Hurricane Info

Meteorology 111

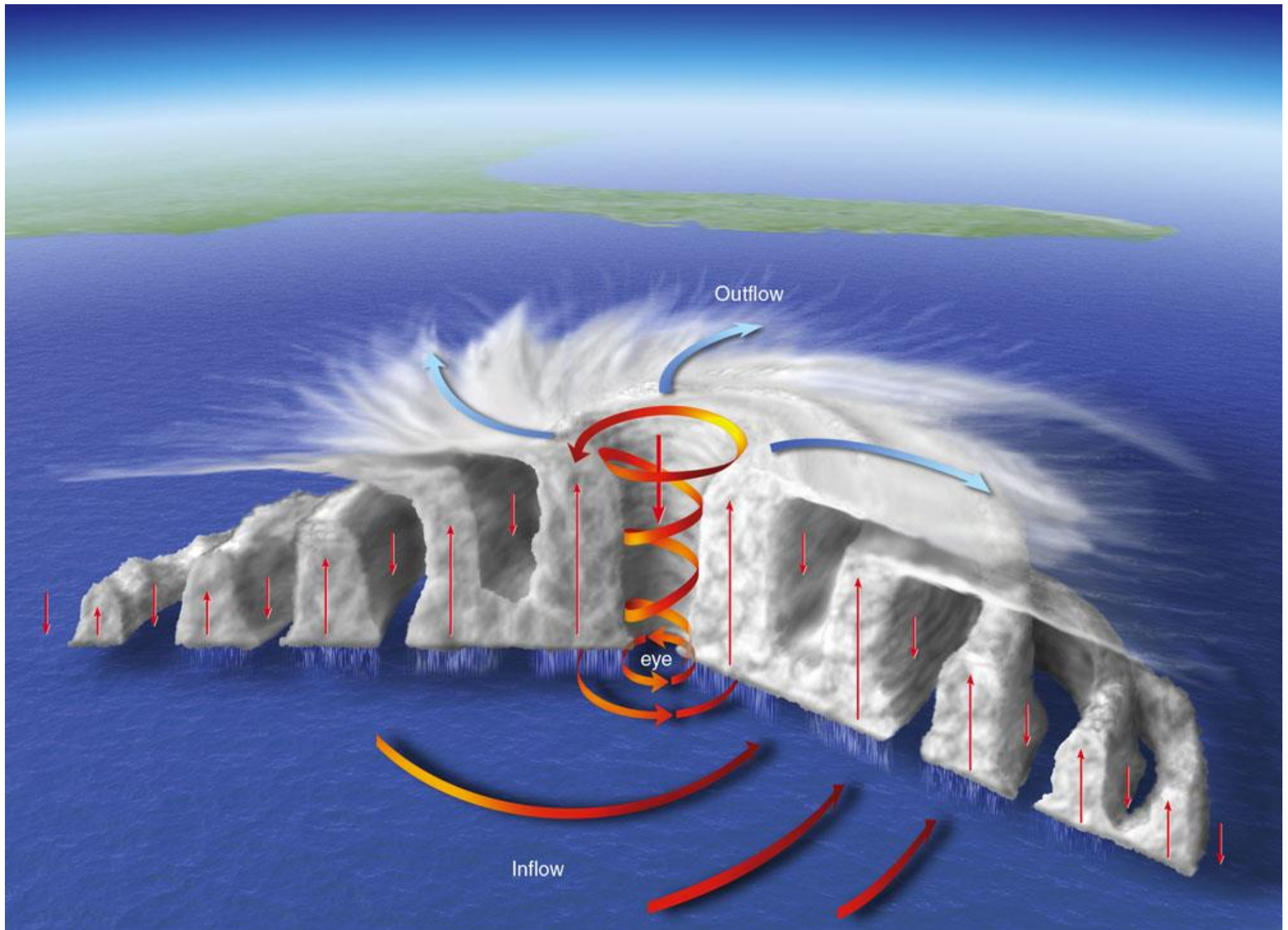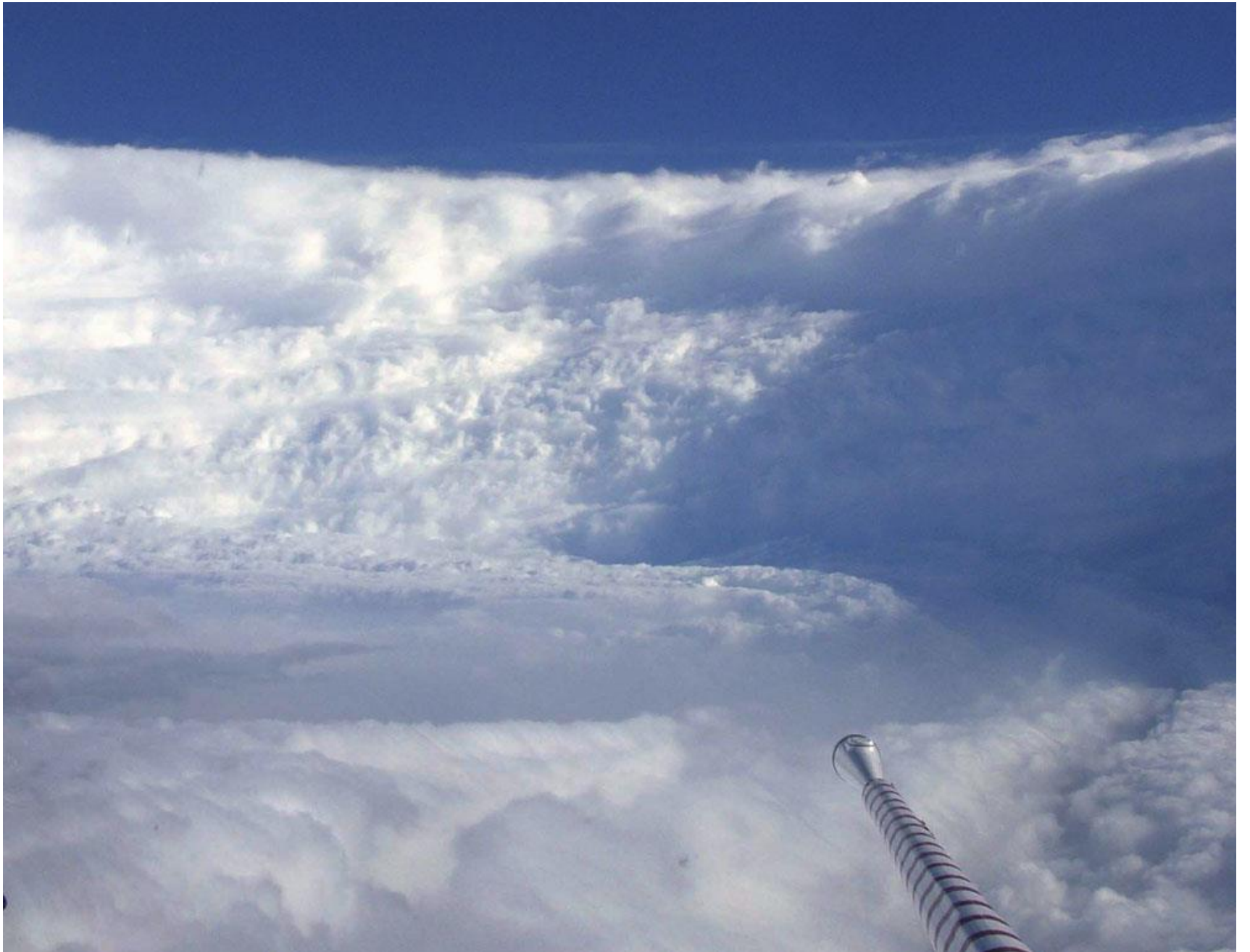# Nomenclature
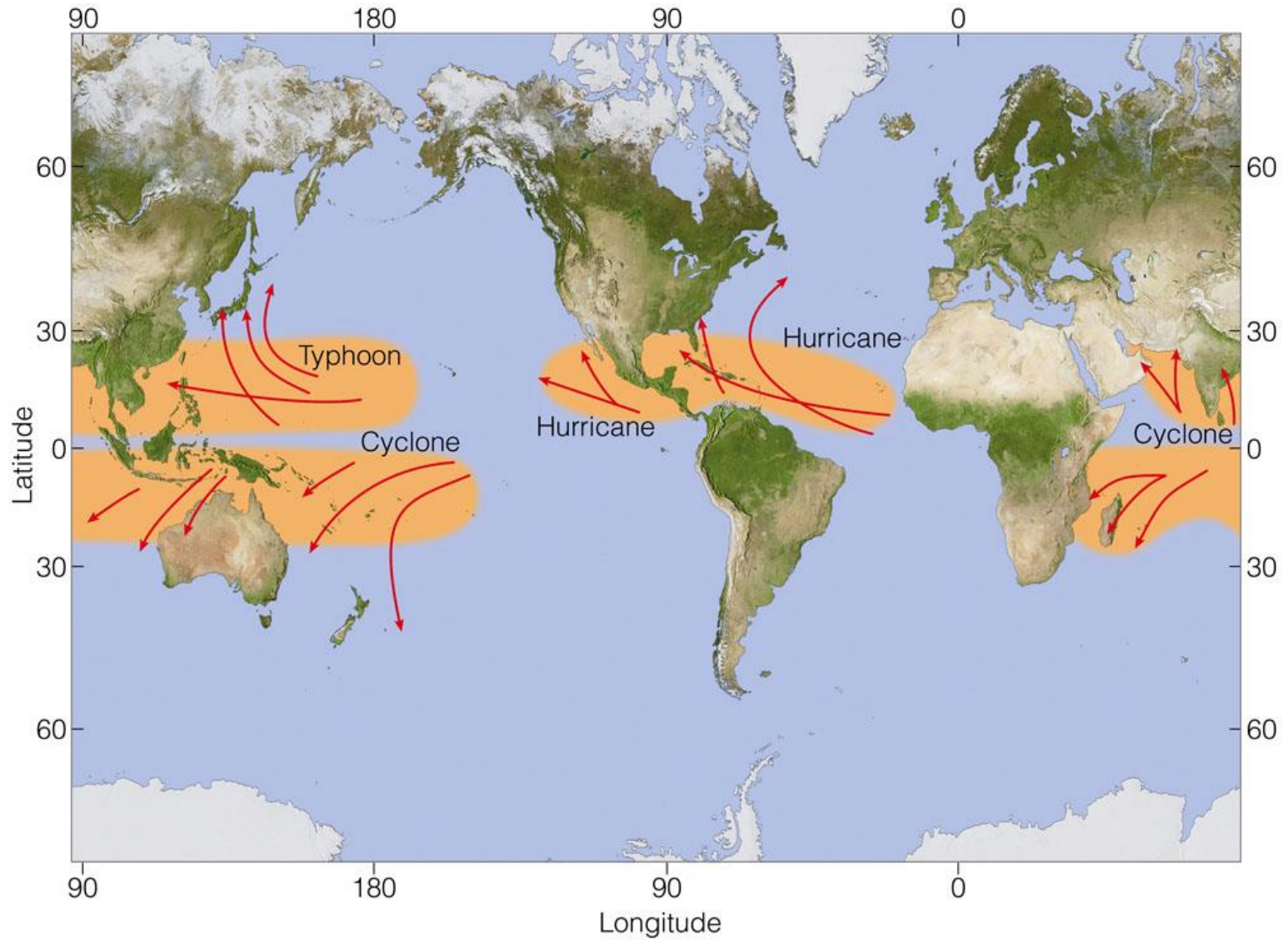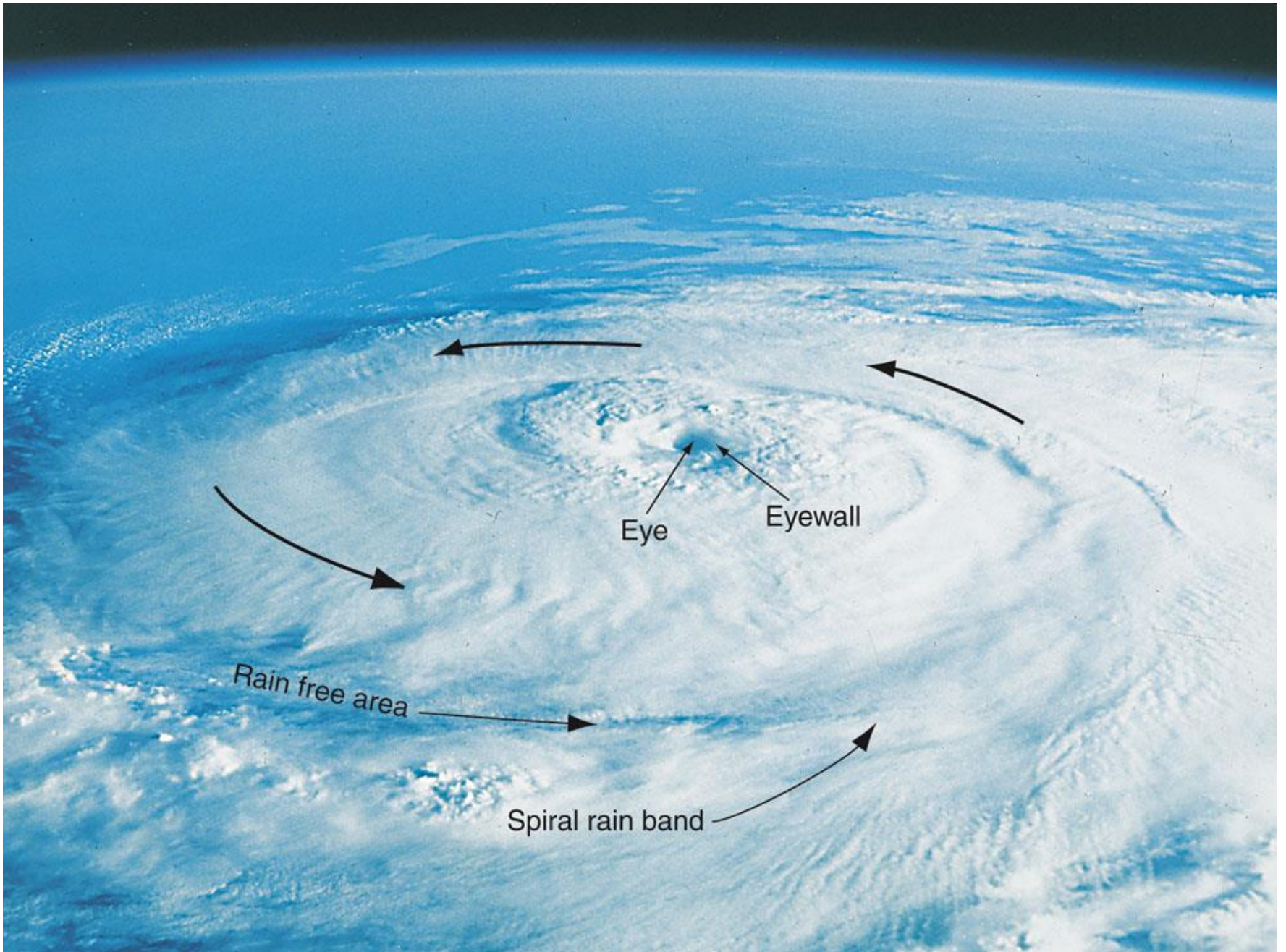
Definitions

- 0 < U < 20kts (23mph): tropical disturbance

- 20kts < U < 34kts (39mph): tropical depression

- 35 < U < 64kts (73mph): tropical storm (gets name)

- U > 64kts (**74mph or greater**): Hurricane

Saffir-Simpson
Hurricane Wind Scale

● ● ● ● ●

Category 1 - 5

5 WIND: 157 mph or higher
DAMAGE: Catastrophic damage will occur

4 WIND: 130-156 mph
DAMAGE: Catastrophic damage will occur

3 WIND: 111-129 mph
DAMAGE: Devastating damage will occur

2 WIND: 96-110 mph
DAMAGE: Extremely dangerous winds will cause extensive damage

1 WIND: 74-95 mph
DAMAGE: Very dangerous winds will produce some damage

Hurricane Facts

- 66% of all hurricanes occur in the NH.

- Never strengthen within about 5 degrees of the equator or cross the equator.

- Rarely originate north of 25 degrees.

- Form over all tropical oceans, except south Atlantic and south-east Pacific.

- ~80 tropical storms per season (50-70% develop into hurricane).

- Western Pacific in NH produces largest number of tropical storms.

Conditions for Development

- Sea surface temperature must equal or exceed about 26 degrees C (**79 degrees F**).

- Surface layer of warm water in ocean must be sufficiently deep. Typically about 60 meters or more.

- Weak vertical wind shear.

- Location must be at least 5 degrees north or south of the equator

- How do you kill a hurricane (3 ways)?
  - Cold water, land, strong wind shear

Hurricane Physics

- Warm core systems: descending air in the eye.

- Winds strongest to the right of hurricane if facing direction of motion.

- Why are winds strongest in the eye?
  - Conservation of angular momentum

- Storm surge: abnormal rise in sea level associated with the movement of a hurricane over a coastal region.

H

L

Surface air pressure

Increasing

Surface wind speed

Increasing
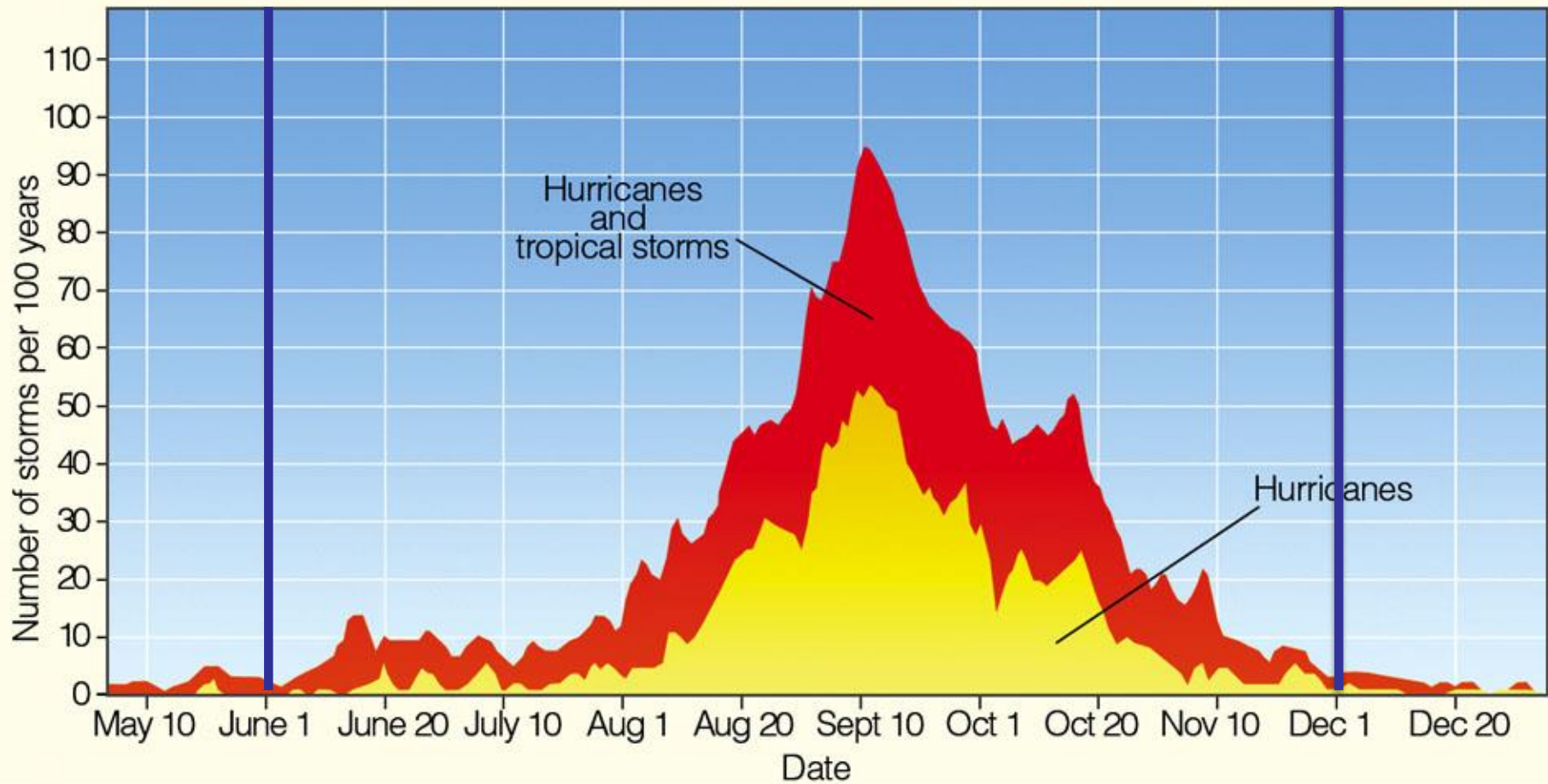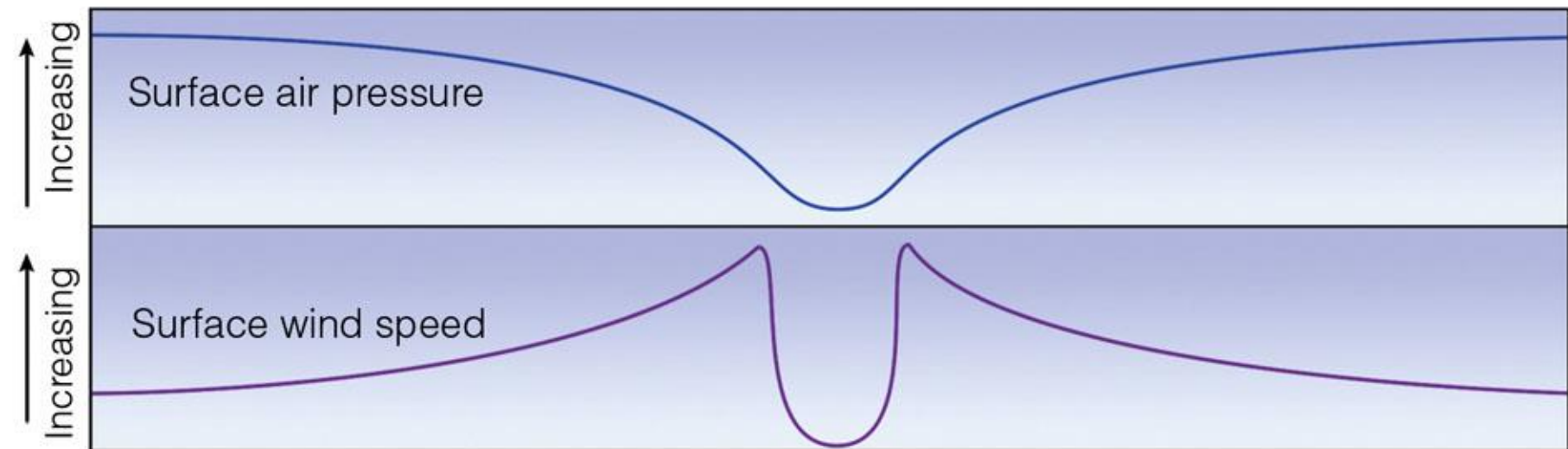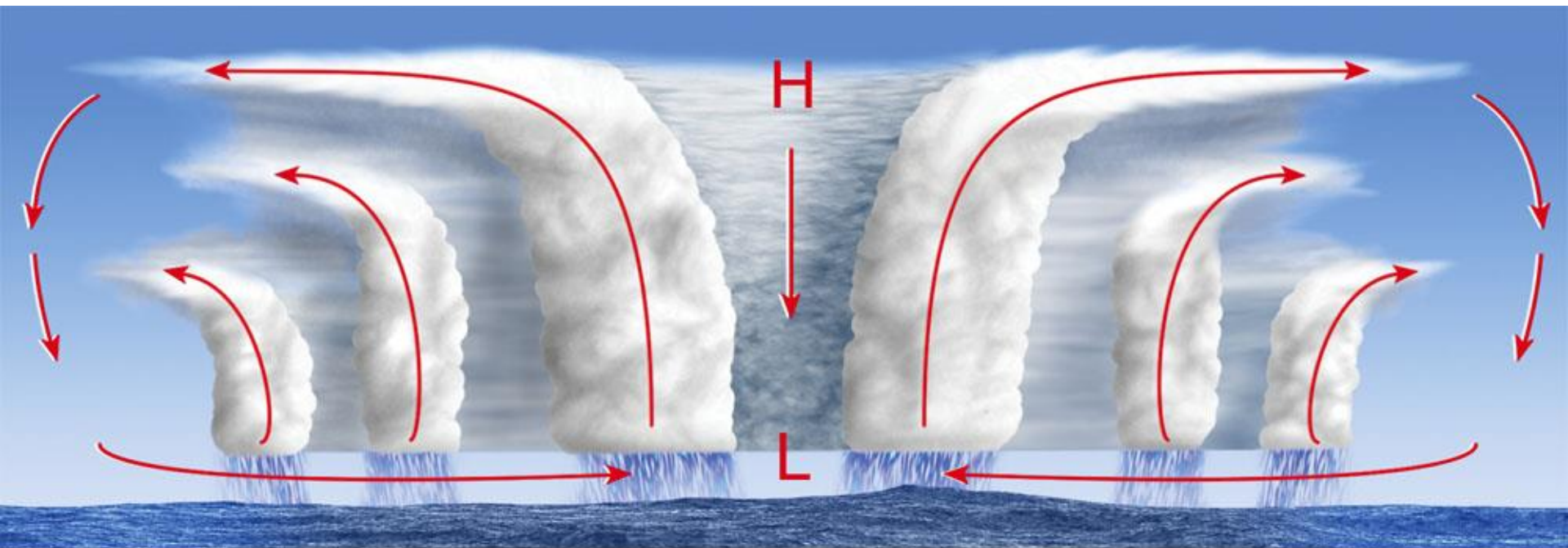
Storm Surge

- Highest waves and wind speeds to the right of the storm.

- Low pressure causes surface to swell

- Inland flooding is the cause of the most casualties.

Storm Surge

17 ft storm tide

15 ft Surge

2 ft normal high tide

Mean sea level

NOAA/The COMET Program
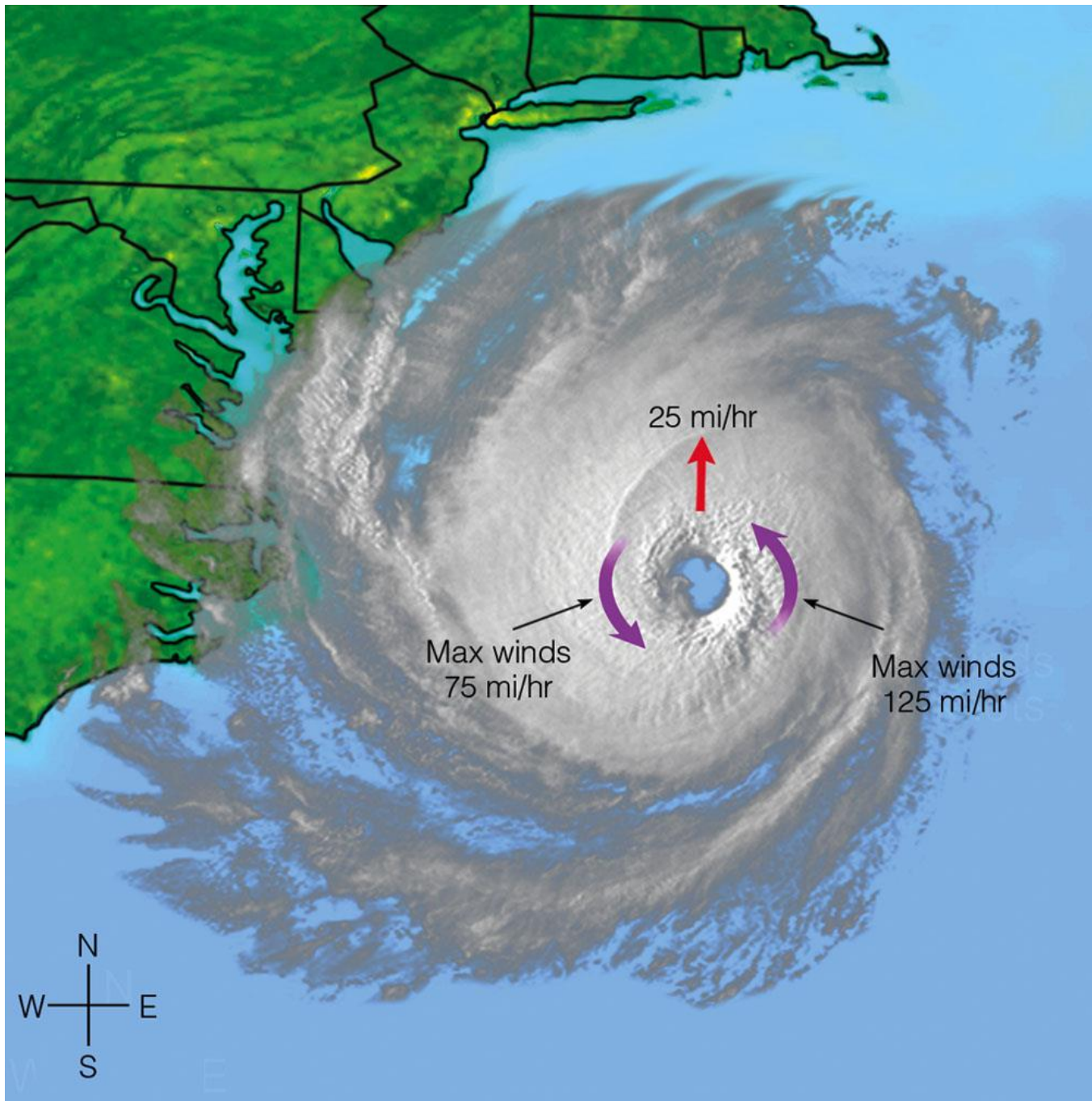
Storm Surge

Atlantic Pronunciation Guide (PDF)

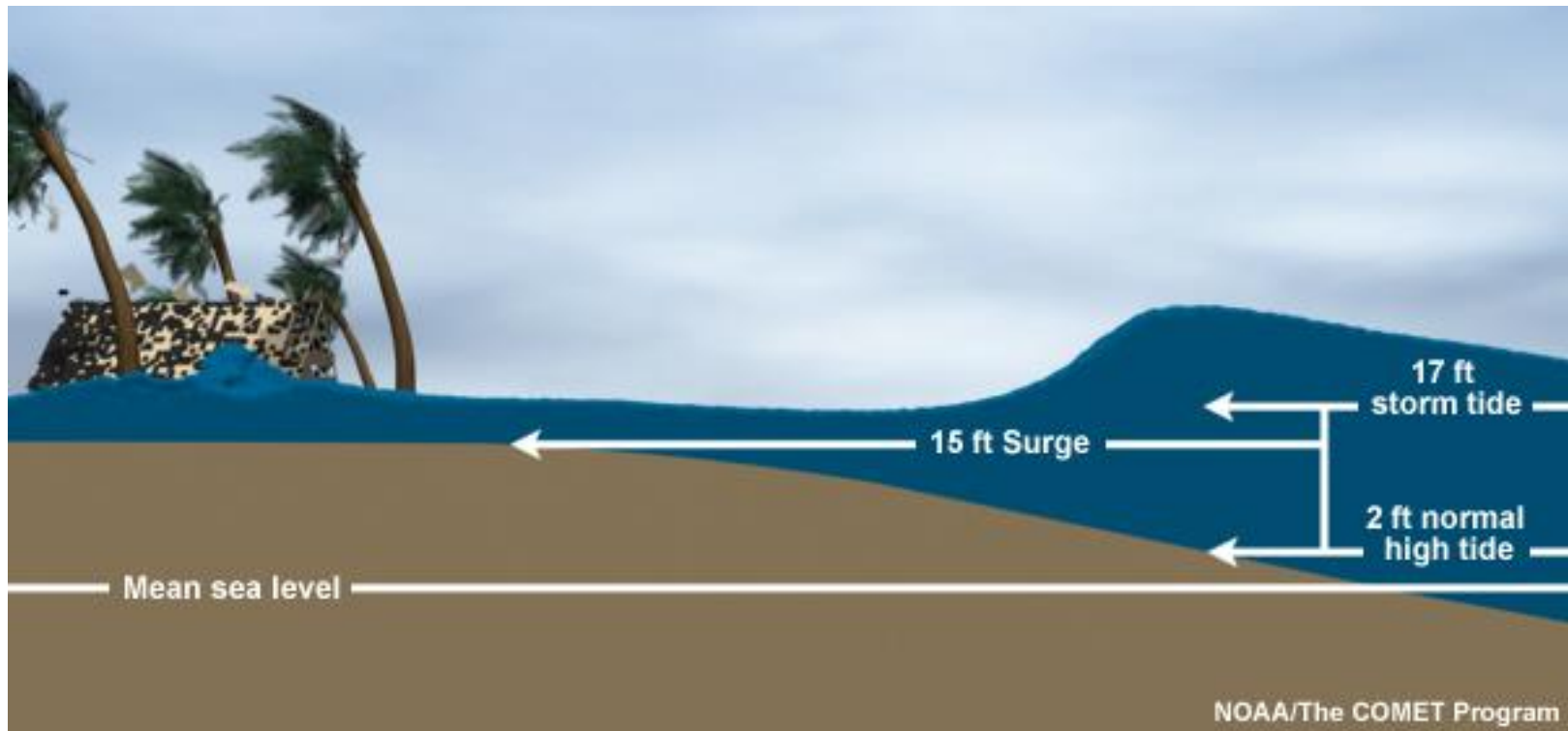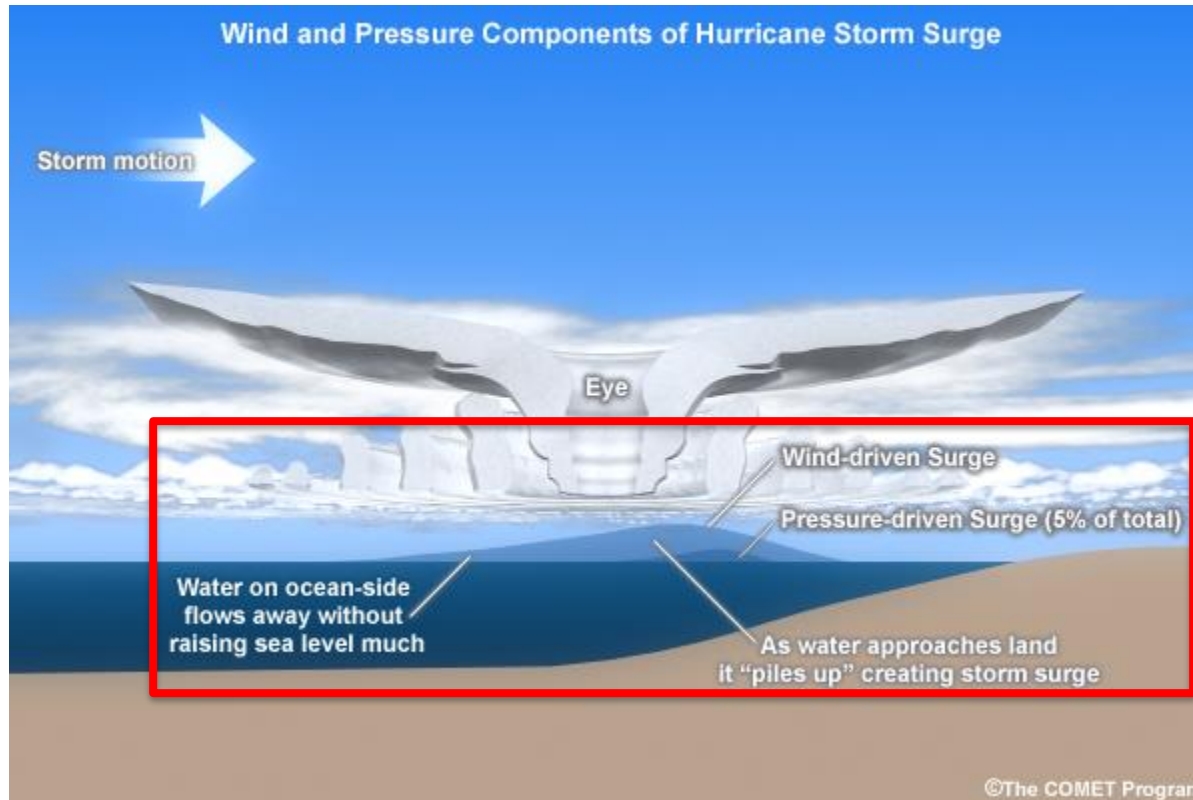| 2022	2023	2024	2025	2026	2027
Alex	Arlene	Alberto	Andrea	Arthur	Ana
Bonnie	Bret	Beryl	Barry	Bertha	Bill
Colin	Cindy	Chris	Chantal	Cristobal	Claudette
Danielle	Don	Debby	Dexter	Dolly	Danny
Earl	Emily	Ernesto	Erin	Edouard	Elsa
Fiona	Franklin	Francine	Fernand	Fay	Fred
Gaston	Gert	Gordon	Gabrielle	Gonzalo	Grace
Hermine	Harold	Helene	Humberto	Hanna	Henri
Ian	Idalia	Isaac	Imelda	Isaias	Imani
Julia	Jose	Joyce	Jerry	Josephine	Julian
Karl	Katia	Kirk	Karen	Kyle	Kate
Lisa	Lee	Leslie	Lorenzo	Leah	Larry
Martin	Margot	Milton	Melissa	Marco	Mindy
Nicole	Nigel	Nadine	Nestor	Nana	Nicholas
Owen	Ophelia	Oscar	Olga	Omar	Odette
Paula	Philippe	Patty	Pablo	Paulette	Peter
Richard	Rina	Rafael	Rebekah	Rene	Rose
Shary	Sean	Sara	Sebastien	Sally	Sam
Tobias	Tammy	Tony	Tanya	Teddy	Teresa
Virginie	Vince	Valerie	Van	Vicky	Victor
Walter	Whitney	William	Wendy	Wilfred	Wanda

Retired Atlantic Names

Retired Atlantic Names by Year

Retired Atlantic Names by Year

		1954 Carol Hazel Edna	1955 Connie Diane Ione Janet	1956	1957 Audrey	1958	1959	1960 Donna	1961 Carla Hattie
1962	1963 Flora	1964 Cleo Dora Hilda	1965 Betsy	1966 Inez	1967 Beulah	1968	1969 Camille	1970 Celia	1971
1972 Agnes	1973	1974 Carmen Fifi	1975 Eloise	1976	1977 Anita	1978 Greta	1979 David Frederic	1980 Allen	1981
1982	1983 Alicia	1984	1985 Elena Gloria	1986	1987	1988 Gilbert Joan	1989 Hugo	1990 Diana Klaus	1991 Bob
1992 Andrew	1993	1994	1995 Luis Marilyn Opal Roxanne	1996 Cesar Fran Hortense	1997	1998 Georges Mitch	1999 Floyd Lenny	2000 Keith	2001 Allison Iris Michelle
2002 Isidore Lili	2003 Fabian Isabel Juan	2004 Charley Frances Ivan Jeanne	2005 Dennis Katrina Rita Stan Wilma	2006	2007 Dean Felix Noel	2008 Gustav Ike Paloma	2009	2010 Igor Tomas	2011 Irene
2012 Sandy	2013 Ingrid	2014	2015 Erika Joaquin	2016 Matthew Otto	2017 Harvey Irma Maria Nate	2018 Florence Michael	2019 Dorian	2020 Laura Eta Iota	2021 Ida

› Table 13.4

The Fifteen Deadliest Hurricanes in the United States

RANK	HURRICANE (MADE LANDFALL)	MONTH/YEAR	DEATH TOLL
1	Galveston, Texas	September, 1900	>8000
2	Florida (Lake Okeechobee)	September, 1928	>2000
3	Louisiana/Mississippi	October, 1893	>1800
4	Katrina (Louisiana)	August, 2005	>1500
5	South Carolina/Georgia	August, 1893	>1000
6	Georgia/South Carolina	August, 1881	>700
7	New England	September, 1938	638
8	Florida Keys/South Texas	September, 1919	>600
9	Georgia/South Carolina	September, 1804	>500
10	Corpus Christy, Texas	September, 1919	>450
11	North Carolina (Capes)	September, 1857	424
12	Florida (Keys)	September, 1935	408
13	Louisiana	August, 1856	400
14	New England	September, 1944	390
15	Audrey (Louisiana)	June, 1957	390

Hurricanes and Climate Change
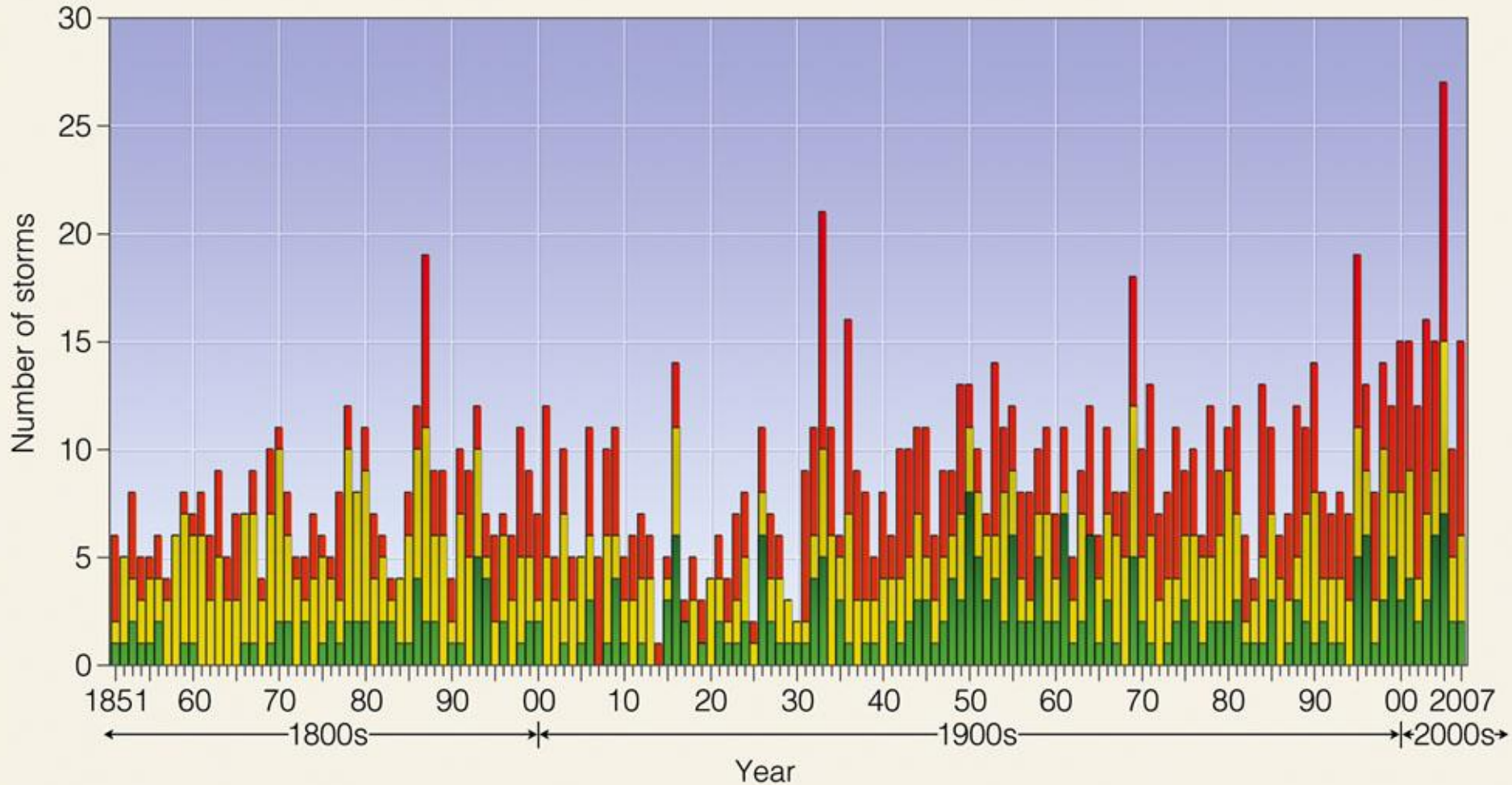
Hurricanes and Climate Change

- The strongest Tropical Cyclones (TCs) are projected to get stronger with warming.

- TCs are stalling more often.

- TCs have migrated poleward in most regions as the tropics have expanded.
  - This exposes less prepared populations to TCs.

- It is not clear that we will have more TCs forming, but once a TC does form, it is more likely to:
  1. Be at a major hurricane intensity
  2. Have greater rain-rates
  3. Intensify rapidly

- The is also good evidence that tracks change, forward speed slows over land and TCs are more likely to stall.