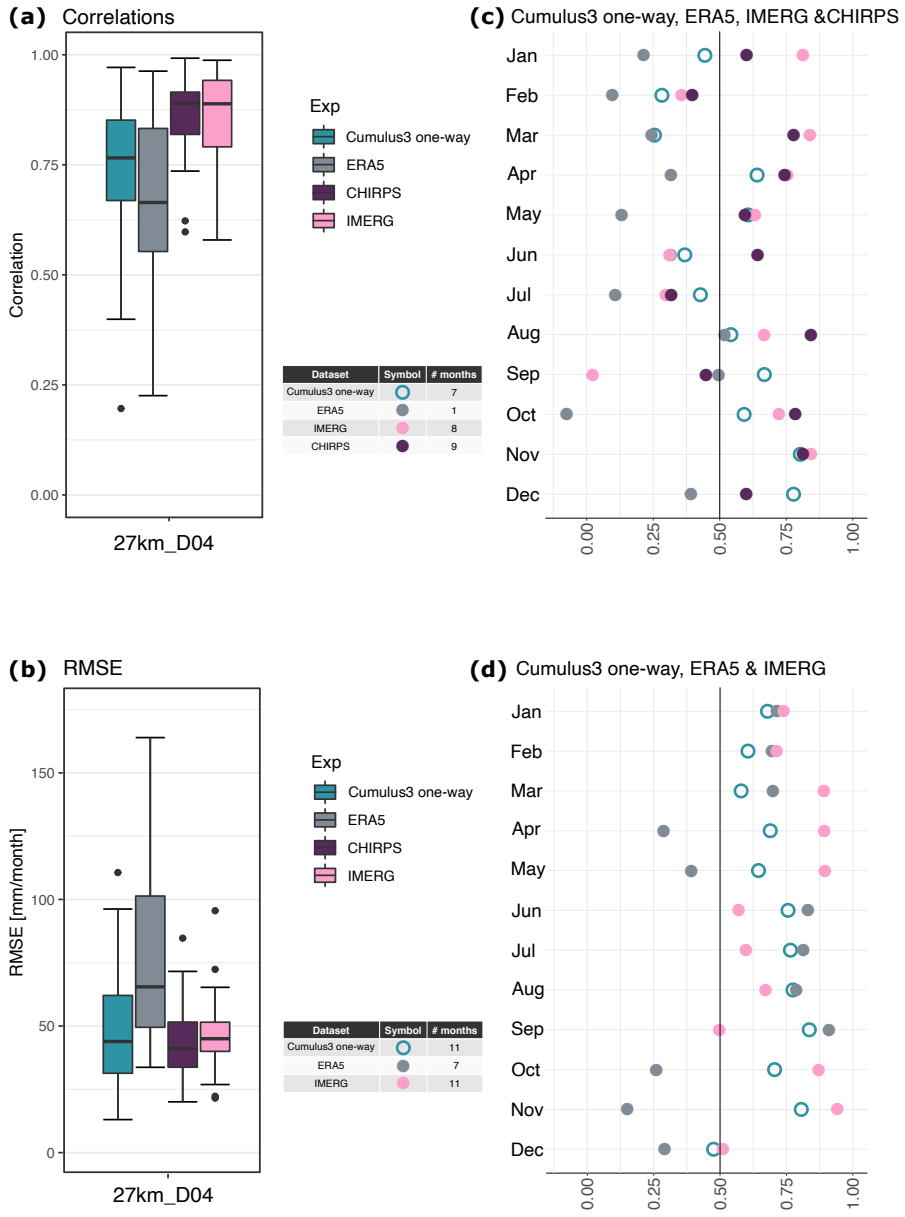

Figure S2. **(a)** the temporal correlation and **(b)** root-mean-square error (RMSE) between the annual cycle of measured and simulated monthly precipitation sums for 2006 at the nearest grid point to the station's location are shown for Cumulus3 one-way, ERA5, CHIRPS and IMERG. The box and whisker plots show the values in relation to 28 stations for the different domains with 1 km spatial resolution. The whiskers extend to the value that is no more than 1.5 times the inter-quartile range away from the box. The values outside this range are defined as outliers and are plotted with dots. **(c)** pattern correlation of monthly precipitation sums between Cumulus3 one-way, ERA5, CHIRPS and IMERG and weather station data, and **(d)** between Cumulus3 one-way, ERA5 and IMERG compared to CHIRPS (interpolated onto the CHIRPS grid). The labelling of the symbols is given in the table next to each panel, along with the number of months (# months) in which the option obtains correlation patterns above the reference value of 0.50 (a moderate correlation used to visually evaluate the performance of nesting options). Only one setting is shown (27 km_D4).

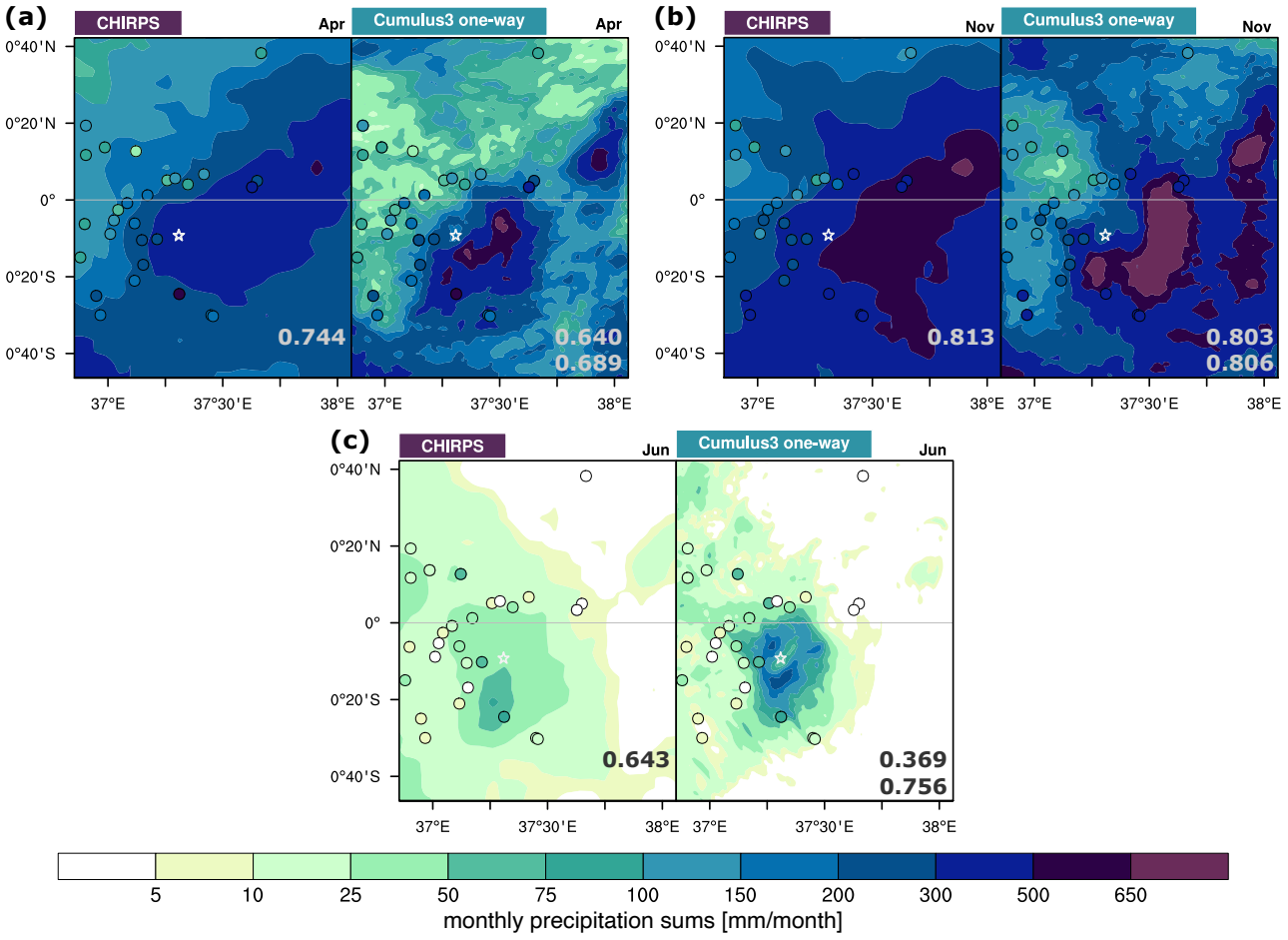

Figure S3. Monthly precipitation sums for **(a)** April 2006 (long rains), **(b)** November 2006 (short rains) and **(c)** June 2006 (dry season) in millimetres per month for the innermost domain (1 km) of the 4 nested domain setup, with the outermost domain of 27 km resolution and a nesting ratio 1:3 for the Cumulus3 one-way setting and CHIRPS. Weather station data are described in Table 2. The white star indicates the summit of Mount Kenya. The numbers in the lower right corner of each panel indicate the spatial correlation with respect to the stations (upper line) and CHIRPS (lower line).