BIRTH OF A HURRICANE

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Image by Strebe 15 August 2011

Text and Cloud Cover added by CG on Science

A CG on Science Production

Contents

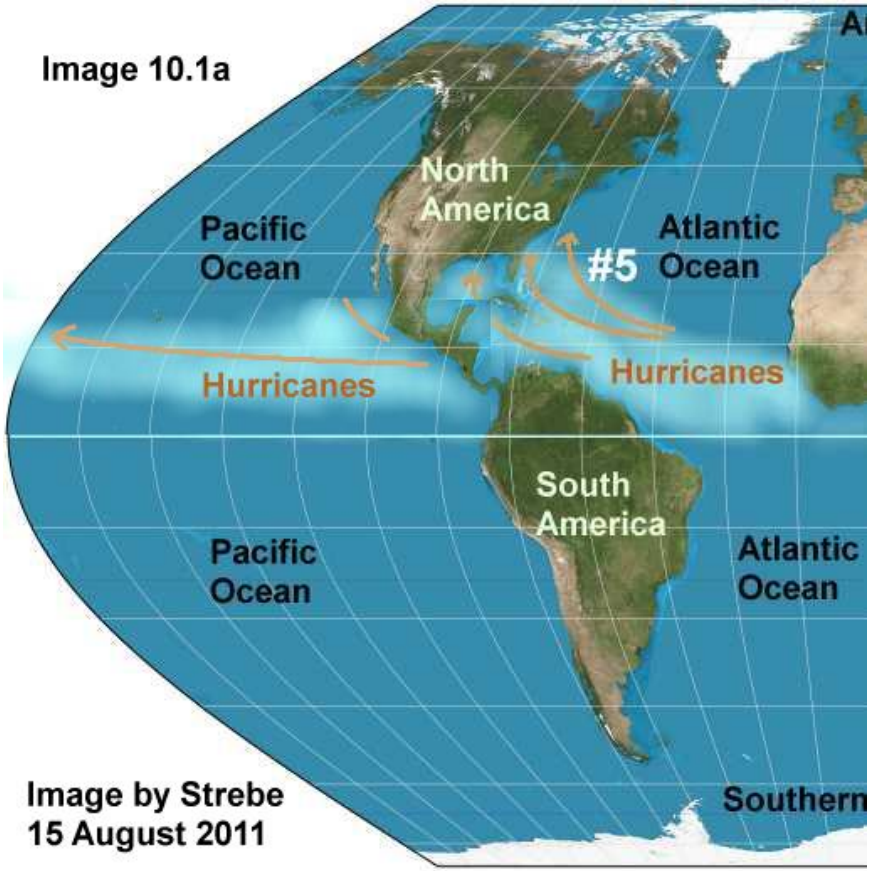
Chapter 10

Birth of a Hurricane

Image 10.1 *Earth Globe Map: Cloud cover and text added by CG on Science* [18] [Strebe credit link]

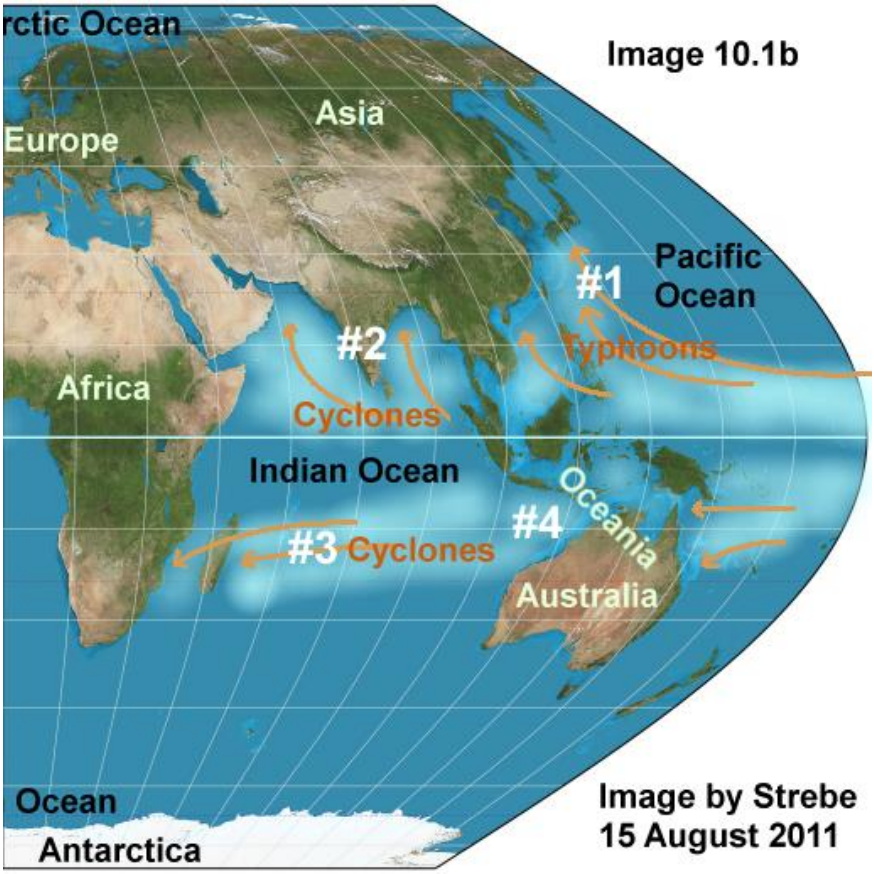
Tropical Storm Regions		Continents	Oceans
#1	NW Pacific (Japan, China, Philippines)	Africa	Arctic
#2	North Indian Ocean	Antarctica	Atlantic
#3	South Indian Ocean	Asia	Indian
#4	Australia (Oceania)	Europe	Pacific
#5	North and Central America	North America	Southern
		Oceania	
		South America	

Table 10.1 *Oceania includes Australia, along with the various islands surrounding it.*



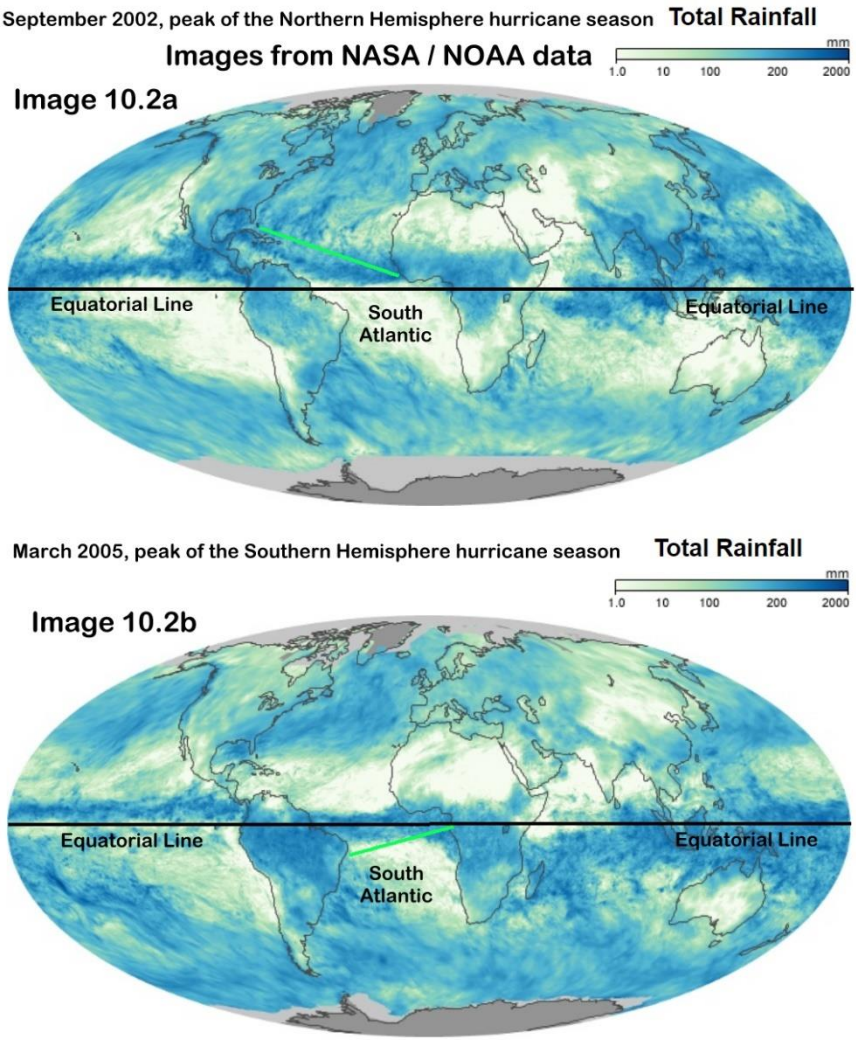
Cloud cover above and below the equatorial line is meant to represent the most common paths tropical storms tend to traverse. There are 5 geographic regions numbered on the globe:

The Pacific Ocean is divided vertically by the global dateline. The Eastern Pacific Ocean is displayed at the far left of **(Pg 3) Image *10.1*** globe. The Western Pacific is displayed at the far right of the Image.



Birth of a Hurricane includes 5 charts. Each of those charts represents one of 5 regions. Two geographic regions (below the equator) are absent from any markings: the south Atlantic Ocean, and east of the dateline, the south Pacific. The easternmost and westernmost outer edges of the map of the globe are where the dateline is located. Each geographic region has significant differences. Water temperature and wind currents change with latitude. Those in turn

affect the ability of any of the more severe tropical storms to develop.



[19] In the south Atlantic Ocean and east of the planetary dateline in the south Pacific Ocean, the ability of more severe tropical storms forming isn't

quite adequate for them to develop. In the south Atlantic Ocean in 2004, Hurricane Catarina became the only known hurricane in the recorded history of hurricanes in that region. Hurricane Catarina managed to acquire wind speeds of 155 km/h, a category 2 equivalent on the Saffir-Simpson hurricane scale.

Image 10.3 Freddy [25b] the cyclone that lasted more than a month.

In 2023, in zone #3 (SW Indian Ocean), just off the east coast of Africa, Cyclone Freddy approached the Island nation of Madagascar. Freddy continued its westward trajectory due west till shortly after reaching the southern border of Mozambique.

A twist of fate did precisely that causing Cyclone Freddy to turn around and head due east, back to Madagascar. Just before the eye of the cyclone reached Madagascar, the cyclone did another about-

face, heading NW to the northern border of Mozambique. For a period of one month, Cyclone Freddy played a game of pin-ball, bouncing between the island nation of Madagascar and the eastern border of Africa, though technically, Cyclone Freddy only bounced twice; but still, Cyclone Freddy ‘bounced’, twice.

Northern hemisphere counterclockwise
Southern hemisphere clockwise

In the case of **(Pg. 6) Image 10.2b**, the location involved is the southern Atlantic Ocean, an area where hurricanes don’t normally form. During peak hurricane season for the southern hemisphere, the Atlantic Ocean south of the equator doesn’t have as much rain as other regions around the globe. As wind currents crossing from South Africa to Brazil, there isn’t enough rising moisture for any tropical storms to reach hurricane strength.

The same seems to apply to the region west of the South American continent but east of the Pacific dateline, and south of the equator. Mountain ranges on the west side of South America may be responsible for the failure of hurricanes to form just west of South America.

What would our view of hurricanes be if no hurricanes more powerful than a category 2 ever

existed, and the likelihood of any hurricanes forming at all was virtually non-existent, with any occurrence only being once in a thousand years? Conditions in the south Atlantic Ocean and east of the dateline in the south Pacific Ocean are that way. Conditions in those two regions simply aren't conducive to the formation of more severe hurricanes. Tropical storms in those regions do occur, but rarely progress into a more severe hurricane.

In all cases, HTCs (hurricanes, typhoons, and cyclones) travel from east to west. The principles behind the storm's formation are all the same. HTCs are all derived from tropical storms, though not all tropical storms become severe enough to be classified as an HTC. This is especially true during the beginning or ending of the HTC season. The primary determining factor as to how severe a tropical storm can become is the warmth of water in the ocean.

During the beginning and ending of the HTC season, ocean waters might not be warm enough for a tropical storm to develop into an HTC. In the case of a tropical storm encountering a large land mass such as a continent, its path of travel can be deflected. Without such a deflection, a tropical storm will always travel from east to west with a slight northerly or southerly migration, depending upon whether the storm is north or south of the equator.

An HTC forming north of the equator will rotate in a counterclockwise direction. An HTC which developed south of the equator will rotate in a clockwise direction. An HTC will eventually reach a land mass capable of causing the storm to dissipate and lose its strength.

In **(Pg 3)** ***Image 10.1***, the cloud cover shown is meant to represent the average paths a tropical storm and HTC might travel. Storms can travel virtually anywhere due to varying air current patterns spanning the globe. A tropical storm forming just off the west coast of Africa can travel all the way to the North American continent, veer northward to New York or Maine, then veer eastward traveling all the way to Europe.

All HTCs develop rotation. Due to that rotation, an HTC's path will be deflected anytime it reaches a land mass. A small island might not cause much deflection. If the arms of an HTC brush up against a larger continent, the path of the HTC can change rather substantially.

Fastest HTC Wind Speeds by region. (As of 12 September 2022) for each region.

#1) Typhoons, NW Pacific [20]

Chart #1 NW Pacific Ocean

Typhoon Season: Entire year, though mostly May through October

RSMC Tokyo's Tropical Typhoon Intensity Scale

Category	Knots (kt)	mph	km/h
Violent Typhoon	≥ 105	≥ 121	≥ 193
Very Strong Typhoon	85-104	98-120	157-192
Strong Typhoon	64-84	73-97	119-156
Typhoon	34-63	39-72	63-118
Tropical Depression	≤ 33	≤ 38	≤ 62

Annual average of 26 tropical storms of which 16 reach typhoon strength.

Occurring in 2013, Typhoon Haiyan [21] reached wind speeds of 313 km/h, sweeping the Philippines. In *Chart #1,* the most severe storm category is 'Violent typhoon' with wind speeds ≥ 193 km/h. On the Saffir-Simpson scale, wind speeds of 313 km/h would have classified the storm as a very intense Category 5 Super Typhoon.

Typhoon Haiyan displaced 4.1 million people, killed more than 6,000, with 1,800 people missing. The typhoon damaged 1.1 million houses and destroyed 33 million coconut trees. Total damage was estimated at $5.8 billion.

#2) Cyclones, North Indian Ocean [22]

Chart #2 Indian Ocean (North of the equator)

Cyclone Season: From March to June, and October to December

Category: Cyclone	Knots (kt)	mph	km/h
Super Cyclonic Storm	≥ 120	≥ 138	≥ 222
Extremely Severe Cyclonic Storm	90-119	103-137	167-221
Very Severe Cyconic Storm	64-89	73-102	118-166
Severe Cyclonic Storm	48-63	55-72	89-117
Cyclonic Storm	34-47	39-54	63-88
Deep Depression	28-33	32-38	51-62
Depression	17-27	20-31	31-50

Average of four to six cyclones in this region every season.

Odisha Cyclone [23] occurred in1999. It was the most intense recorded and among the most destructive. The cyclone eventually reached wind speeds of 260 km/h, making landfall 29 October 1999. Damage in India was exacerbated in that a very severe cyclone had hit the same region less than two weeks earlier. Estimated damage was US $4.5 billion.

#3) Cyclones, SW Indian Ocean [24]

Chart #3 Indian Ocean (Southwest of the Equator)
Cyclone Season: From November through April
Southwest Indian Ocean Intensity Scale

Category: Cyclone	Knots (kt)	mph	km/h
Very Intense Tropical Cyclone	≥ 116	≥ 133	≥ 213
Intense Tropical Cyclone	90-115	103-132	166-212
Tropical Cyclone	64-89	73-102	118-165
Severe Tropical Storm	48-63	55-72	89-117
Moderate Tropical Storm	34-47	39-54	63-88
Tropical Depression	28-33	32-38	51-62
Tropical Disturbance	≤ 27	≤ 31	≤ 50

Average of 15 tropical storms per year.

Occurring in 2021, Tropical Cyclone Faraji [25] made its debut, reaching peak wind speeds of 260 km/h. On the Saffir-Simpson scale, wind speeds of 260 km/h would have classified the storm as a Category 5, just above the minimum 252 km/h to meet that requirement.

#4) Cyclones, Australia (Oceania) [26]

Chart #4 Australia (Oceania)

Cyclone Season: From November through April

Australian Tropical Cyclone Intensity Scale

Category: Cyclone	Knots (kt)	mph	km/h
Cat 5	≥ 108	≥ 124	≥ 200
Cat 4	86-107	98-123	160-199
Cat 3	64-85	73-97	118-159
Cat 2	48-63	55-72	89-117
Cat 1	34-47	39-54	63-88

Australia averages 11 cyclones per year.

Occurring in the 19th century (4 March 1899), Cyclone Mahina [27] was the deadliest cyclone in Australian recorded history with over 300 people killed. The storm generated a 13-meter high (43 foot) storm surge. Authorities state such storms occur only once every two or three centuries.

The Australian Bureau of Meteorology estimates Mahina's peak central pressure to have been 914 hPa (26.99 inHg). Queensland scientists and researchers are cited as wanting the number to be upgraded to 880 hPa (25.99 inHg) which would make Mahina the most intense tropical cyclone recorded to make landfall anywhere in the world.

#5 Hurricanes, North Atlantic [28]

Chart #5 North Atlantic
Hurricane Season: From June through November
Saffir-Simpson Intensity Scale (Maximum Sustained Winds)

Category: Hurricane	Knots (kt)	mph	km/h
Cat 5	≥ 137	≥ 157	≥ 252
Cat 4	113-136	130-156	209-251
Cat 3	96-112	111-129	178-208
Cat 2	83-95	96-110	154-177
Cat 1	64-82	74-95	119-153
Tropical storm	34-63	39-73	63-118
Tropical depression	≤ 33	≤ 38	≤ 62

The U.S. averages 10 tropical storms per year with 6 becoming hurricanes.

The Most Intense Hurricanes in the United States 1851-2004 [29]. The most intense hurricane in the United States recorded history was an unnamed hurricane in 1935. The hurricane was a Cat 5 with minimum pressure of 892 mbar (26.35 inHg). In the number 2 spot was Hurricane Camille, occurring in 1969. The storm was a Cat 5 with minimum pressure of 909 mbar (26.84 inHg).

Hurricane Camille [30] had 1-minute sustained winds of 280 km/h (175 mph). Camille is one of just four hurricanes to make landfall in the U.S. with a Category 5 status. Camille produced a peak storm surge of 7.3 m (24 feet). Over 259 people were killed along with U.S. $10.5 billion in damage (in today's dollars in 2021).

There are five charts for hurricane, cyclone, and typhoon wind speeds. An HTC's wind speed will vary depending upon its location on the globe, among a variety of other factors. The various charts designate what area of the globe tends to be involved.

An HTC traveling across the Atlantic and reaching the North American continent will either enter the Gulf of Mexico or travel north-eastward along the North America continent's Atlantic coastline. Which direction the HTC takes depends upon how much of the HTC's arms pass over the Florida peninsula. If the HTC's arms cover more than half of the Florida peninsula, the friction might be great enough to cause the HTC to travel northward along the continent's Atlantic coastline. If the HTC's eye travels to the west across land, the HTC will likely spend the rest of its life inland. If the HTC's rotation carries it out into the ocean, it can travel from Maine, all the way to Europe.

There are five charts displayed in this chapter, Chart #1 through Chart #5. Each chart depicts HTC wind speeds by storm category and represents a different location on the globe. Each chart's corresponding number is on the globe **(Pg 3)** ***Image 10.1*** to assist you in identifying the region on the globe the chart is referring to.

If you reference **(Pg 3)** ***Image 10.1***, a picture of the Earth globe, there are numbers '#1', '#2', '#3', '#4', and '#5'. Each number corresponds to an included chart. The MS Excel charts (Chart #1 through Chart #5 above) were derived using wind speed data provided by an included index link for each chart on 12 September 2022.

As an HTC travels further north (or south) of the equator, oceanic waters become cooler. Traveling across cooler waters reduces the rate at which moisture will rise from the ocean to feed an HTC's growth. An HTC traveling from North America to Europe would tend to be a mere tropical storm by the time it arrives in Europe. The colder water at upper latitudes (latitudes closer to the poles) simply can't support the existence of an HTC.

CG on Science Publications

Astrophysics in the 21st Century (book)
Galactic and Planetary Systems

Birth of a Hurricane (ePamphlet)

Dark Matter in a Fluid Universe (ePamphlet)

(listing current as of 22 October 2024)

Simple principles having simple explanations.

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https://www.cgonscience.com

22 October 2024, two additional ePamphlets are being prepared for publication, with a 3rd waiting to be written.

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Portions of his research are published on AGM2M.org as well as Quora, and now Amazon Kindle.

Appendix

[18]

https://commons.wikimedia.org/w/index.php?curid=16115216

[19]

https://en.wikipedia.org/wiki/South_Atlantic_tropical_cyclone

NW Pacific (#1)

[20] http://agora.ex.nii.ac.jp/digital-typhoon/help/unit.html.en

[21] https://en.wikipedia.org/wiki/Typhoon_Haiyan

North Indian Ocean (#2)

[22] https://en.wikipedia.org/wiki/Tropical_cyclone_scales

[23] https://en.wikipedia.org/wiki/Tropical_cyclone_scales

SW Indian Ocean (#3)

[24] https://en.wikipedia.org/wiki/Tropical_cyclone_scales

[25] https://en.wikipedia.org/wiki/Tropical_cyclone_scales

[25b] https://www.youtube.com/watch?v=kD1tpom9gBg

Australia (#4)

[26] http://www.bom.gov.au/cyclone/

[27] https://en.wikipedia.org/wiki/Cyclone_Mahina

North America (#5)

[28] https://www.nhc.noaa.gov/aboutsshws.php

[29] https://www.nhc.noaa.gov/pastint.shtml

[30] https://en.wikipedia.org/wiki/Hurricane_Camille