

Counting Global Tropical Cyclones

It’s harder than it sounds!

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INTRODUCTION

- Tropical cyclone disasters often lead to discussions of climate change
- NOAA, CSU, and many others issue seasonal outlooks to raise awareness
- Informing those discussions and validating those forecasts requires robust tropical cyclone metrics
  - Named Storms (≥34 kt)
  - Hurricanes (≥64 kt)
  - Major Hurricanes (≥96 kt)
  - Accumulated Cyclone Energy (ACE)

DATA

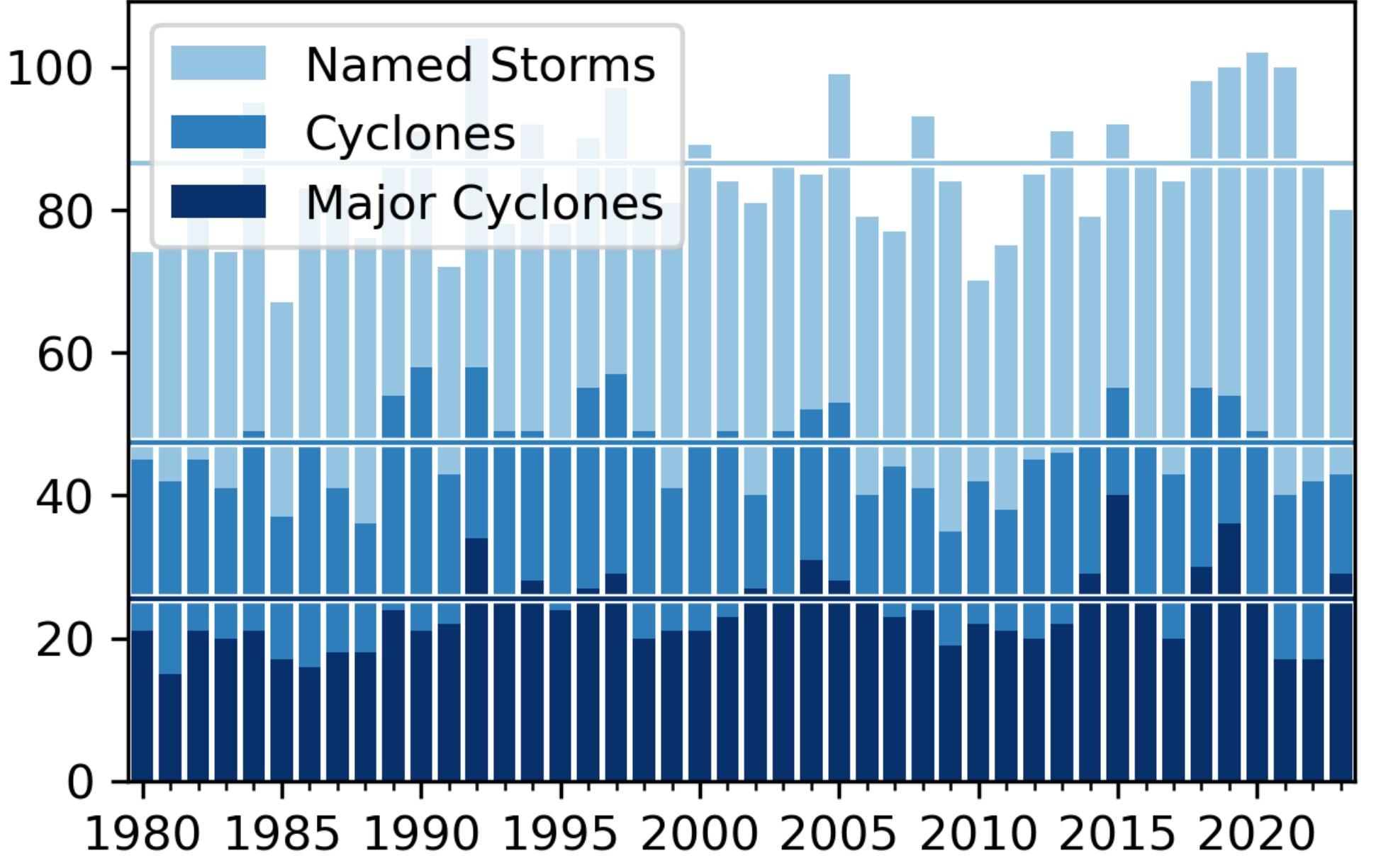
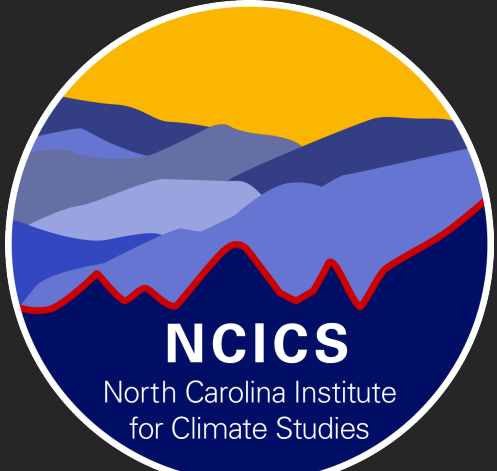
- IBTrACS collects data in near-real time
- NHC’s working best track (“b-decks”) provide data for the Atlantic and East Pacific
- JTWC data for the other basins
  - No official source for working best tracks
  - Preliminary tracks are obtained from NCEP’s “tcvitals” with UCAR as a backup
  - Most international agencies are not available until the following year

METHODOLOGICAL CHOICES

- Subtropical portions of tracks are counted but extratropical portions are not
- Only synoptic hours (00z, 06z, 12z, 18z) are used for ACE
- IBTrACS “spurs” are included for ACE but not for other counts
- What happens when a storm crosses months/years/basins?
  - NCEI counts it in all—basins/months cannot be summed
  - CSU counts it in the basin where it first reached that status—the same storm could count as a tropical storm in one basin and a hurricane in another.
- Northern Hemisphere counts are for January–December.
- Southern Hemisphere counts are for July–June.
- Depending on the report, global counts are either January–December or the sum of the two hemispheres

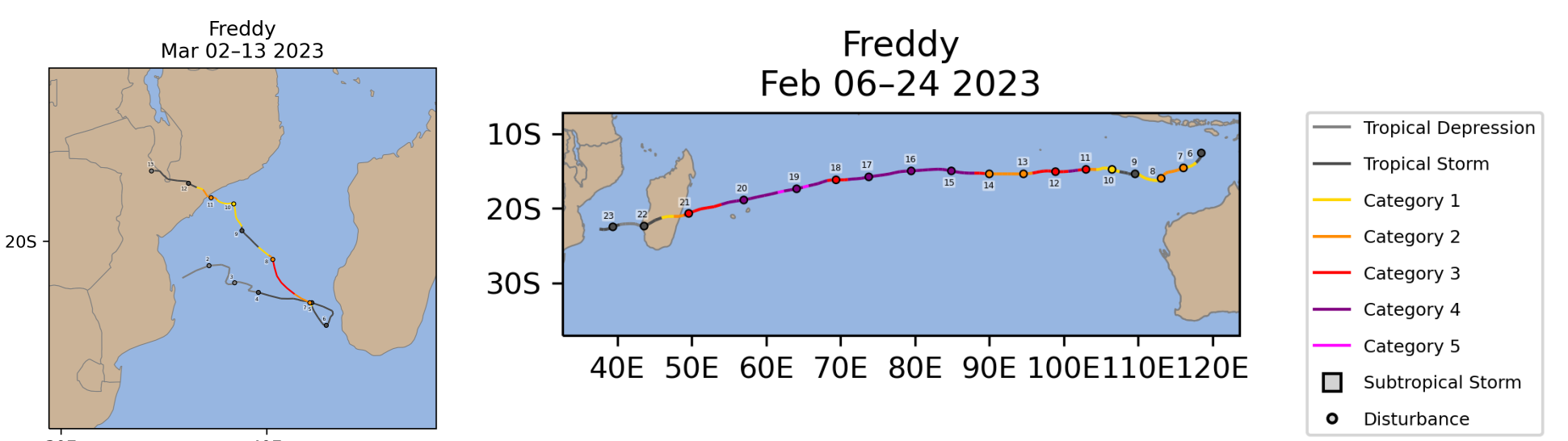
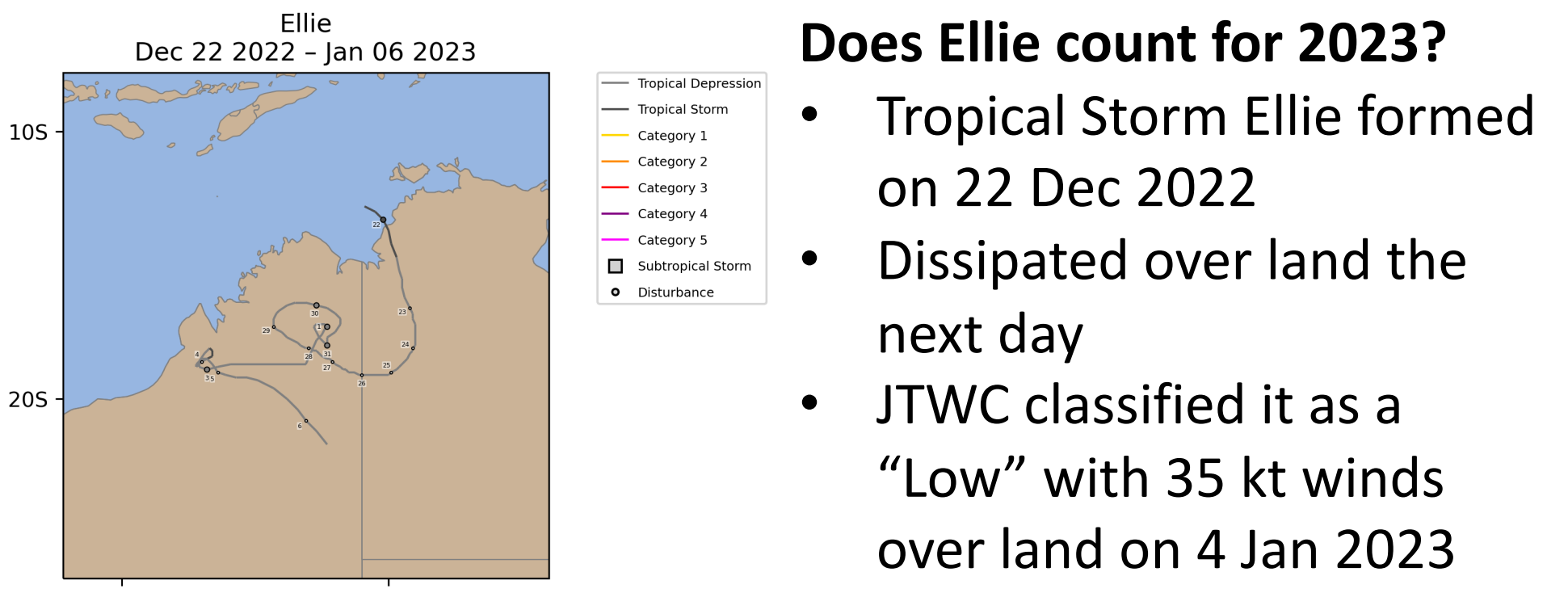
Climate monitoring of tropical cyclones depends on preliminary datasets.

Precision is limited by subjectivity in how to count storms.



	T.S. ≥34 kt	Hurr. ≥64 kt	Maj. ≥96 kt	Cat.-5 ≥137 kt	ACE
Atlantic	20 ++	7	3	1 +	144
East Pacific	17	10 +	8	2 +	166
West Pacific	17 ---	12 -	8	2	268
North Indian	8 ++	4 ++	3 ++	1 ++	56
South Indian	9 -	7 +	4 +	1 ++	134
Australia	9 -	5	4 +	0	67
South Pacific	6	4	2	0	31
Global	78 -	45	30 +	7 +	854

“+” denotes top tercile; “++” is top 10%; “-” is bottom tercile; “-” is bottom 10% (all relative to 1991–2020).

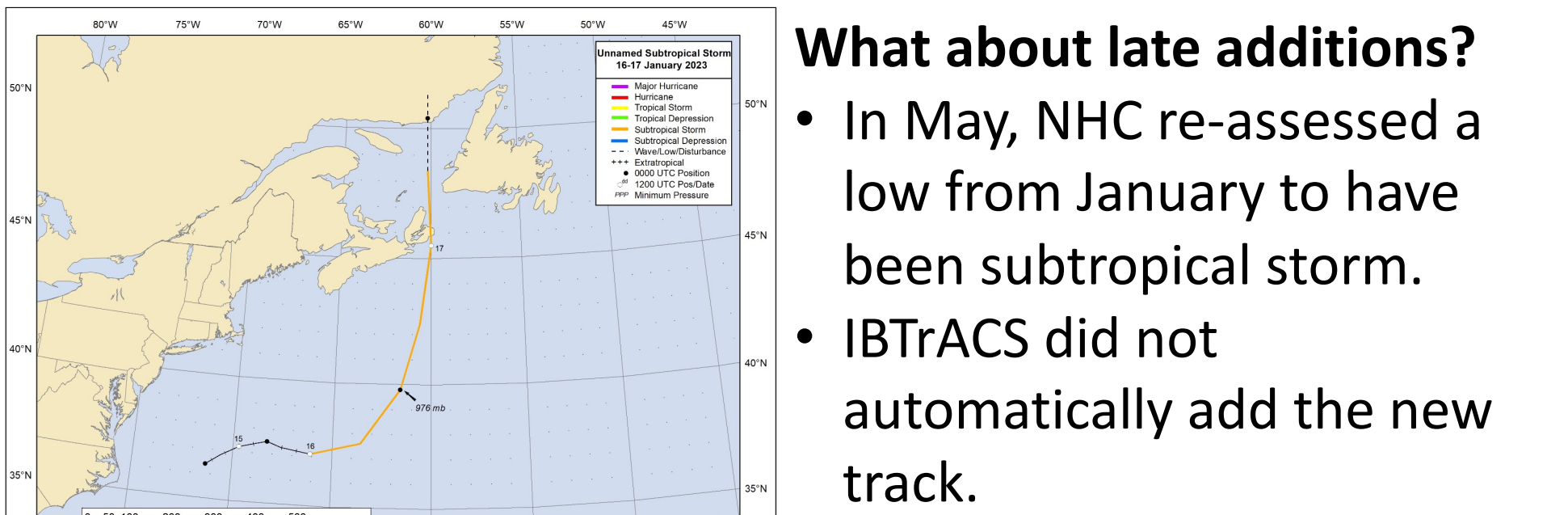


**Does Ellie count for 2023?**

- Tropical Storm Ellie formed on 22 Dec 2022
- Dissipated over land the next day
- JTWC classified it as a “Low” with 35 kt winds over land on 4 Jan 2023

**Was Freddy 0, 1, or 2 storms in the South Indian Ocean?**

- Freddy developed as a major cyclone over the Australian region (>90°E)
- It crossed into the South Indian Ocean (<90°E) region as a major cyclone
- Freddy dissipated over Southern Africa during late February
- It redeveloped over the Mozambique Channel in March. IBTrACS did not automatically connect the tracks.



**What about late additions?**

- In May, NHC re-assessed a low from January to have been subtropical storm.
- IBTrACS did not automatically add the new track.
- Most other changes to operational estimates are omitted until the full best track comes out the following year.