THE ATLANTIC HURRICANE SEASON SUMMARY – 2014

SPECIAL FOCUS ON ANTIGUA AND BARBUDA (PRELIMINARY)

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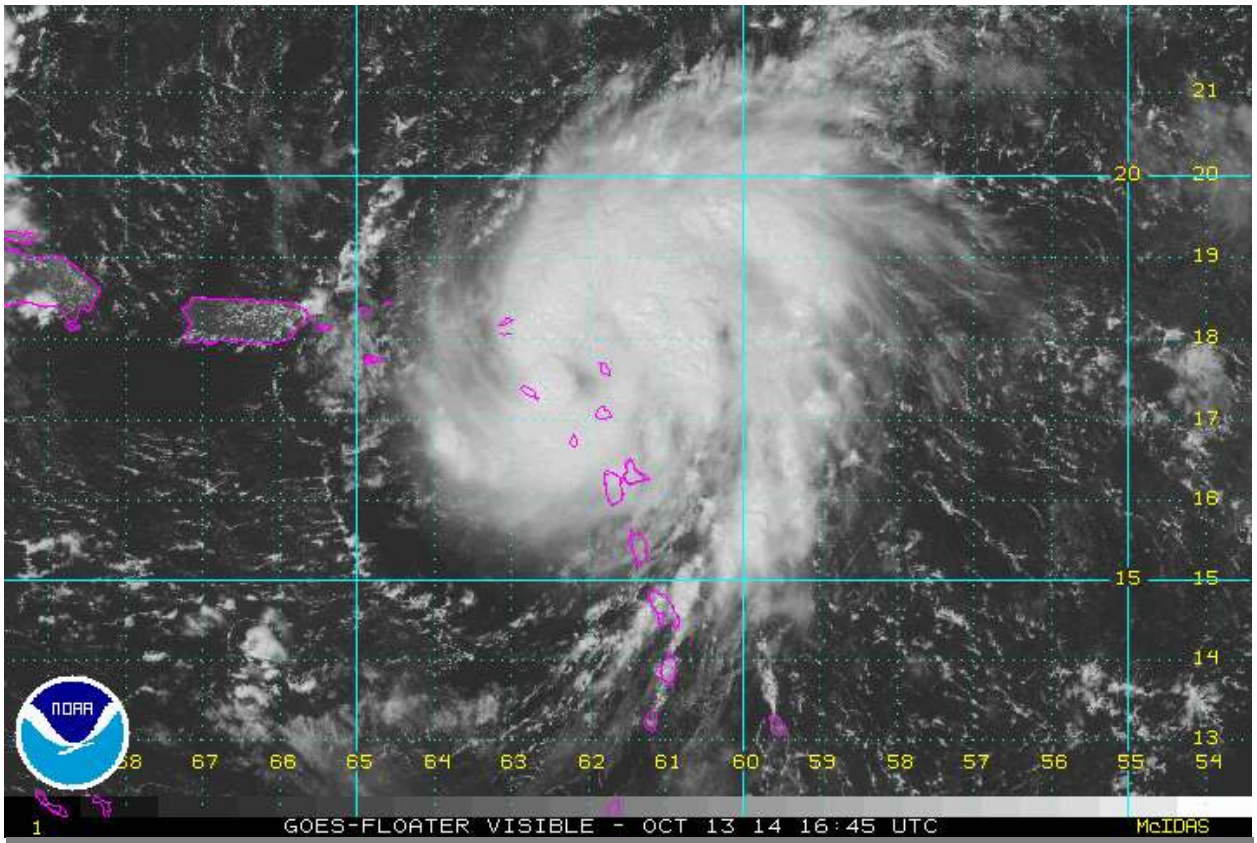
December 4, 2014



Satellite Image: Hurricane Gonzalo – Oct 13, 12:45 pm 2014

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The Season in Brief

The 2014 Atlantic hurricane season was relatively quiet generally but relatively average for Antigua. It produced eight (8) named storms. Of the eight (8) storms, six (6) became hurricanes and two reached major hurricane status - category three (3) or higher on the Saffir-Simpson Hurricane Wind Scale. The strongest tropical cyclone for the season was Major Hurricane Gonzalo with peak winds of 145 mph and minimum pressure of 940 mb (see figure 2). Gonzalo impacted Antigua and Barbuda and most of the other northeast Caribbean islands causing loss of lives and 100s of millions of dollars in damage.

Relative to Antigua and Barbuda

Relative to Antigua and Barbuda, the rest of the Leeward Islands and the British Virgin Islands, two (2) tropical cyclones entered or formed in our defined monitored area (10N 40W – 10N 55W – 15N 70W – 20N 70W – 20N 55W – 15N 40W – 10N 40W) - Bertha and Gonzalo. Gonzalo impacted the northeast Caribbean with hurricane force winds, passing directly over Antigua, St. Martin and Anguilla. This is the first time since Jose in 1999, Antigua has had sustained hurricane force winds, ending our 14 year hurricane drought. In terms of number of named storms, it was not a quiet season for Antigua but rather an average one; however, with respect to hurricanes, we were a year over due since one affects us every three years on average. We were also seven years overdue for the centre of a hurricane to pass over us. On average, Antigua is affected (directly hit, hit or brushed) by a named storm every other year, a hurricane every 3 years and a major hurricane every 8.3 years.

Detail and Perspective

The season had below the normal of 12 named storms, near the normal of 6 hurricanes and also near the normal of three major hurricanes; the season tied with 1997 for the fewest number of named storms since 1995, the start of the current active multidecadal period. This season also tied with 1997, 1993 and 1991 for the fourth fewest number of storms since 1981.

Further, the season was below normal with respect to the Accumulated Cyclone Energy (ACE) index, which was 66. The ACE index, measures the collective strength and duration of named storms and hurricanes. The index was 71% of the median and 63% of average (1981 – 2010); this is the 11th lowest since 1981. Compared to last year, there were six fewer storms but the ACE for 2014 is almost twice that of 2013's ACE (36), indicating this season packed a bigger

"punch". Further, the ACE accrued during October (30) was more than that accrued for August and September combined (29). The last time that this happened was 1963.

Overall, tropical cyclone activity caused over US$231 million dollars in damage and 17 deaths. For Antigua and Barbuda, Gonzalo caused around US$40 million dollars in damage. See table 1 and map 1 for all of the 2014 Atlantic Tropical Cyclones.

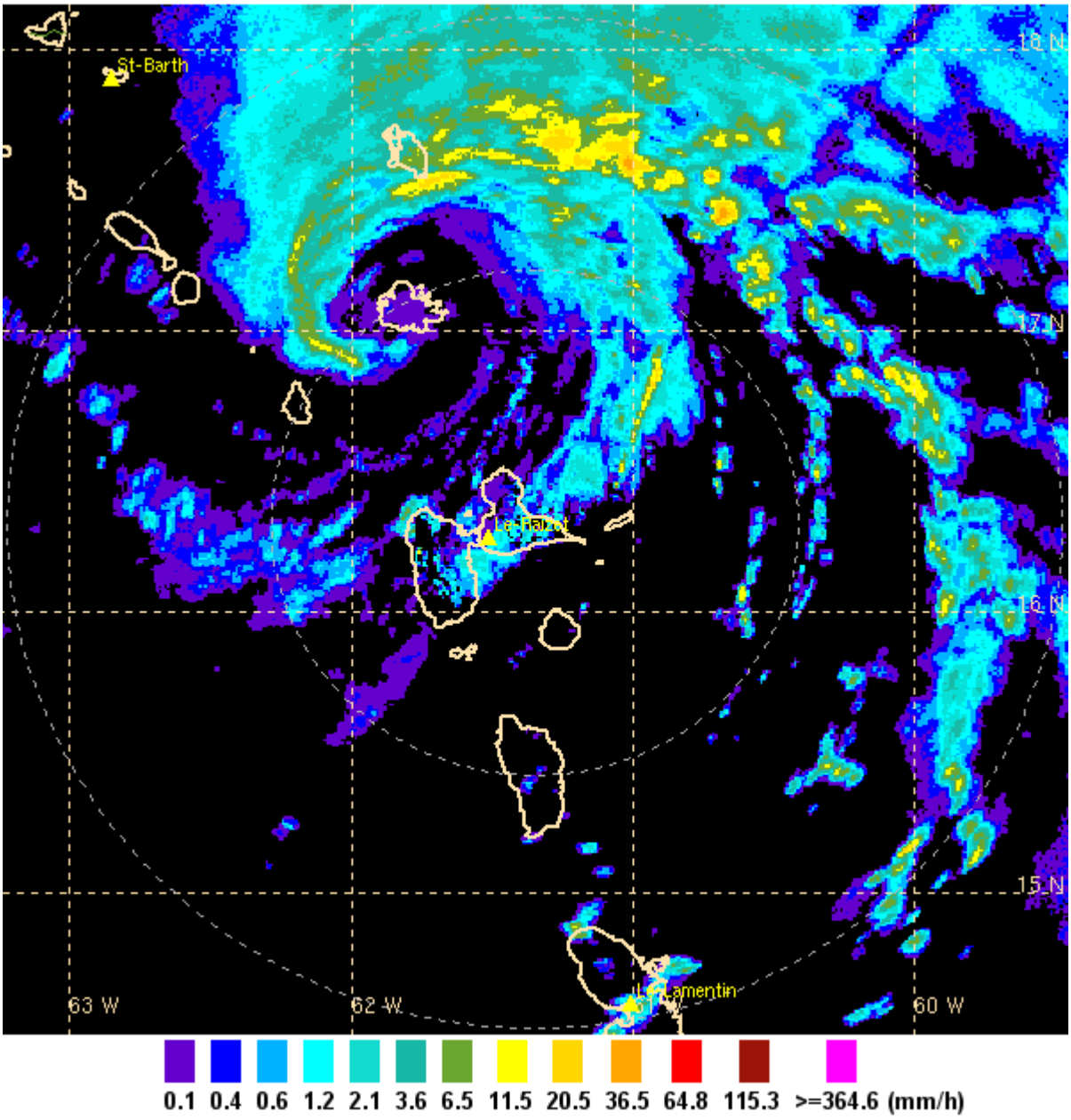

Figure 1: Radar image showing Hurricane Gonzalo approx. centred over Antigua Oct 13, 10 am (Image courtesy Meteo France).

Similar to last year, the relatively quiet season was due to dry mid-level air and prevalent sinking motion across the Atlantic Basin. Sea surface temperatures across the tropical North Atlantic were also cooler than normal for portions of the season, and vertical wind shear was quite strong across the Caribbean.

Most of the forecasts for the season, did an okay good job in forecasting a below normal season. However, this below normal season expectation was due to a forecast El Nino, which never materialized. An average season has 12 named storms and six (6) hurricanes, including 3 major hurricanes (1981 – 2010).

Tropical Cyclone in the Monitored Area

Hurricane Bertha

By definition, Bertha brushed Antigua as a storm on August 1-2. At its closest point, the centre of the storm passed about 120 miles southwest of Antigua between 8 pm August 1 and 2 am August 2. At the V. C. Bird International Airport in Antigua, the maximum 1-minute sustained wind from Bertha was around 27 mph with maximum gusts around 38 mph. Total rainfall from the system, measured at the airport, was about 8.4 mm or 0.33 inches over the period August 1-3. The system also minimally affected Montserrat, Nevis and St. Kitts.

Bertha developed from a tropical wave into a tropical storm during the morning of July 31; the depression stage was missed. Bertha intensified into a category 1 hurricane on August 4, just north of the Bahamas. On August 5, Bertha became post-tropical or lost its tropical characteristics. The remnants of Bertha reached the United Kingdom and caused severe weather conditions.

Hurricane Gonzalo

Gonzalo made a direct hit on Antigua on October 13. The centre passed over Antigua between 10 and 11 am. Officially, the system is listed as a storm at the time of impacting Antigua. However, data at collected at the Antigua and Barbuda Meteorological Service shows Gonzalo had sustained winds of category 1 hurricane strength. The Met Office anticipates that Gonzalo will be upgraded to a hurricane just before making landfall on Antigua. The maximum 1-minute, sustained wind speed measured at the V. C. Bird International Airport was 77 mph at 1244 UTC on October 13. During the period of the maximum 1-minute, sustained wind, a five seconds gust of 90 mph was recorded. There are unofficial reports of gusts of 100-105 mph, suggesting maximum sustained winds could have been in the range 80-85 mph (Harper et al. 2010). Gonzalo hit Barbuda with winds of around 61 mph and gusts to around 70 mph. Gonzalo also affected the rest of the Leeward Islands and British Virgin Islands.

On October 10, the low pressure area and tropical wave which eventually became Gonzalo were detected about 805 miles southeast of Antigua and began to be monitored for tropical cyclone formation. October 12, upon investigation by a hurricane hunter aircraft, the disturbance was upgraded to Tropical Storm Gonzalo at 1:30 pm, about 223 miles east-southeast of Antigua, missing the depression stage. Later that on October 12, yet to be confirmed, but we believe it

then strengthened into a hurricane on the night of October 12 and impacted Antigua as a Category 1 hurricane.

After impacting Antigua and Barbuda, it strengthened further, becoming a Category 2 hurricane while passing just east and north of Anegada in the British Virgin Islands on early October 14 and a Category 3 hurricane later the same day. The following morning Gonzalo became a Category 4 hurricane briefly. Gonzalo moved on from the Caribbean and made a direct hit on Bermuda with Category two winds. Gonzalo later on impacted Newfoundland before becoming post-tropical on October 19. The remnants went on to cause severe weather conditions across the United Kingdom.

Figure 2: Hurricane Gonzalo as seen from the International Space Station on October 16, 2014. At the time, Gonzalo was at peak strength, with 145 mph winds.

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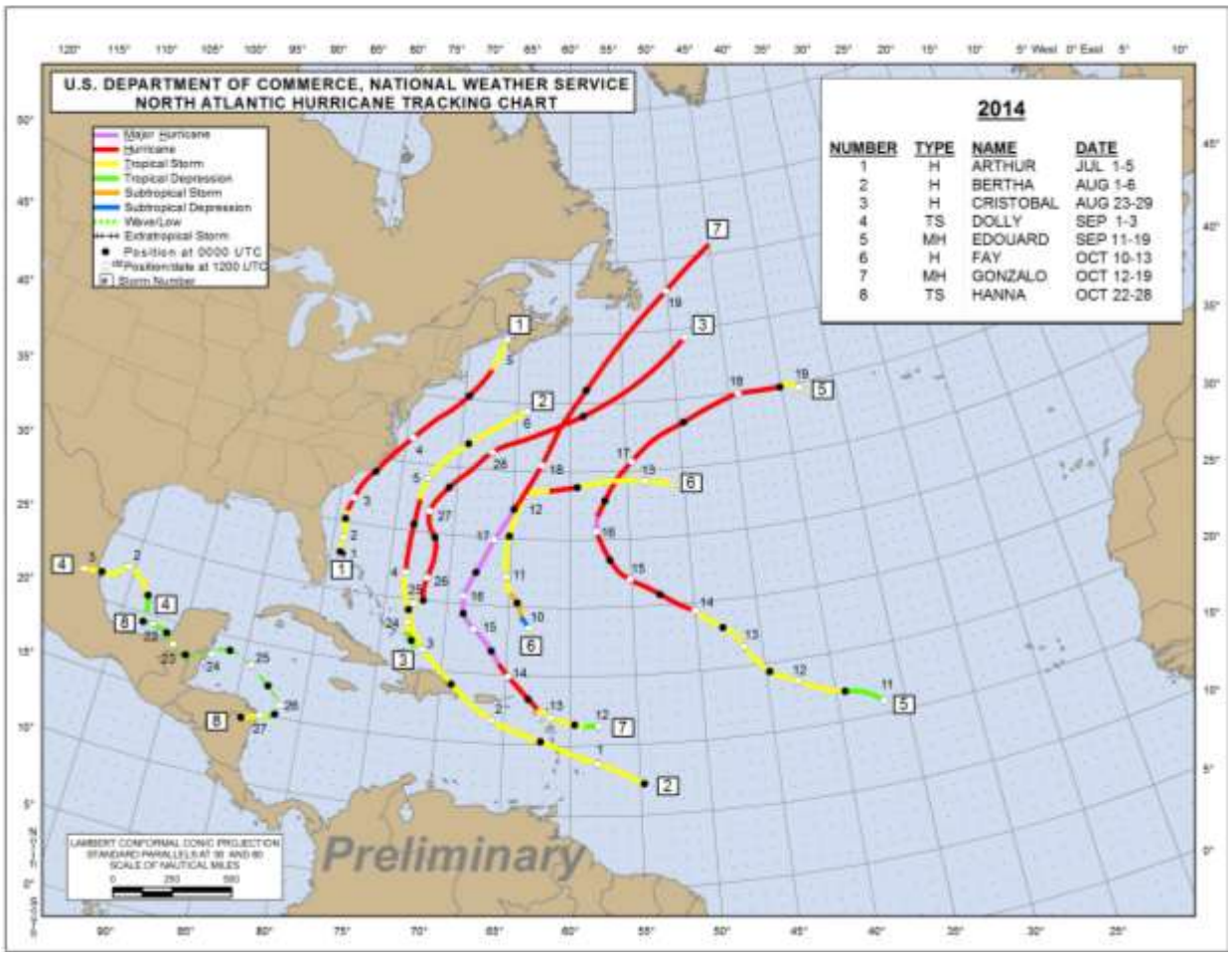
Name	**Date**	**Max Wind (mph)**	**Deaths**	**Antigua/Barbuda Damage - US$Million**
1. H ARTHUR	Jul 1-5	100	1	0
2. TD TWO	Jul 21-23	35	0	0
3. H BERTHA	Aug 1-6	80	2	Minimal
4. H CRISTOBAL	Aug 23 – 29	85	7	0
5. TS DOLLY	Sep 1-3	50	1	0
6. MH EDOUARD	Sep 11-19	115	2	0
7. H FAY	Oct 10-13	75	0	0
8. MH GONZALO	Oct 12-19	145	4	40
9. TS HANNA	Oct 22-28	40	0	0

Table 1: The Atlantic Hurricane Season Summary - 2014. Totals: 8 Named Storms, 6 Hurricanes and 2 Major Hurricanes. The season caused about 17 deaths and US$231 in damage. (Sources – NOAA, Wikipedia.com, ABMS Climate Section and Gov. of Antigua and Barbuda). Click to see a satellite image summary of the season.



Map: 1 Storm Tracks – 2014 (Picture Courtesy NHC).