



Hurricane Bill, August 2009

EVENT BRIEFING, 28 August 2009

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Hurricane Bill was the 2nd named system and first hurricane of the 2009 Atlantic hurricane season. Bill became a classic Cape Verde Hurricane on 17 August and quickly became a major Category 4 Hurricane by 19 August (Figure 1).

Moving in a general west-north-west direction, Hurricane Bill did not make landfall on any CCRIF member country, although Bermuda was the most exposed to its effects. As it moved away from the Leeward Islands and between Bermuda and the Bahamas, Hurricane Bill began losing its strength and was eventually downgraded to a Category 3 and then a Category 2 Hurricane (see Figure 1). At its strongest it was associated with maximum wind speeds up to 135 mph and a low pressure of 943 mbar. Associated hurricane force winds extended 115 miles with tropical storm force winds extending 290 miles from the centre.

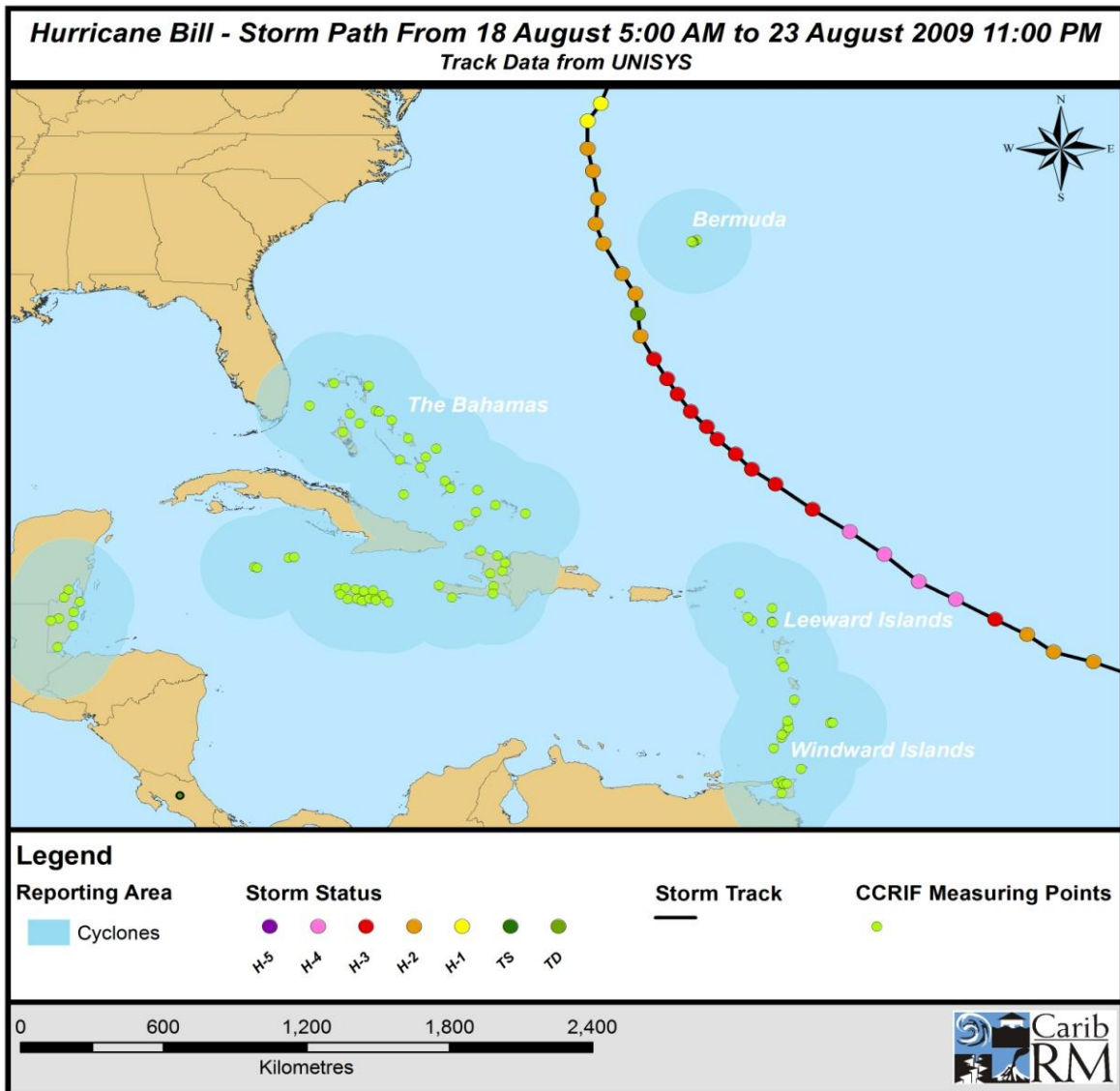


Figure 1 Bill, Track through the Caribbean.
Source: NOAA-NHC.

Impact in the Leeward Islands

Hurricane Bill was a Category 4 storm when it was positioned east of the Leeward Islands. Although none of the islands were directly hit by Bill, they did experience heavy rainfall (see Figure 2) and fairly large sea swells as a result of its proximity.

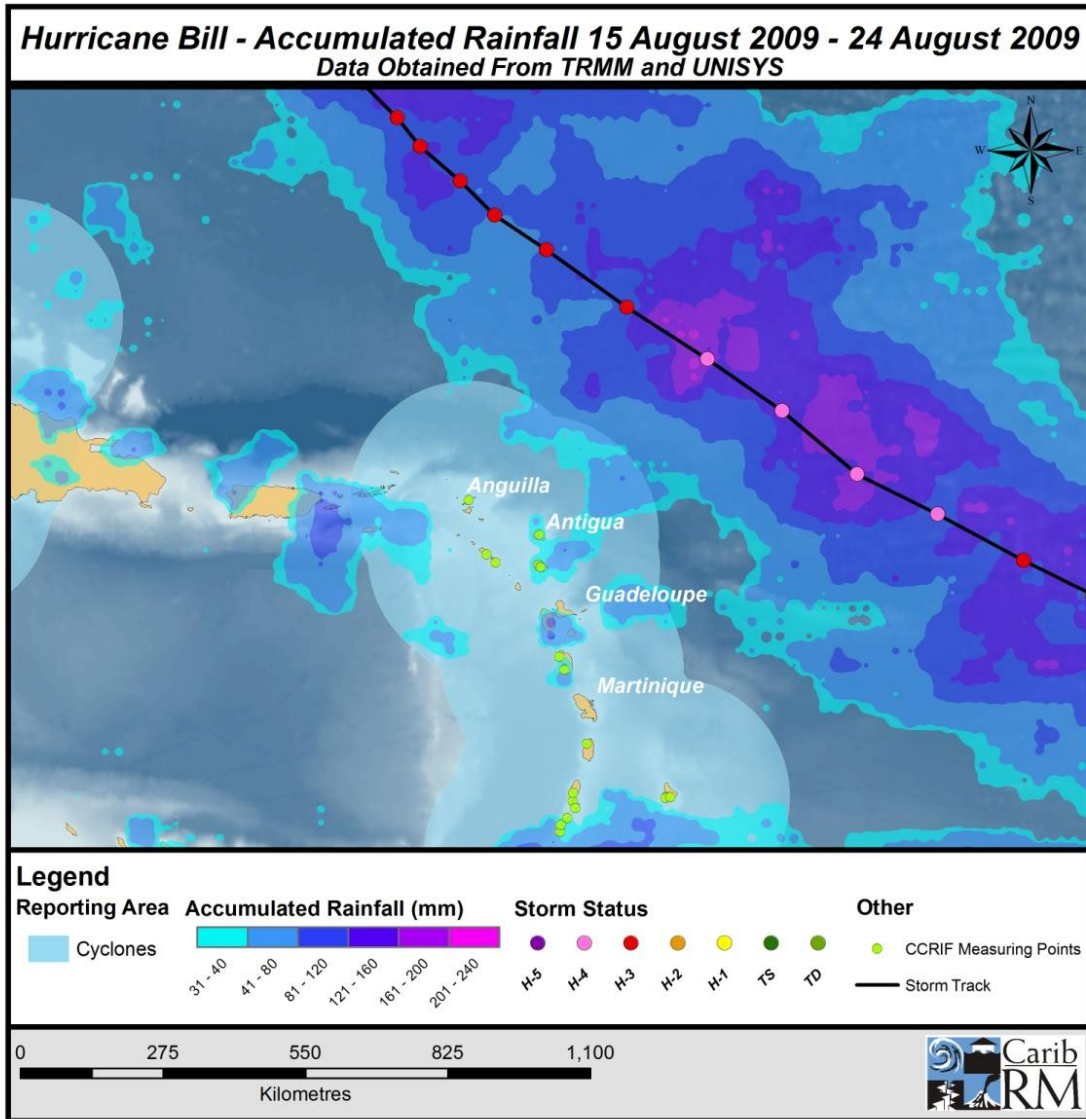


Figure 2 Hurricane Bill, accumulated rainfall 15 -24 August 2009.
 Source: TRMM and NOAA-NHC.

Impact in Bermuda

Of the 16 CCRIF members Bermuda was the most exposed island to Hurricane Bill. However by the time Bill reached its closest proximity to Bermuda, at 290 km west-south-west of the island, it had lost most of its energy and had been downgraded to a Category 2 Hurricane. Bermuda was therefore affected by winds ranging between 30 to 50 mph and was therefore spared the full brunt of the Hurricane (see Figures 3 and 4).

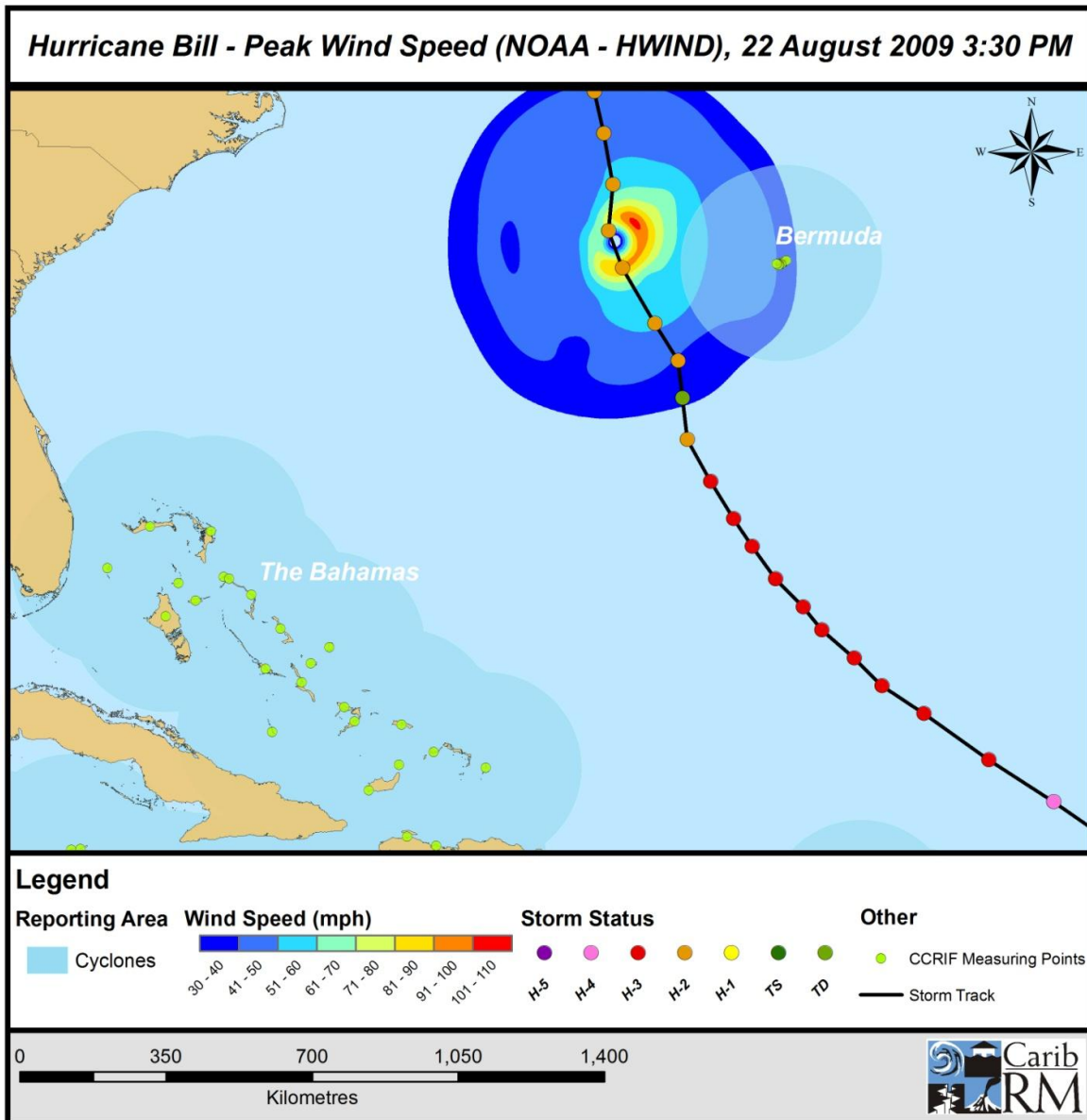


Figure 3 Hurricane Bill, peak wind speed.
Source: NOAA-HWIND.

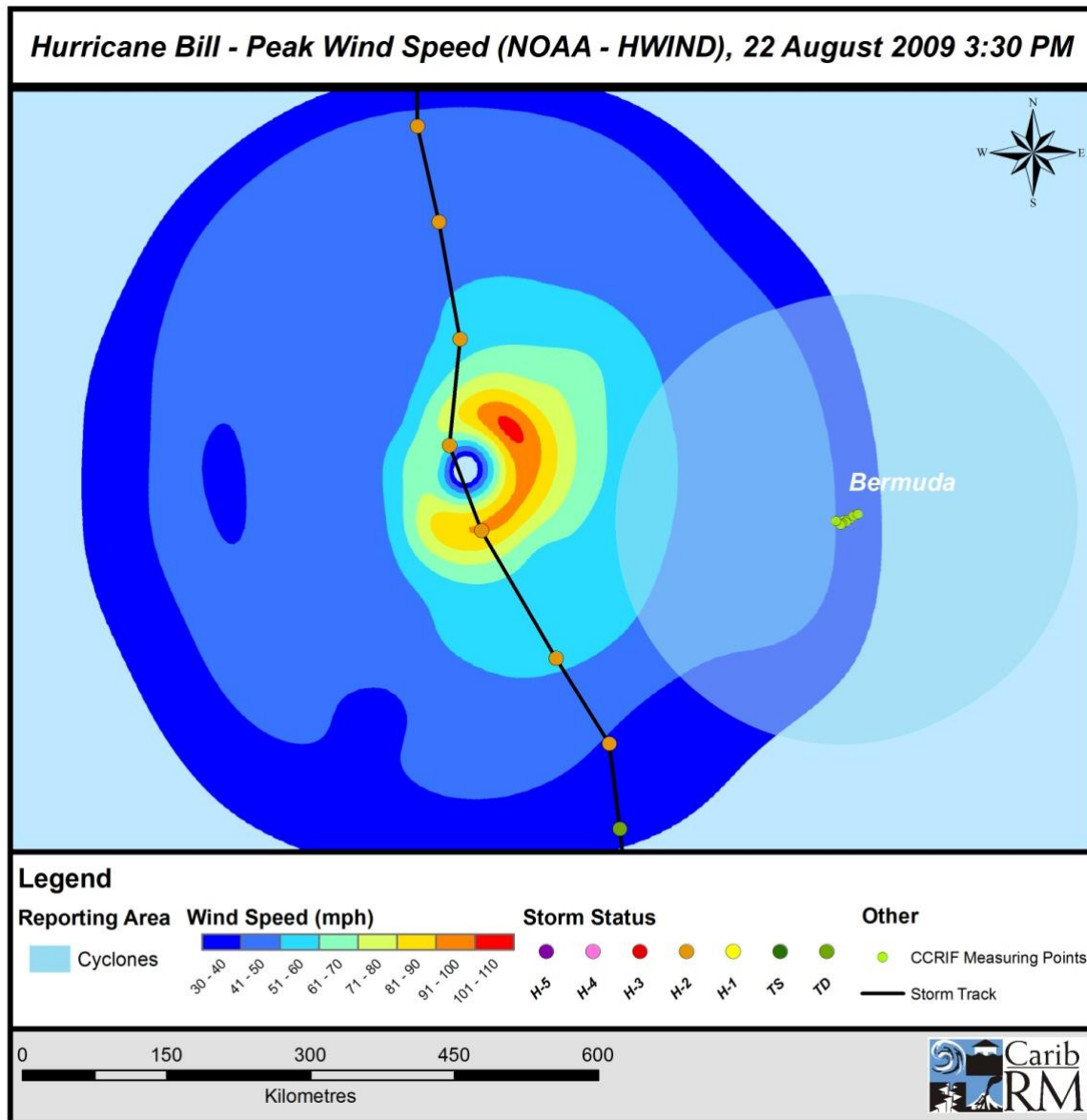


Figure 4 Hurricane Bill, wind speed affecting Bermuda, 22 August 2009.
 Source: NOAA-HWIND.

There were no reports of major damage or casualties, although the Bermuda Electric Company (BELCO) indicated that 3,700 properties had lost access to power as a result of the passage of the Hurricane. Electrical power was however restored to all residents by the following day. Most of the outages were reportedly caused by debris falling onto power lines and winds blowing out switches rather than any downed power lines.

The causeway and the L F Wade International Airport which had been closed on the Friday, 21 August in anticipation of the hurricane were open and back in operation by the next day.

The Bermuda Weather Service however reported incidents of flooding on the roads along the northern coast and observation of waves up 30 to 35 feet outside several reefs surrounding the island. Major swells up to 15 feet were also reported along the south shore and several beaches showed evidence of sand erosion as a result of the powerful high energy waves.

CCRIF Coverage

Hurricane Bill did not qualify as a 'reportable' event under the CCRIF event monitoring guidelines due to it being further than 230km from any CCRIF measuring point. However, a technical annex attached to this report provides a summary of the information generated within the CCRIF second-generation loss model, which is being run in parallel with the EQECAT model for the 2009 hurricane season.

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TECHNICAL ANNEX

This technical annex documents the outputs of the CCRIF Second Generation (2G) Hazard and Loss Estimation Model (HLEM) developed by Kinetic Analysis Corporation. Although 2009/10 policies are based on the EQECAT model (and losses calculated therein), CCRIF has been running the HLEM model in order to test its operational efficiency and verify the calculated hazards and losses for real events.

HLEM uses a 'modelled-loss' approach (as opposed to the index approach used in the EQECAT model), and the level of loss used as a basis for settlement of claims on CCRIF policies (once the policies are based on the 2G model) is that calculated within the model once it is run using the final track data from the National Hurricane Center. The final calculation run within the HLEM also includes outputs of final hazard footprints for wind, wave, surge and rain; these are the exact same hazard footprints that are used as a basis for calculating the modelled loss.

Hazard Footprints

The following two figures show the wind field and rain field from HLEM for Bill, the former for Bermuda, the latter for the northeastern Caribbean. They are displayed in Google Earth, which is one of the delivery mechanisms used for HLEM outputs (and, indeed, for the real-time forecast system, RTFS, operated by KAC for CCRIF clients during the hurricane season.)

The wind field should be compared with Figure 4 of the main event report. The NOAA wind field estimate is for peak sustained winds of 30-40 mph on Bermuda, which is consistent with surface measurements of 35-45 mph (three amateur weather stations). Bermuda lies outside of the weak tropical storm wind field in the HLEM output (so basically winds below 39 mph), which thus appears to underestimate the size of the tropical storm force wind field. We do not regard this as particularly important, as tropical storm winds contribute very little to any wind-induced losses.

The rain field should be compared with Figure 2; note that 1 inch is equivalent to 25mm. The overall rain field is generally consistent with the satellite based estimates, particularly for the areas of highest rainfall, peaking in the 8-10 inches (200-250mm) range in both. The lower amounts of rainfall on the edges of the storm track are a little less consistent; however, it should be noted that the satellite estimates are for a 10 day period while the HLEM outputs are just for storm-related rainfall.

Note that the HLEM storm surge output showed no impact in any CCRIF territory.

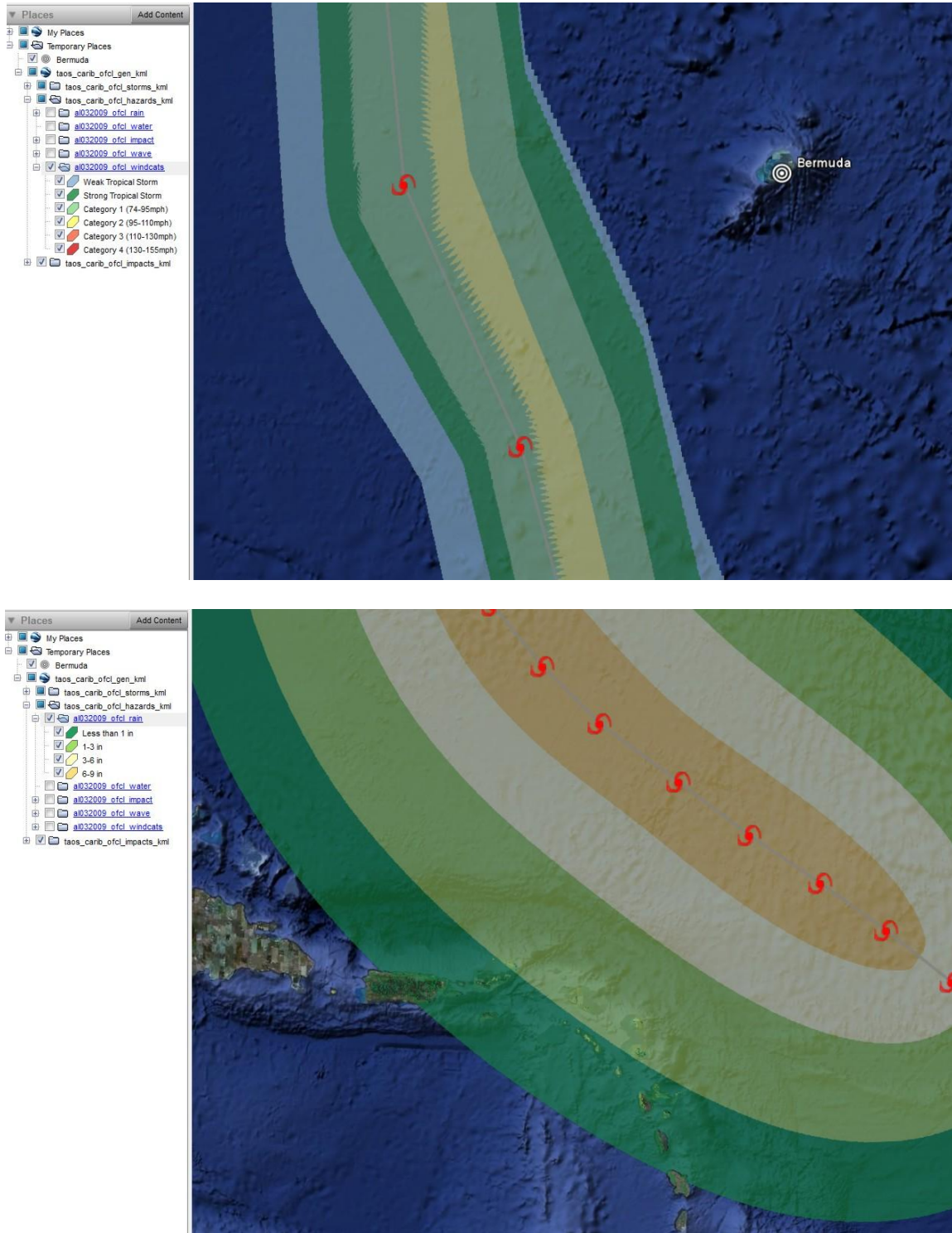


Figure T1 Hurricane Bill, wind speed (above) and rainfall (below) from HLEM.

Loss Estimate

As expected, the loss estimate from the KAC model is zero for all CCRIF territories.