Climate Change and cyclones: global learning

22 May 2020

WMO State of Global Climate (2019)

- Global tropical cyclone activity in 2018-2019 **was above average.**
- Northern hemisphere had 72 tropical cyclones, compared with the average of 59: Accumulated cyclone energy (ACE) was 4% above average.
- Southern hemisphere season was also above average, with 27 cyclones, highest number in a season since 2008–2009.
- **Particularly extreme cyclone season in the North Indian Ocean**.
  - Three cyclones reached maximum sustained winds of 100 km or more (first known instance in a single season)
  - Seasonal ACE was the highest on record by a large margin.
- **Also bad in South Indian Ocean basin: 18 cyclones of which 13 reached hurricane intensity (highest number on record)**

IPCC Fifth Assessment Report (AR5, 2014)

- However, raw number of events is not the best way to describe multiplying risks from climate change and cyclone activity.
- Historical data record is inconsistent and only robustly available for around 40 years. Hence, the IPCC's assessment in 2014 that…
- "There is low confidence that long-term changes in tropical cyclone activity are robust, and there is low confidence in the attribution of global changes to any particular cause. **However, it is virtually certain that intense tropical cyclone activity has increased in the North Atlantic since 1970**."

IPCC Special Report on Oceans, Cryosphere and Climate (2019)

- Much clearer link between **climate change and cyclone intensity**, as well as **unpredictability** (including through rapid intensification)
- "**Anthropogenic climate change** has increased observed precipitation, winds, and extreme sea level events associated with some tropical cyclones, which has increased **intensity** of multiple extreme events and associated cascading impacts"
- "The **average intensity** of tropical cyclones, the proportion of Category 4 and 5 tropical cyclones and the associated average precipitation rates are projected to increase for a 2°C global temperature rise above any baseline period."

IPCC…future models show

- "Extreme sea levels and **coastal hazards will be exacerbated** by projected increases in tropical cyclone intensity and precipitation"

- **Interaction with other climate risks:** "Rising mean sea levels will contribute to higher extreme sea levels associated with tropical cyclones."

- Extreme events are projected to significantly increase throughout this century under all greenhouse gas emissions scenarios."