Figures

1. Comparison of the annual average surface temperature of CRU-TS (Climatic Research Unit Time-Series) version 3.22 (Harris et al., 2014) with HadGEM2 control simulation.
2. Comparison of the annual average precipitation of CRU-TS version 3.22 (Harris et al., 2014) with HadGEM2 control simulation.
3. Comparison of average monthly variation in precipitation of CRU-TS version 3.22 (Harris et al., 2014) with HadGEM2 control simulation.
4. Comparison of Net Primary Productivity (NPP) of the EMDI (Ecosystem Model-Data Intercomparison) dataset (Olson et al., 2001; dots) with HadGEM2 control simulation.
5. Comparison of the annual cycle of O_3 observations (black) with UKCA-ExtTC (blue), the ACCENT ensemble of models (grey) and the ACCENT multi-model ensemble mean (red). Observations are taken from Logan et al. (1999) and Thompson et al. (2003a, b). The modelled and observed O_3 concentrations at 100 and 250 hPa in the latitude bands 30°S–EQ and EQ–30°N have been multiplied by a factor of 2.
6. Comparison between regional vertical profiles of modelled (red) and observed (black) O_3 from various aircraft campaigns compiled into data composites by Emmons et al. (2000). In particular, regional profiles are compared from 4 different aircraft campaigns: the Pacific Exploratory Mission in the Tropical Pacific (PEM-Tropics B) campaign, which took place during the wet season of the southern tropics (March–April 1999); the Pacific Exploratory Mission West A (PEM West A) aircraft campaign, which took place in September–October 1991 over the northwestern Pacific; the Subsonic Assessment Ozone and Nitrogen Oxide Experiment (SONEX) and Pollution From Aircraft Emissions in the North Atlantic Flight Corridor (POLINAT 2) campaigns which took place during September to November 1997 in particular; the Transport and Atmospheric Chemistry near the Equator – Atlantic (TRACE A) field campaign (Fishman et al., 1996), which took place during September–October 1992.
7. Comparison between multi-annual monthly mean modelled surface O_3 concentrations with surface observations. The surface sites include Barrow (71°N, 157°W), Mace Head (53°N,

10°W), Niwot Ridge (40°N, 106°W), Bermuda (32°N, 65°W), Mauna Loa (20°N, 156°W), Barbados (13°N, 59°W), Samoa (14°S, 171°W), Cape Grim (41°S, 145°E), Syowa (69°S, 39°E), and the South Pole (90°S, 0°E). The relative annual mean bias (in %), the root mean square error (in ppbv), the correlation coefficient, and the model score (the percentage of months when the modelled and observed monthly mean concentrations are within 20% of each other; in %) are shown for each location in blue, purple, green, and orange, respectively.

8. Seasonal mean O_3 deposition velocities (cm/s) simulated with HadGEM2 for South America, averaged over 8 years of simulations, for the wet (Figure a; February, March, April, FMA) and dry season (Figure b; August, September, October, ASO).

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