

Hurricane Preparedness Week 2021

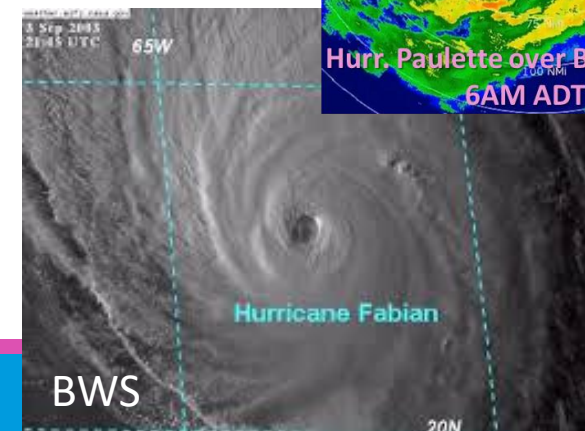
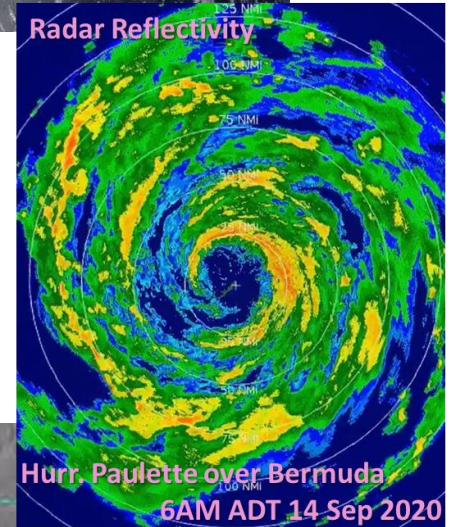
31 May - 4 June 2021

In collaboration with the Government of Bermuda
Disaster Risk Reduction Mitigation Team

Tropical Cyclone Terminology

- Tropical Depression* - A tropical cyclone in which the maximum sustained surface wind speed is <34 knots.
- Tropical Storm*- A tropical cyclone in which the maximum sustained surface wind speed ranges from 34 to 63 knots.
**Also includes Subtropical Cyclones*
- Hurricane - A tropical cyclone in which the maximum sustained surface wind is 64 knots or higher.
- Major Hurricane - A hurricane that is classified as Category 3 or higher, 96 knots and higher

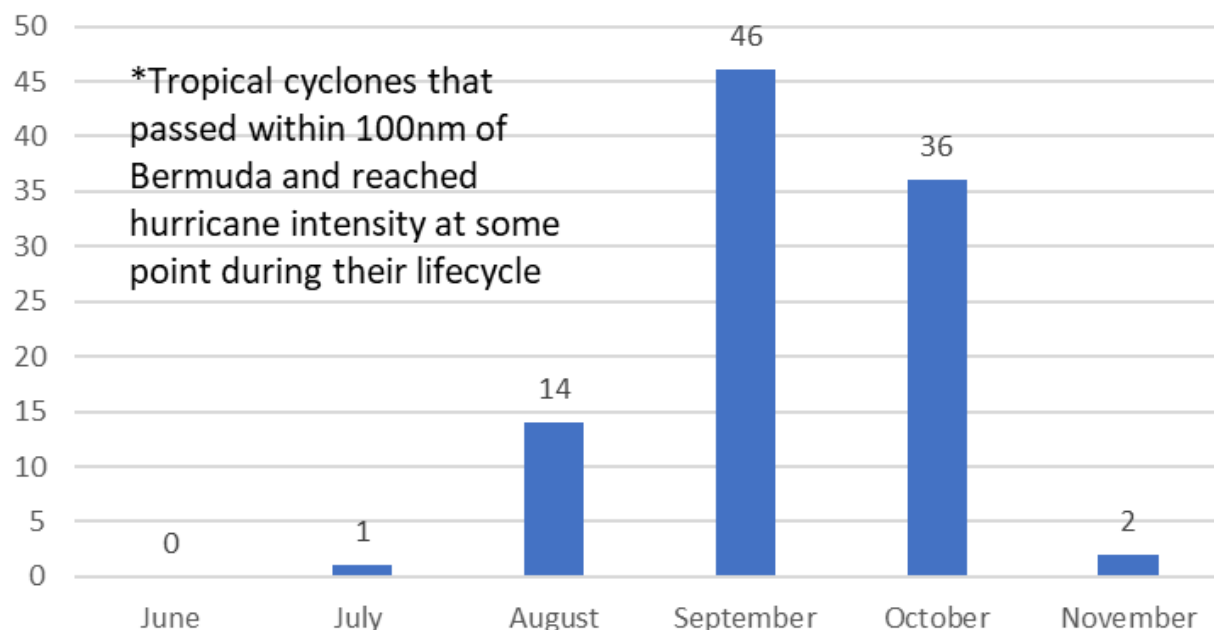
Tropical Depression Arthur



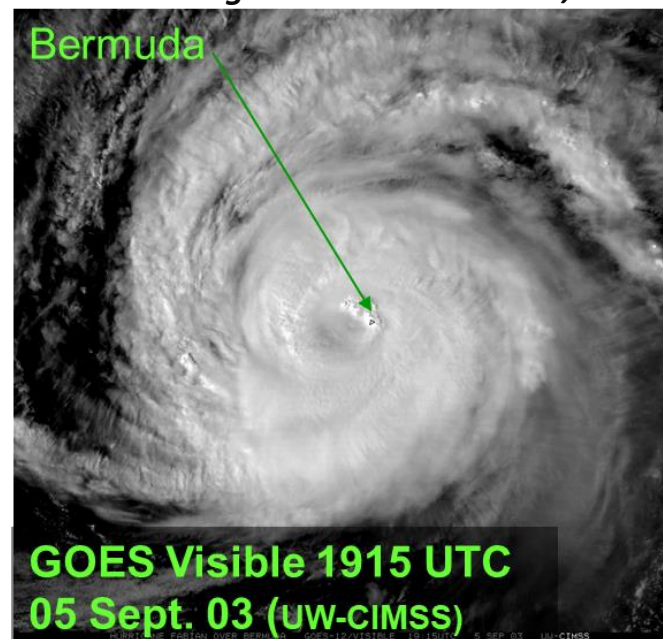
Historical Tropical Cyclone Record For Bermuda

September and October are the most active months for Bermuda storms

Bermuda Hurricanes* by Month (1842-2019)



Satellite image – Hurricane Fabian, 2003



Notable recent storms:

18 September 2019
Major Hurricane Humberto

12-13 October 2016
Major Hurricane Nicole

17 October 2014
Major Hurricane Gonzalo

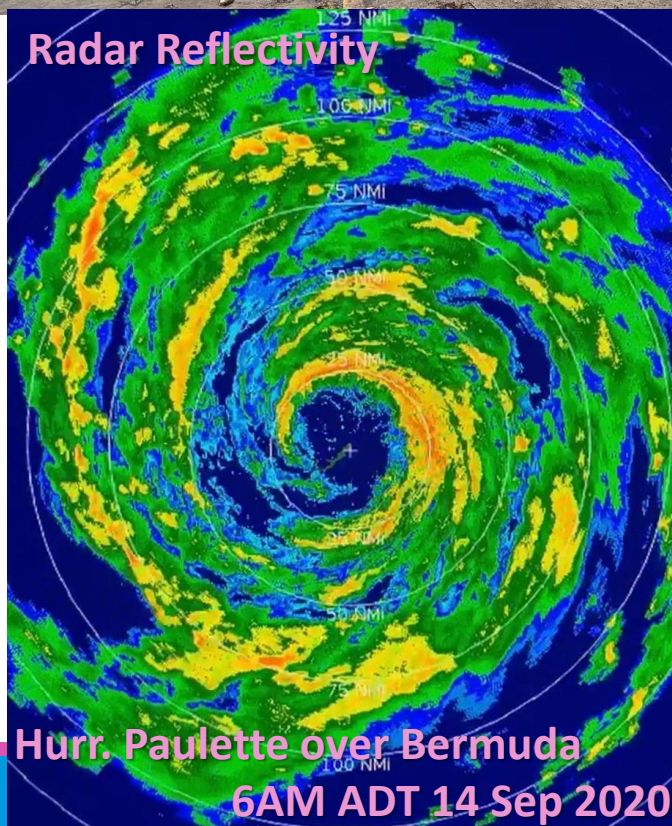
5 September 2003
Major Hurricane Fabian

Storms within 100nm (i.e. meeting BWS Threat criterion)


Sources: NOAA, BWS, BIOS, University of Reading

2020 Hurricane Season – Impacts

- Arthur, Edouard, Paulette, Teddy, & Epsilon threatened Bermuda.
- No injuries or fatalities reported through the season.
- **Hurricane Paulette:**
 - *Direct hit, with eye passage right over the island, 6AM ADT Monday 14 Sept 2020.*
 - *25,000 electricity outages (~70% of total)*
 - *Estimated >US\$50mill in damage.*
- **Hurricane Teddy:**
 - *Distant passage, but a surge & wave event*



Storm	Site	Elev.	Wind Spd(kts)	Gusts (kts)	rainfall (mm)	Surge (m)	Waves (m)
Paulette	Pearl Island	8m ASL	69	82	74	0.73	9 to 10
Teddy	The Crescent	6m ASL	53	71	36	0.89	7 to 8
Epsilon	Pearl Island	8m ASL	34	NA	8	0.13	6



BWS - Tropical Update Bulletin

SUBTROPICAL STORM ANA

IS A POTENTIAL THREAT TO BERMUDA

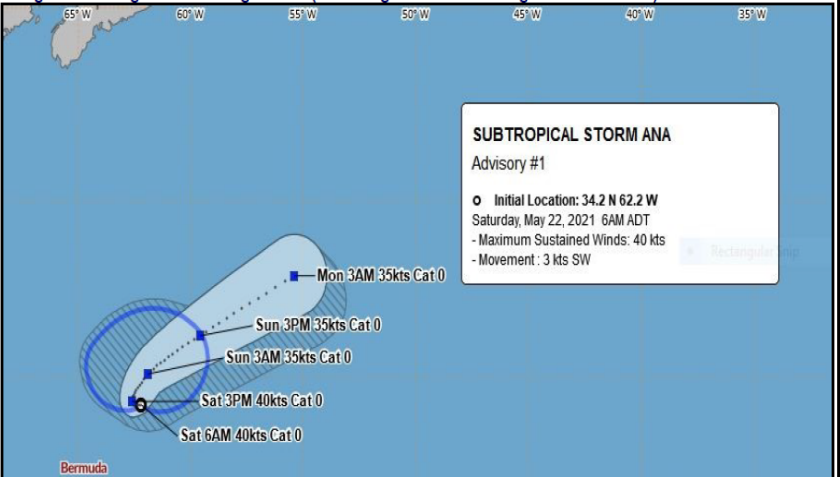
Advisory #1 (last advisory),

6 am Sat, May 22, 2021 (900 UTC Sat, May 22, 2021)

Refresh browser for latest image

KEY: Blue = 34-50 kts, Yellow = 50-64 kts, and Red = 64 kts and greater

Diagonal shading indicates fringe winds (34kts or greater surrounding the storm's core)



A TROPICAL STORM WATCH IS IN EFFECT

Wind Field: at current location Potential Track Area: 1-3 day 4-5 day

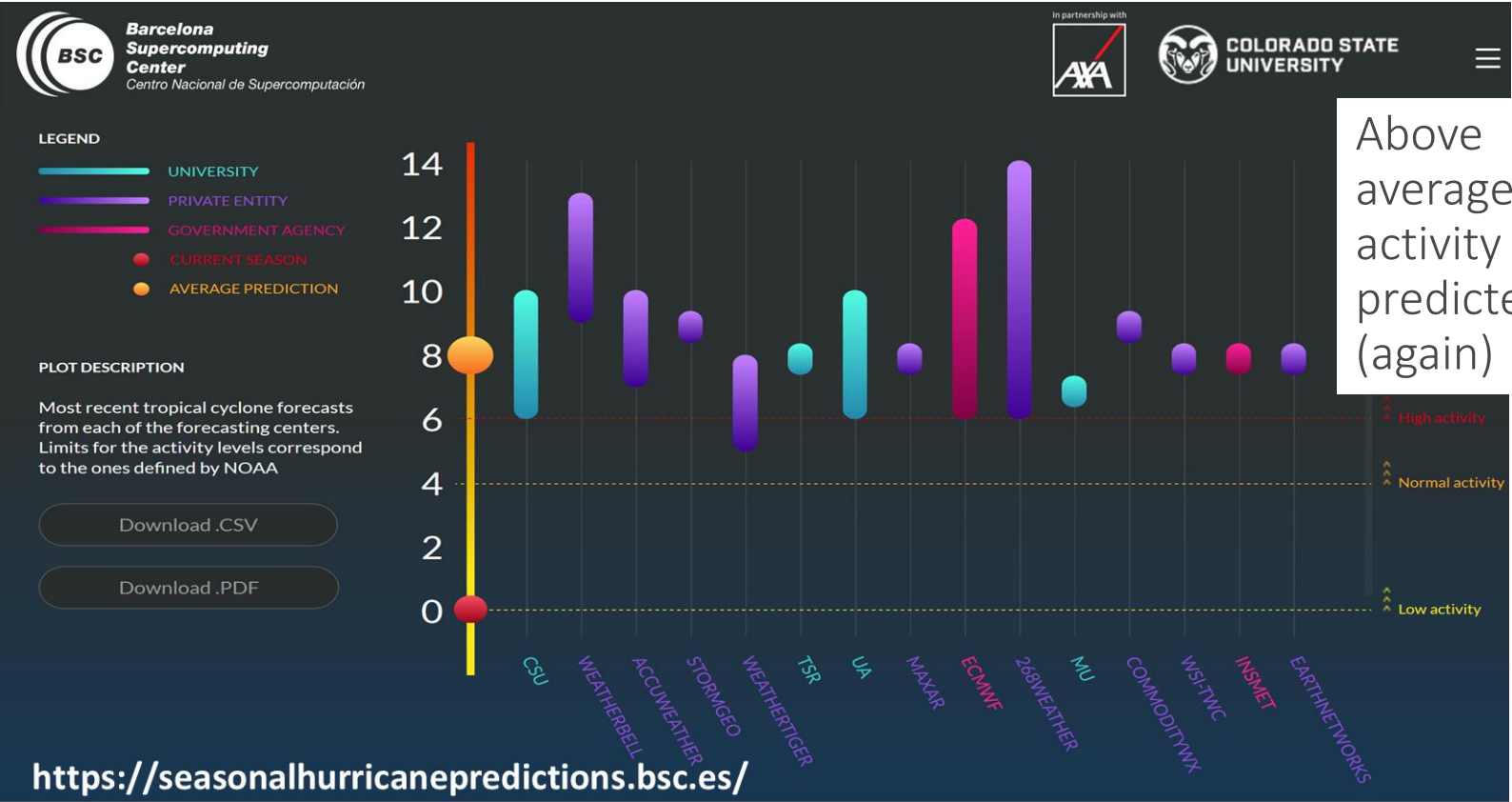
Sustained Wind Speed: tropical storm >= 34kt/39mph strong tropical storm >= 50kt/58mph hurricane >= 64kt/74mph

Closest point of approach to Bermuda within 72 hrs (3 days) is forecast to be 163 nm to the NE, 3 pm Sat, May 22, 2021. However, this system may move closer to Bermuda after this time period depending upon its track.

Current Position:	34.2N 62.2W approx. 173 nm NE of Bermuda
Recent Movement:	WSW or 240 degrees at 3 kt
Central Pressure:	1006 mb / 29.70 in
Max Winds:	40kt gusts 50kt

BWS Tropical Update Bulletins (TUBs), in line with NHC updates, are normally issued every 6 hours (03, 09, 15, and 21 UTC). When a tropical watch or warning is in effect for Bermuda, intermediate TUBs are issued at 3-hour intervals between the regular TUBs (06, 12, 18, and 00 UTC). Additionally, TUBs may be issued at any time due to significant changes in warnings or in the cyclone.

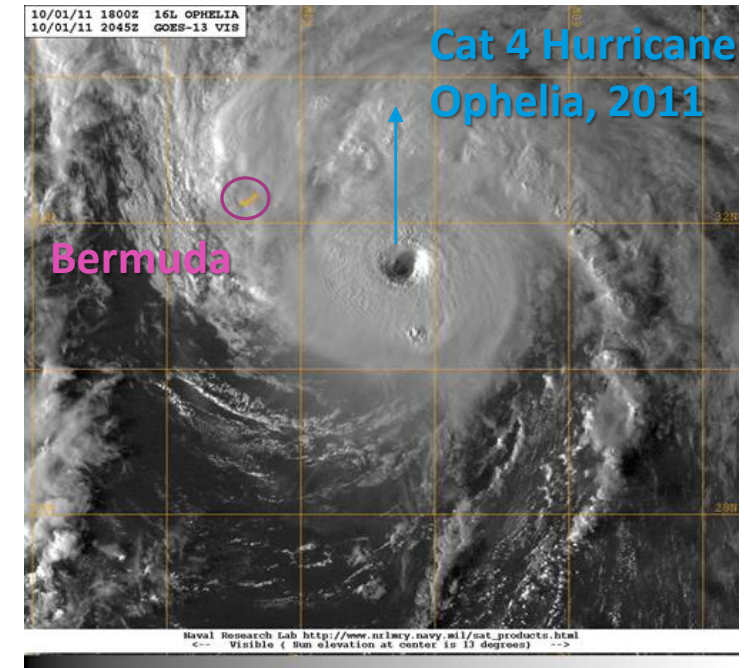
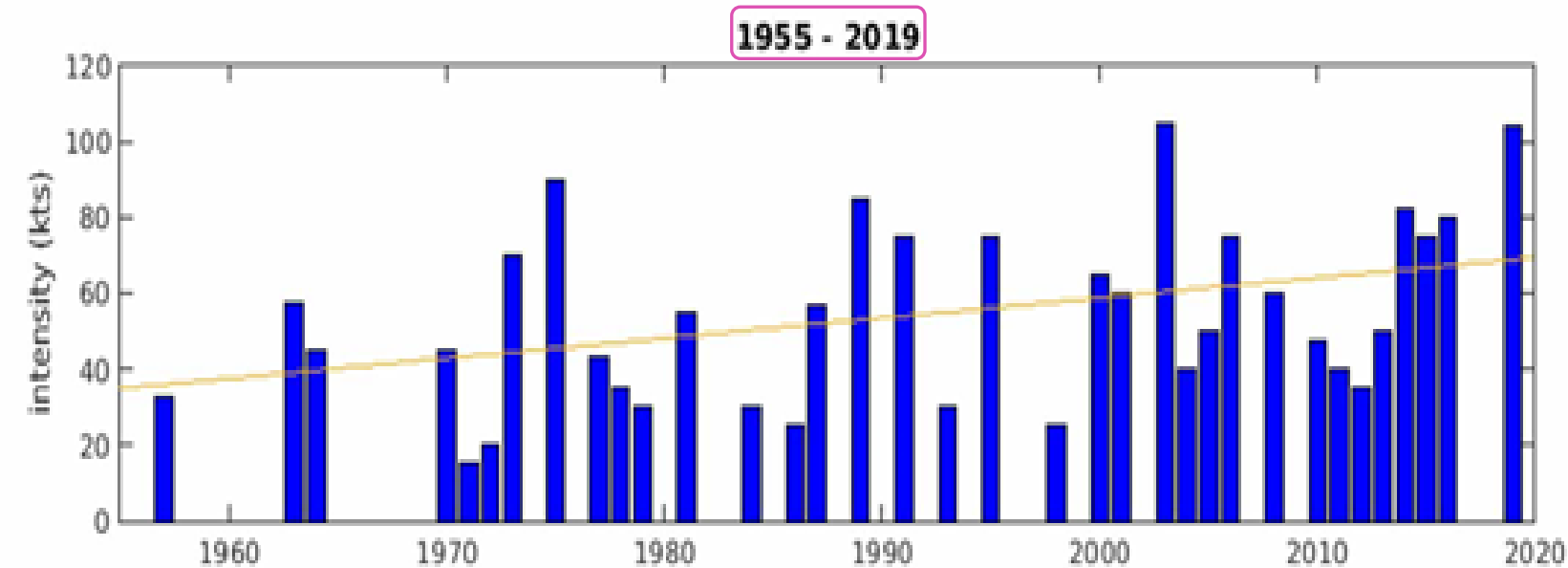
2021 Atlantic Hurricane Season



One pre-season storm recorded already!

Increasing trends in Bermuda hurricane activity

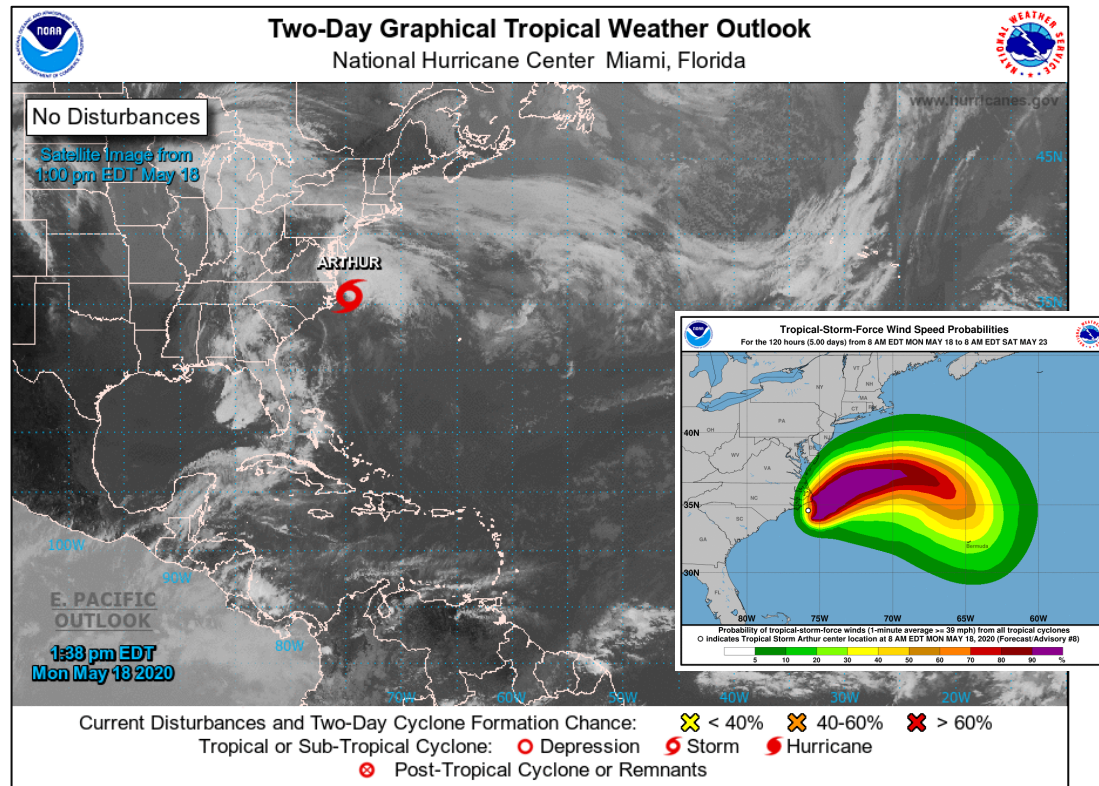
Research shows increasing trends in frequency and intensity of Bermuda tropical cyclones in recent decades



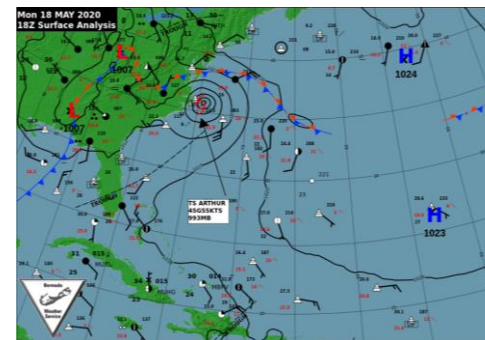
Is a Category 4 impact a reasonable scenario? Yes

BWS and NHC - Separate roles and responsibilities... but close coordination for forecasts and warnings

NHC: Analysis and forecasting of tropical cyclones in the N. Atlantic, Caribbean Sea and Gulf of Mexico



BWS: Observations, forecasts, analyses, watches & warnings for Bermuda and Marine Area out to 25nm

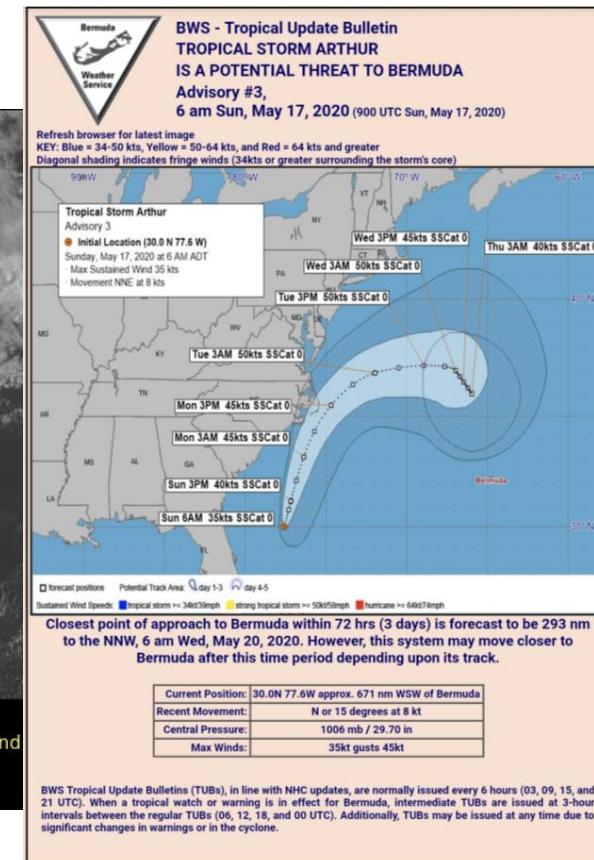


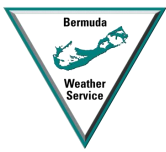
05:25pm Mon 18 May 2020

The red line indicates the marine area - 25 nautical miles from the Island

Lightning: + 0-20 + 20-40 + 40-60 minutes ago

Precipitation: light moderate heavy very heavy



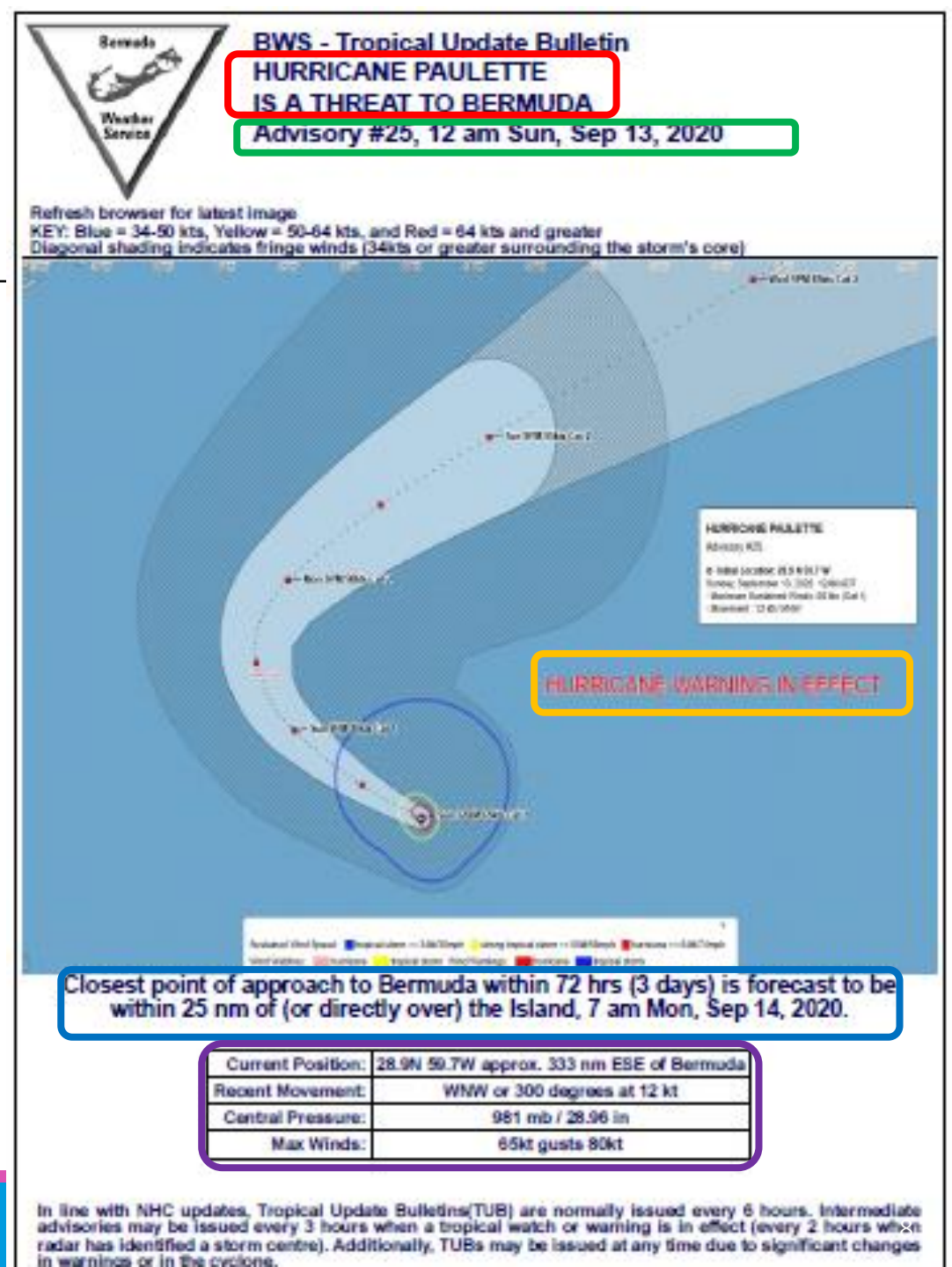


Forecast Products at the Bermuda Weather Service

Tropical Update Bulletin

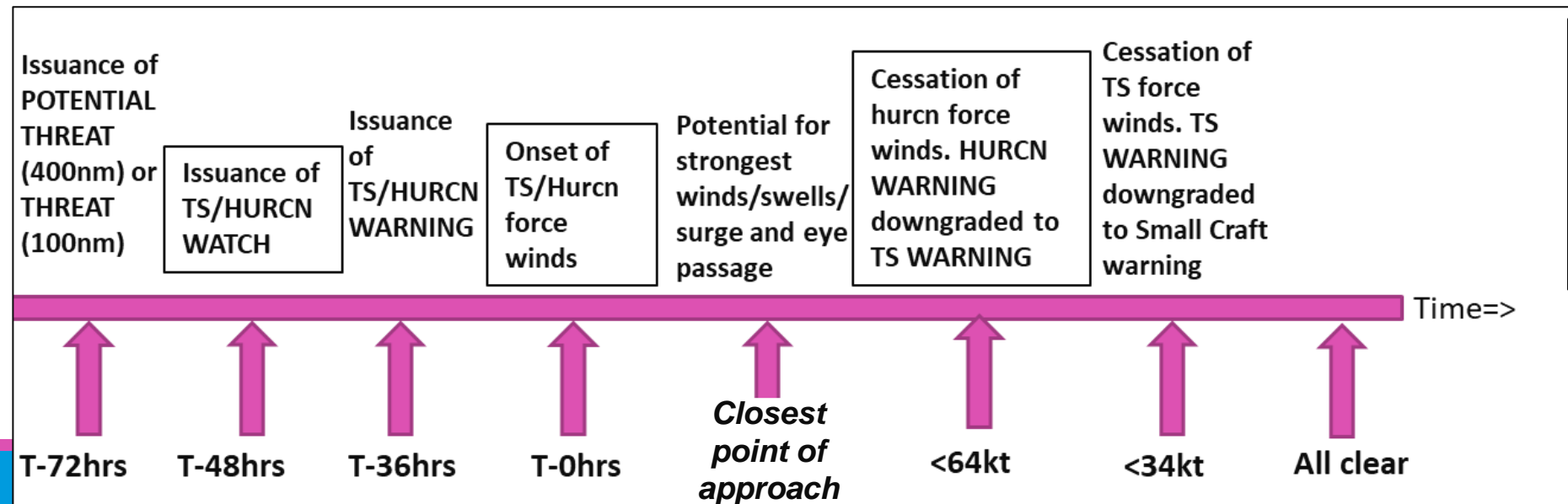
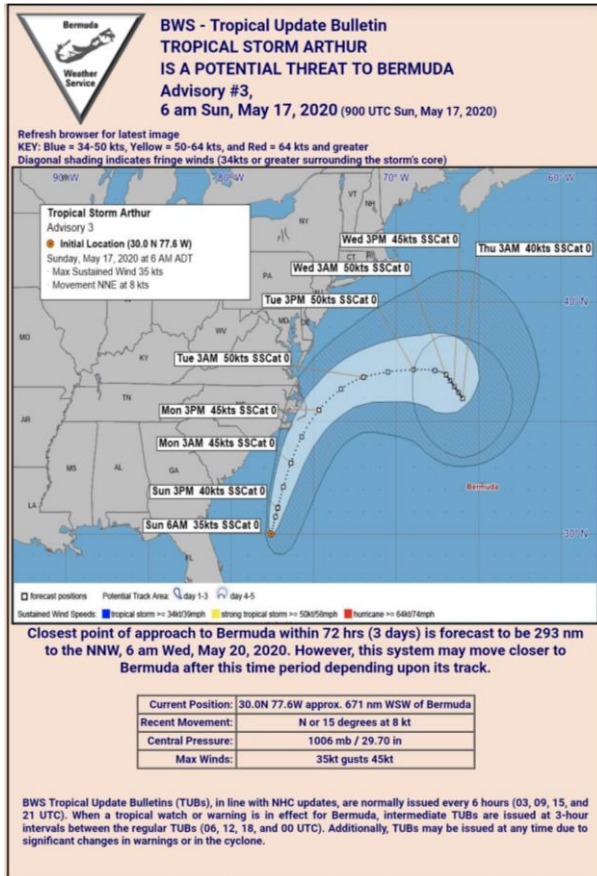
Issued for storms relevant to Bermuda

- Based on NHC Advisory # and time
- Current position relative to Bermuda and intensity details
- Timing and location of forecast closest point of approach ('CPA'), *within the next 72 hours*
- Any additional detail (e.g. Watch/Warning valid)
- Whether the system is a 'Threat' or 'Potential Threat' (see next slide)

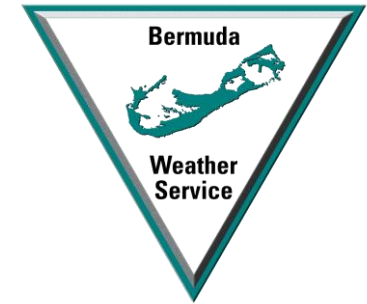


BWS Operational Products and Typical Timeline

- Tropical Update Bulletins (TUBs) are issued on relevant systems every 6 hours - Intermediate (3-hourly) TUBs possible for imminent systems
- Potential Threat** – storm centre to track within 400 nm in next 72 hours
- Threat** – storm centre to track within 100 nm in next 72 hours
- TS/Hurr Watch** – TS/Hurricane conditions possible within 48 hours
- TS/Hurr Warning** – TS/Hurricane conditions expected within 36 hours



- **Key Points:**
- Tropical systems do not behave like winter weather – they can change very rapidly. At the Watch stage, please monitor storm progress carefully, at the Warning stage please make final preparations.
- Please do not become complacent - keep updated on the official sources of information:
 - BWS website www.weather.bm for the latest weather
 - EMO website www.gov.bm/emo for preparation information
 - Emergency Broadcast Facility (100.1FM) during event
 - Bermuda Tree Frog app
- Review/create a Hurricane Preparedness Plan for your family and business incorporating lessons from previous years.



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