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Extraordinary Seminar

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Tropical Cyclones in a warmer climate

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A recent study (Rathmann et al. 2013, *Climate Dynamics*) investigates the possible effects of global warming on tropical cyclone (TC) activity. The study is conducted using the coupled ocean–atmosphere global climate model EC-Earth configured at a relatively high resolution (T159 with 62 vertical levels), which is integrated following the CMIP5 protocol. By considering the late twentieth century (1979–2009) in the historical simulation and the twenty-first century end (2070–2100) in the RCP4.5 and RCP8.5 scenarios, significant future annual mean frequency decreases are found globally and in both hemispheres, accompanied by significant mean lifetime decreases and significant intensity increases, the latter being found through several different measures (but with caveats). In addition, the relatively novel aspect of simulating TCs of the past (1900–1930) is studied to further assess the robustness of the climate change results. These results suggest that TCs in the early twentieth century were more frequent in the southern hemisphere and dissipated more energy in the southern hemisphere and the South Indian Ocean. Although some model biases are present and the coarse model resolution prevents intense TCs in being simulated, reasonable TC simulation skill for other metrics (e.g., TC genesis, frequency of occurrence) is found when validated against present day observations. Thus the model displays an acceptable ability to connect TC climatology with the larger scale circulation.

In an even more recent study submitted to *GRL* the six highest resolution CMIP5 models (including EC-Earth) have been analyzed using the same techniques. It appears that the tendency towards future decreases in TC frequency is a rather common feature for the 6 models. However, this does of course not say anything about possible changes in intensity.