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Supporting Information for

**Longwave Emission Trends over Africa and Implications for Atlantic Hurricanes**

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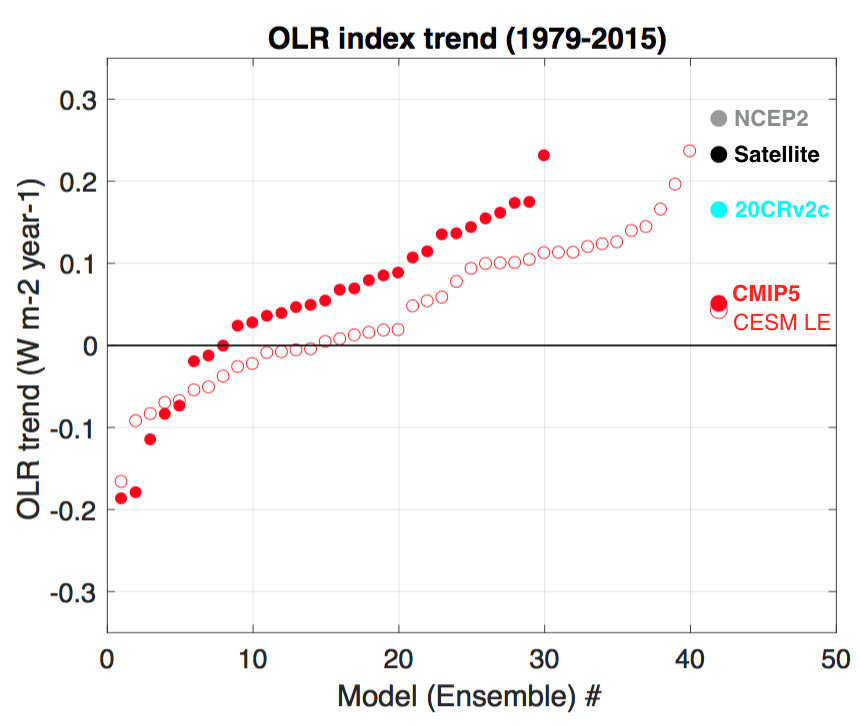
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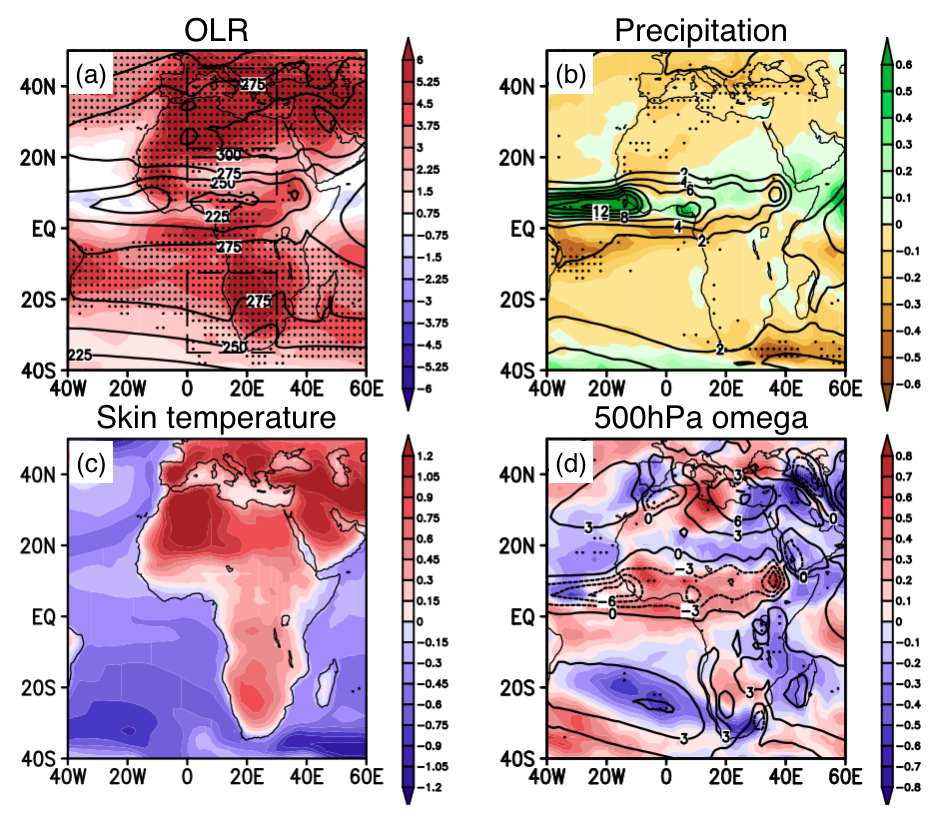
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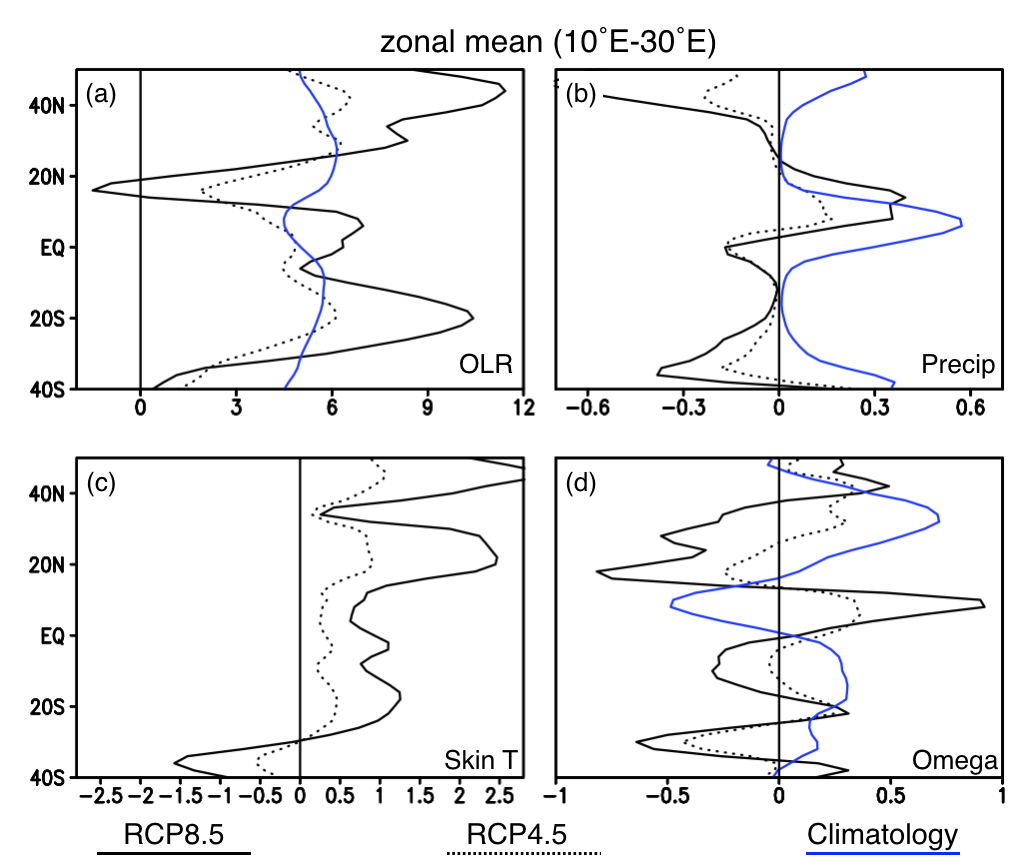
Table S1



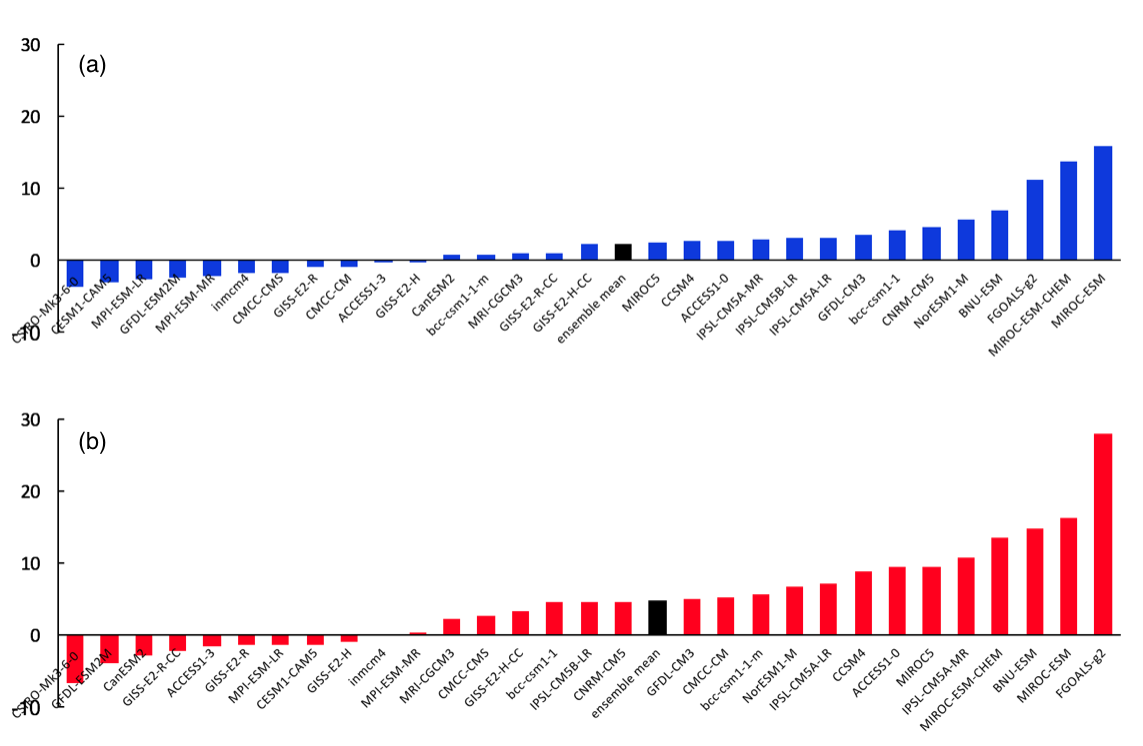
**Figure S1** OLR index trend during the satellite era (1979-2015) in satellite observation (black), NCEP2 reanalysis (gray), 20CRv2c (cyan, 1979-2014) and climate models (red). Red filled circles for 30 CMIP5 climate models and red open circles for the 40-member ensemble of CESM simulations. Ensemble mean results are shown on the right end. Units are W m-2 year-1. The OLR index trend observed by satellite and in the NCEP2 reanalysis are statistically significant at 95% confidence level.



**Figure S2** (**a**) Multi-model mean OLR trend (2006-2100) in July from RCP4.5 experiments (shading, W m-2 century-1) and OLR climatology (contour, W m-2). (**b**) As in (a) but for precipitation (units are mm day-1 century-1 for the trend and mm day-1 for climatology). (**c**) for skin temperature (K century-1, domain mean warming removed) and (**d**) for 500hPa omega (units are 0.01Pa s-1 century-1 for the trend and 0.01Pa s-1 for climatology).



**Figure S3** Zonal mean (10˚E-30˚E) linear trend of various variables in July from RCP4.5 (dotted black) and RCP8.5 (solid black) experiments. Solid blue lines are for climatological profiles. (**a**) for OLR (W m-2 century-1 for trend, 50 W m-2 for climatology), (**b**) for precipitation (mm day-1 century-1 for trend, cm day-1 for climatology), (**c**) for skin temperature (K century-1, domain averaged warming removed) and (**d**) for 500hPa omega (0.01Pa s-1 century-1 for trend, 0.1Pa s-1 for climatology).



**Figure S4** Change in the 72-year low-pass filtered OLR index (2096–2100 relative to 2006–2010) in the 30 CMIP5 models under RCP4.5 (**a**) and RCP8.5 (**b**). Black histograms denote the ensemble mean values.

**Table S1.** List of the 30 CMIP5 climate models used for analysis in this study. 11 models that are used for single-forcing experiments are marked in the bold fonts.

|  |  |  |
| --- | --- | --- |
| **Model** | **Modeling center (Group)** | **AGCM Resolution** |
| ACCESS1-0 | The Centre for Australian Weather and Climate Research | 1.875˚1.25˚ |
| ACCESS1-3 | 1.875˚1.25˚ |
| BCC-CSM1-1 | Beijing Climate Center, China Meteorological Administration | 2.8125˚  2.8125˚ |
| BCC-CSM1-1-M | Beijing Climate Center, China Meteorological Administration | 1.125˚  1.125˚ |
| BNU-ESM | College of Global Change and Earth System Science, Beijing Normal University | 2.8125˚  2.8125˚ |
| **CanESM2** | Canadian Centre for Climate Modelling and Analysis | 2.8125° × 2.8125° |
| **CCSM4** | University of Miami - RSMAS | 1.25˚×0.9424˚ |
| **CESM1-CAM5** | National Center for Atmospheric Research | 1.25˚×0.9424˚ |
| CMCC-CM | Centro Euro-Mediterraneo per I Cambiamenti Climatici | 0.75˚0.75˚ |
| CMCC-CMS | 1.875˚1.875˚ |
| CNRM-CM5 | Centre National de Recherches Meteorologiques / Centre Europeen de Recherche et Formation Avancees en Calcul Scientifique | 1.40625˚  1.40625˚ |
| **CSIRO-Mk3-6-0** | Commonwealth Scientific and Industrial Research Organization in collaboration with Queensland Climate Change Centre of Excellence | 1.875˚1.875˚ |
| **FGOALS-g2** | LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences | 2.8125˚3˚ |
| **GFDL-CM3** | NOAA Geophysical Fluid Dynamics Laboratory | 2.5˚2˚ |
| **GFDL-ESM2M** |
| **GISS-E2-H** | NASA Goddard Institute for Space Studies | 2.5˚2˚ |
| GISS-E2-H-CC |
| **GISS-E2-R** |
| GISS-E2-R-CC |
| INMCM4 | Institute for Numerical Mathematics | 2˚1.5˚ |
| **IPSL-CM5A-LR** | Institut Pierre-Simon Laplace | 3.75° × 1.875° |
| IPSL-CM5A-MR | 2.5˚1.258˚ |
| IPSL-CM5B-LR | 3.75˚1.875˚ |
| MIROC-ESM-CHEM | Japan Agency for Marine-Earth Science and Technology, Atmosphere and Ocean Research Institute (The University of Tokyo), and National Institute for Environmental Studies | 2.8125˚  2.8125˚ |
| MIROC-ESM |
| MIROC5 | Atmosphere and Ocean Research Institute (The University of Tokyo), National Institute for Environmental Studies, and Japan Agency for Marine-Earth Science and Technology | 1.40625˚  1.40625˚ |
| MPI-ESM-LR | Max Planck Institute for Meteorology | 1.875˚1.875˚ |
| MPI-ESM-MR |
| MRI-CGCM3 | Meteorological Research Institute | 1.125˚1.125˚ |
| **NorESM1-M** | Norwegian Climate Centre | 2.5° × 1.875° |