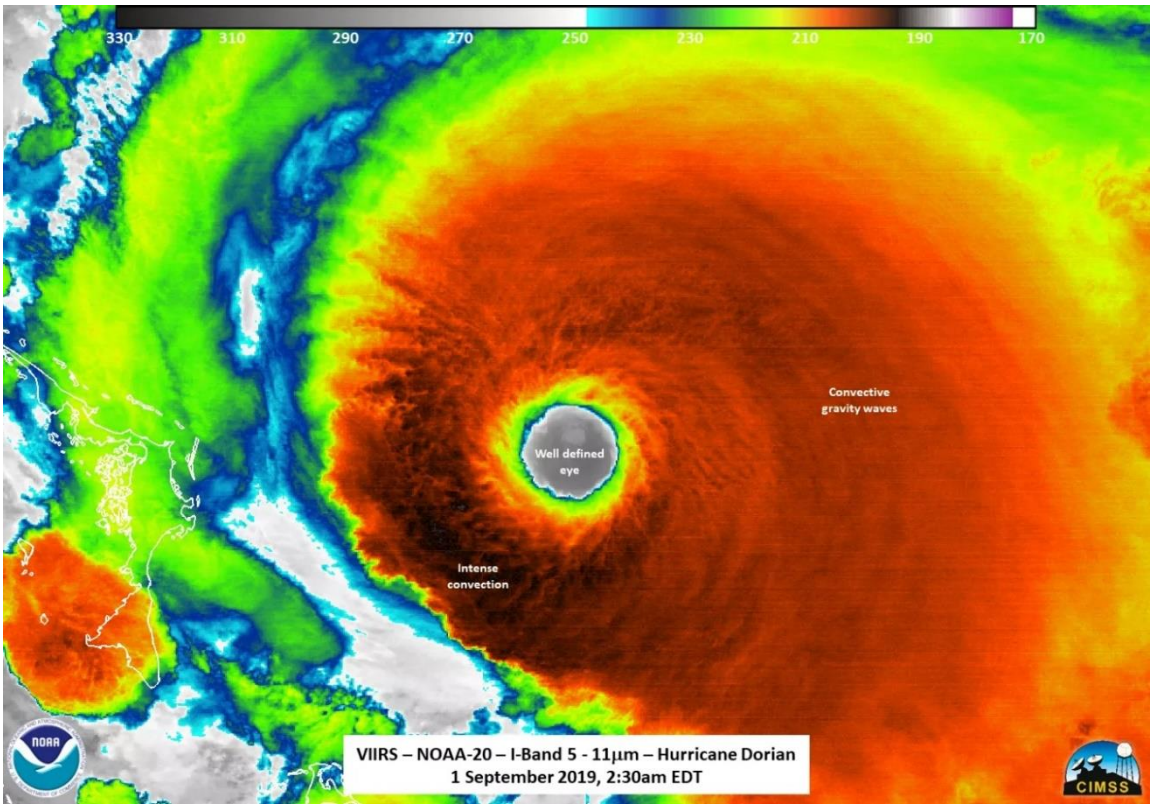
PDNA

Cyclone Ditwah has been one of the most significant disaster events Sri Lanka has experienced in recent years, causing widespread impacts on lives, livelihoods, infrastructure, and essential services across multiple sectors.

1. What is the “Eye” of Cyclone Ditah?



![Image](https://ww2010.atmos.uiuc.edu/guides/mtr/hurr/gifs/def1.gif?utm_source=chatgpt.com)

The **eye** of a cyclone is the **calmest and lowest - pressure region** at the center of the storm.

Key characteristics of the eye:

* Diameter: typically 20–60 km
* Very low surface pressure
* Light winds or calm conditions
* Often clear skies or broken clouds
* Surrounded by the eyewall, which is the most dangerous part

⚠️ Important :

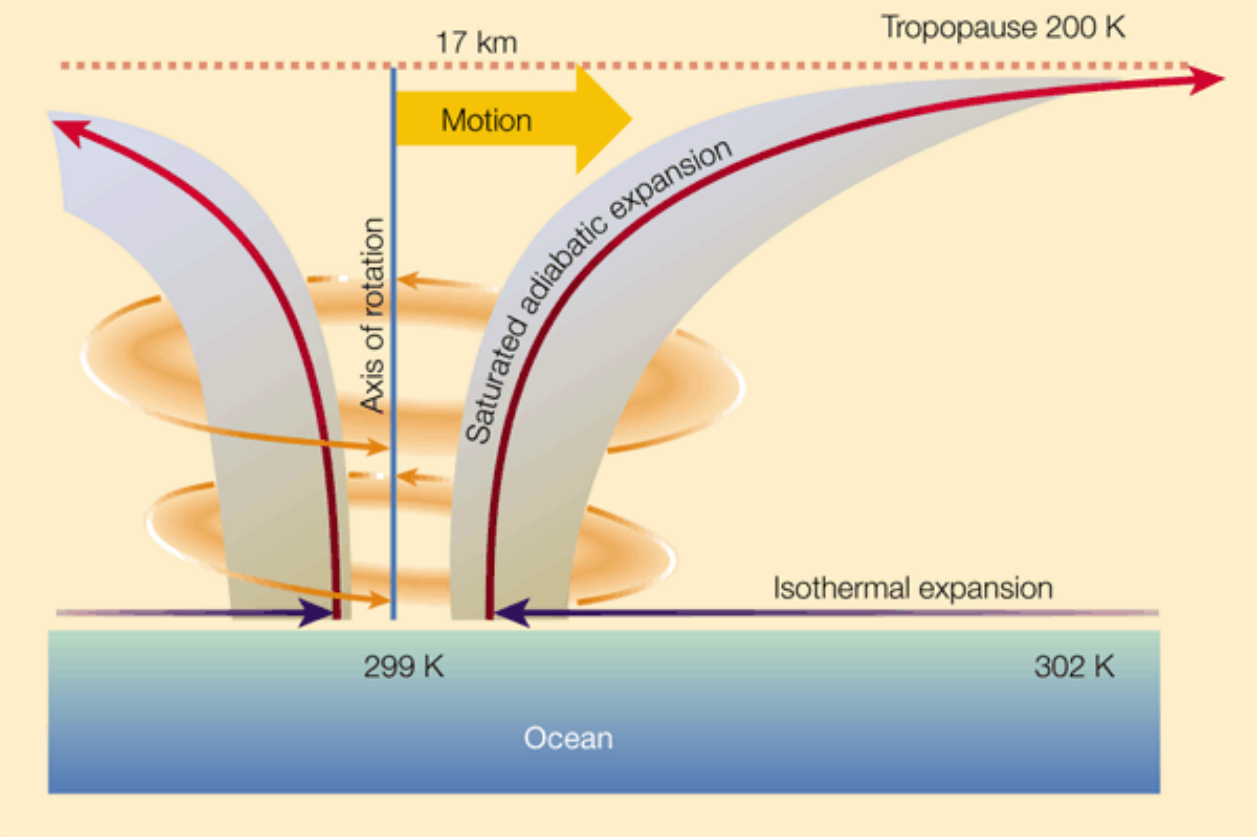
When the eye passes over land, people may think the storm is over, but **the second half of the cyclone strikes suddenly from the opposite direction**, often causing severe damage.

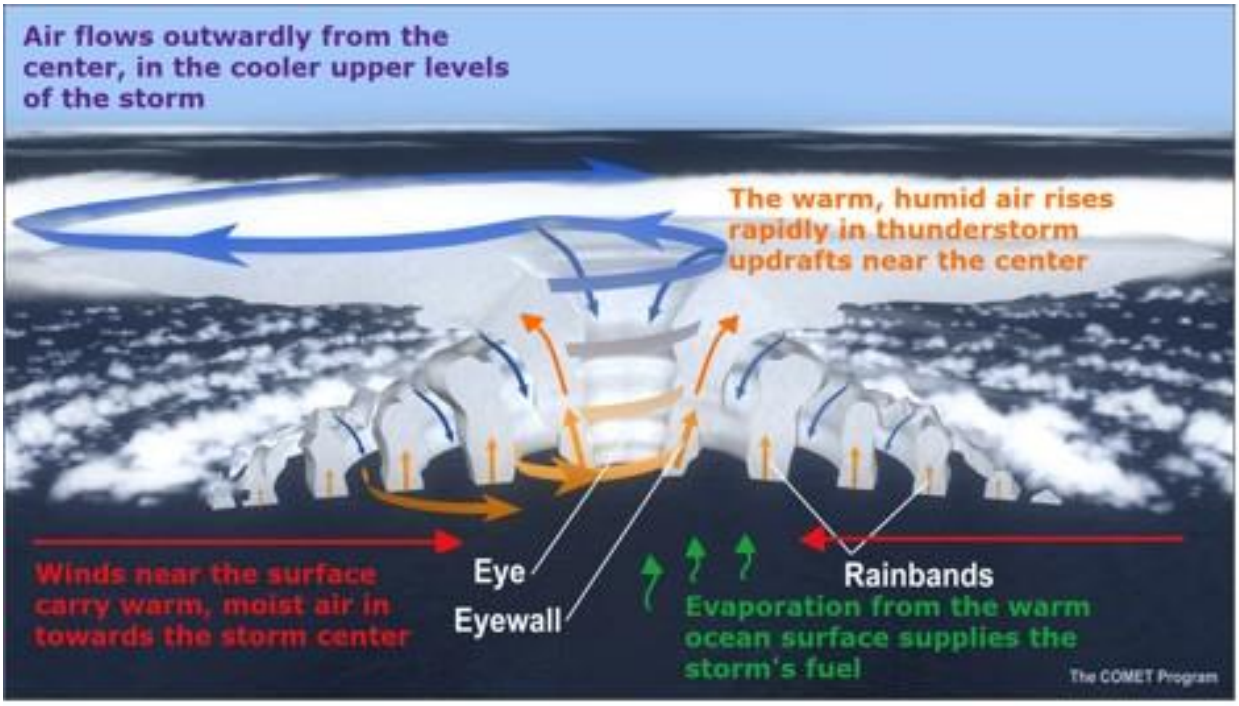
2. The Eyewall – The Most Dangerous Zone

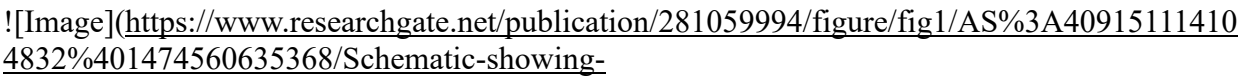
* A **ring of intense thunderstorms** surrounding the eye
***Contains:**
* **Strongest winds**
* **Heaviest rainfall**
* **Maximum storm surge**
* Vertical cloud towers can exceed **12–16 km in height**

This is where **most destruction occurs**.

3. How Cyclone Ditah Obtains Energy (The Heat Engine Concept)







The role of latent heat release in storm intensification in the PV. png? utm_source=chatgpt.com)

Cyclones function like a **giant natural heat engine.**

Step-by-step energy process:

1. Warm Ocean Surface

* Sea surface temperature must be ≥ **26.5°C**
* Indian Ocean temperatures during Ditah were **well above this threshold**

2. Evaporation

* Warm ocean water evaporates rapidly
* Moist air rises into the atmosphere

3. Condensation

* As moist air rises, it cools and condenses into clouds
* This releases **latent heat**

4. Latent Heat Release

* This heat **fuels the cyclone**
* Causes air pressure to drop further at the center

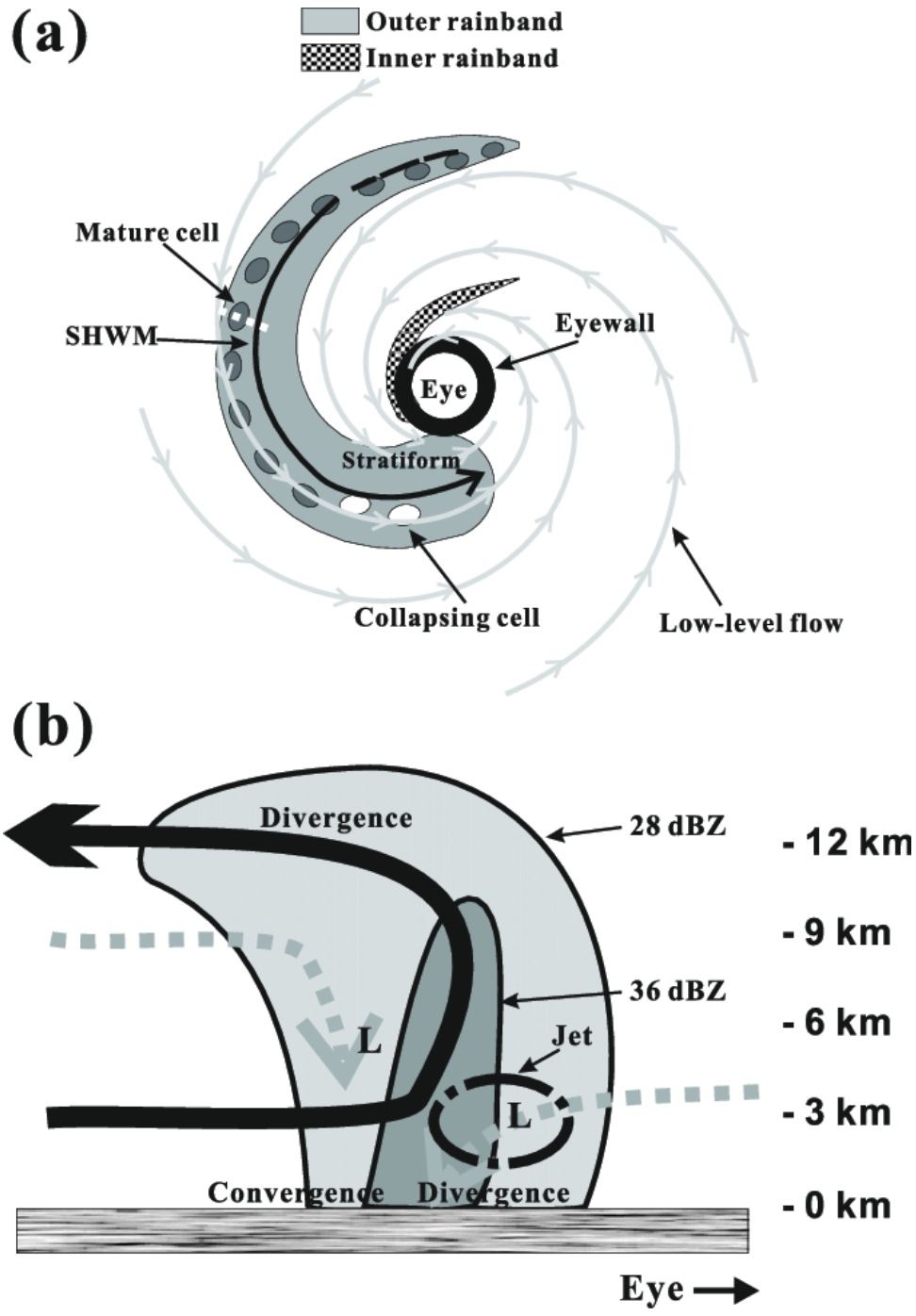
5. Pressure Gradient

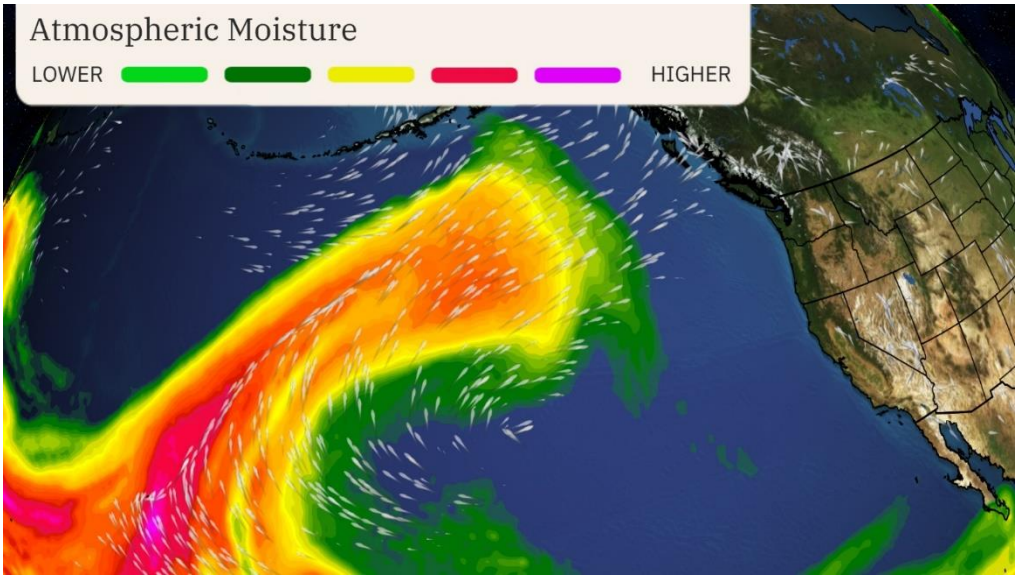
* Air rushes toward the low - pressure center
* Earth's rotation (Coriolis force) causes rotation

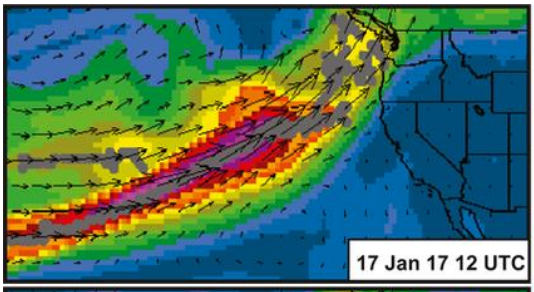
🔁 This cycle repeats continuously as long as:

* Warm water exists
* Wind shear is low
* Moisture supply remains strong

4. How Cyclone Ditah Gathers Moisture




Atmospheric Moisture
LOWER
HIGHER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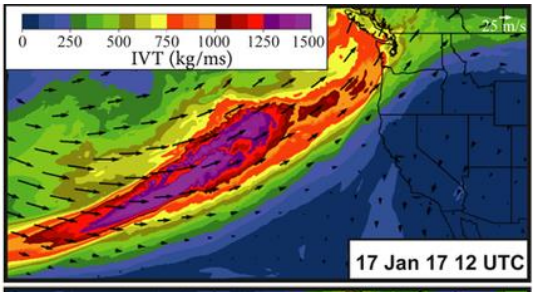
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IVT (kg/ms)
25 m/s
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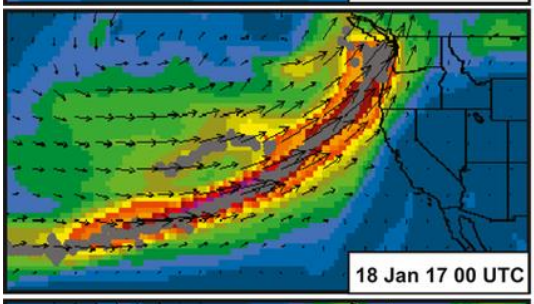
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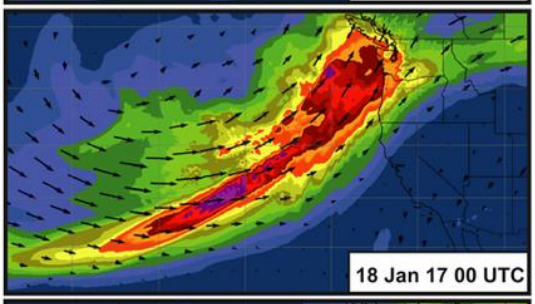
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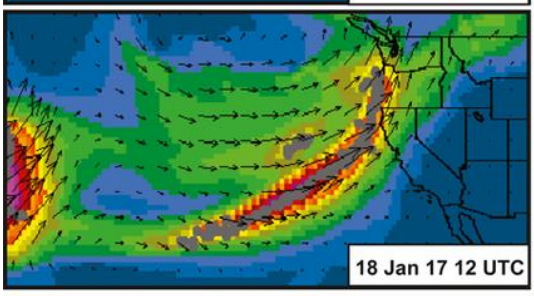
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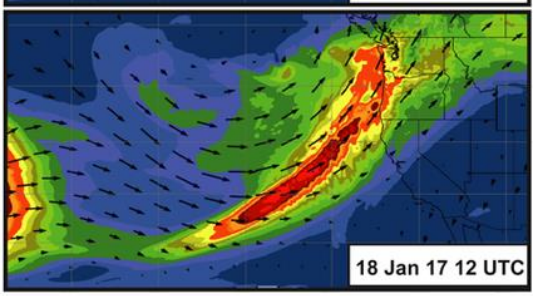
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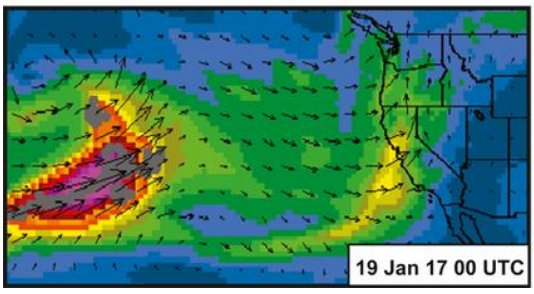
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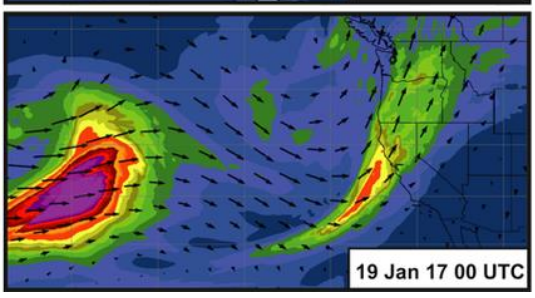
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Cyclone Ditah gathers moisture from:

* Warm Indian Ocean waters
* Surrounding humid air masses
* Long atmospheric moisture corridors

Spiral Rainbands:

* Act like **conveyor belts**
* Pull moisture from **hundreds of kilometers away**
* Continuously feed the core of the cyclone

5. Total Moisture Content – Why Ditah Is Exceptionally Dangerous

The scientific term you are referring to is:

Integrated Water Vapor (IWV) or Integrated Water Vapour Transport (IVT)

*This represents the **total amount of moisture present in the atmospheric column.**

Why this matters:

* High IVT = **extreme rainfall potential**
* Causes:
* Flash floods
* River floods
* Landslides (as experienced in Sri Lanka)

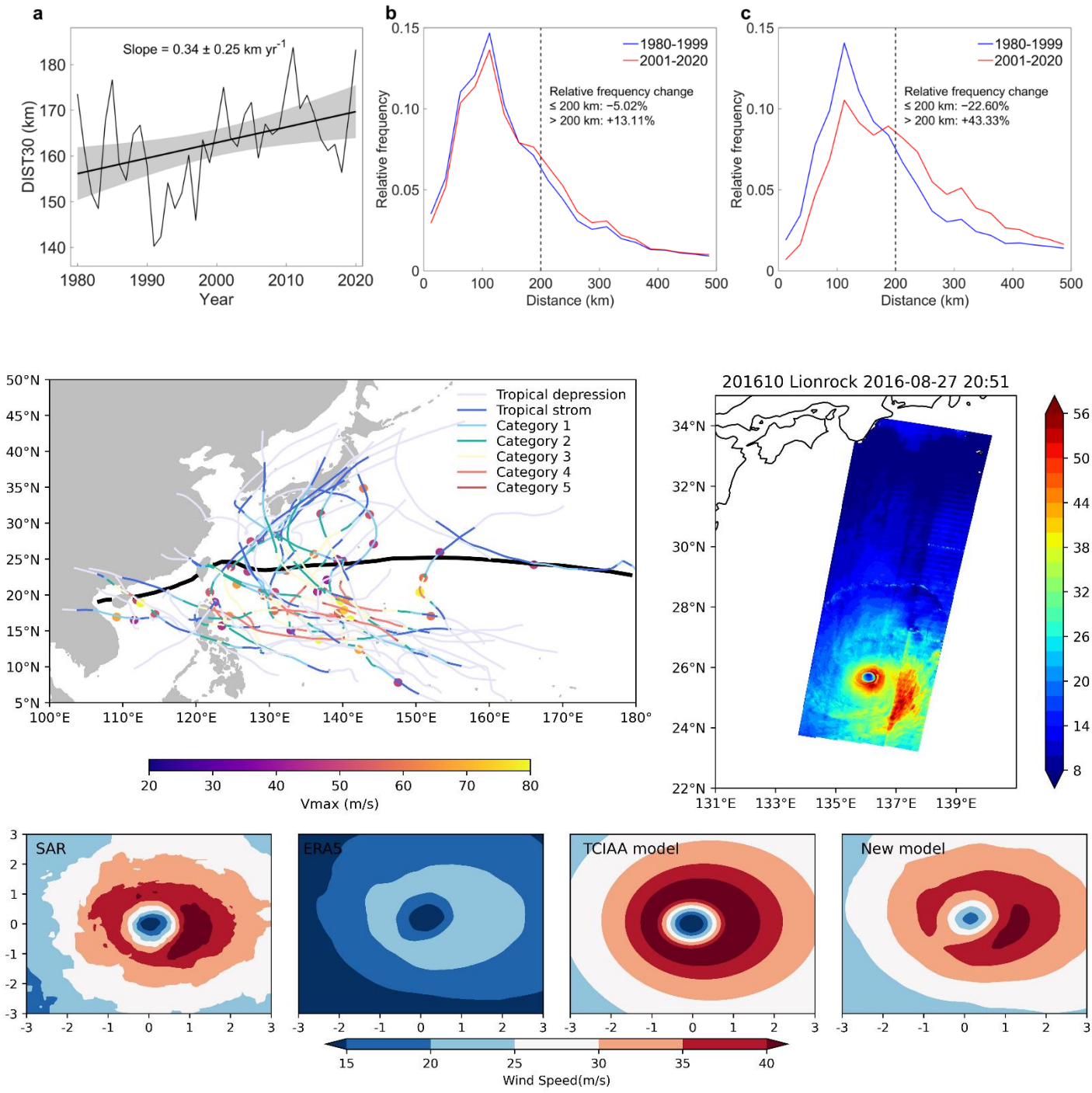
In Cyclone Ditah:

* The **moisture envelope (IVT zone)** expanded to a size **larger than Sri Lanka**

This means:

* Even areas far from the eye received **continuous heavy rain**
* Prolonged saturation of soil
* Increased landslide risk days after landfall

6. Why the Moisture Zone Being Larger Than Sri Lanka Is Critical



![Image](https://pbs.twimg.com/media/G4iudr3a8AETosl.png?utm_source=chatgpt.com)

* The *rainfall footprint* of Ditah extended *well beyond the wind field*
* Sri Lanka experienced:
* Long-duration rainfall
* Repeated rainbands
* Catchment-wide flooding

This explains why:

* Damage occurred **even without direct eyewall impact**
* Landslides continued **after winds weakened**
* Recovery took longer due to **soil instability**

7. Why Cyclone Ditah Is a Climate - Relevant Event

Cyclone Ditah demonstrates:

* **Warmer oceans = stronger cyclones**
* **Higher moisture-holding capacity of air** (≈7% more moisture per 1°C warming)
* **Larger and wetter storms**, not just stronger winds

This aligns with global climate science and explains:

* Increased frequency of **extreme rainfall disasters**
* Greater **compound disasters** (floods + landslides)

8. Key Message for Policy and PDNA Context

You may summarize Ditah scientifically as:

"Cyclone Ditah was not only a wind event, but a **large-scale moisture-driven disaster, where the integrated water vapor field exceeded the size of Sri Lanka, re**sulting in prolonged rainfall, widespread flooding, and landslides. This underlines the urgent need for climate-resilient recovery and improved early warning systems."