

Best Track Committee Re-Analysis Comments for 1949  
**Replies to comments in boldface by Andrew Hagen and Chris Landsea – January 2014**

General comments:

1. There are several cases, particularly for systems in the additional notes, where a discussion of the upper-air data from the Historical Weather Maps (HWM) would be useful. This is especially true for systems close to the east coast of the United States, where more upper air data is available. Please add such discussion where they are appropriate.

**When the status of a system near the east coast of the United States is in question, the upper-air data/maps are now referred to.**

2. There are several instances of “possible central pressure” in relation to aircraft data throughout the submission. These are confusing. Please determine whether these are central pressures or not, and state this unequivocally in the text.

**Unfortunately, there are cases where it is unclear whether the aircraft made a penetration fix and obtained a central pressure or whether they flew near the center of the tropical cyclone and obtained instead a peripheral pressure. If the evidence is reasonably conclusive that a pressure value is a central pressure reading, then this will be so stated and included into HURDAT. If it is possible that the pressure value was a central pressure measurement but the evidence is weak, this will also be so stated and the value NOT included into HURDAT. While it would be make all such cases clear, the evidence is going to be, at times, ambiguous.**

3. There are several aircraft winds marked with an asterisk (\*) in the metadata. What does this mean?

**The asterisk (\*) means that the aircraft estimated surface wind was greater than or equal to the reported flight-level wind at that same time and location of the aircraft. For example, in Storm #2 on Aug, 24th at 2000 UTC, aircraft estimated the surface winds at 35 kt N and reported flight level winds of 30 kt NNE at 22.0N, 69.4W**

4. There are several binder entries of coded aircraft observations for multiple systems. Have these been fully decoded and incorporated into the submissions?

**These data, like the observations in 1948, have already been plotted on the microfilm maps.**

1949 Storm #1:

1. The Monthly Weather Review (MWR) states that “winds of 80 mph were reported by surface vessels in its path” on 21-22 August. These reports are not included in the daily metadata, the metadata summary, or the data tabulation. **Please find these ship reports that were apparently available to the forecasters at the time.**

**Unfortunately, after a search through MWR, COADS, microfilm, HWM and all other sources, the original ship reports are not available. We did include this in the text of the daily summary on the 21<sup>st</sup> and have now added it to the Ship Highlights and the Raw Database file. Fortunately, these 80**

**mph [70 kt] winds are of similar magnitude from the aircraft estimated surface winds (80 kt) and slightly higher than that derived from the 993 mb central pressure on the 21<sup>st</sup> at 17Z (59 kt). The 70 kt shown in HURDAT at 18Z is unchanged.**

2. On a related note, please better explain the reason for keeping the 70 kt on 21 August when the central pressure was 993 mb. While the original HURDAT shows 70 kt, the pressure is normally associated with lower winds.

**The 70 kt kept in HURDAT is a blend of the 59 kt from the pressure-wind relationship and the 80 kt surface winds estimated from the aircraft reconnaissance, and is consistent with the aforementioned ship reports.**

3. Is the aircraft-reported 984 mb pressure at 1500 UTC 22 August too far from the 1200 UTC synoptic time to be included in HURDAT as a central pressure?

**Agreed to remove this value from HURDAT, in deference to the 974 mb measured from a ship at 19Z.**

4. Please provide more detailed information on the ship which “believes” it passed through the center near 1900 UTC 22 August and reported 974 mb. Can we really ‘believe’ that is a central pressure measurement?

**A time series from the ship CAMCHE shows a full 180 degree wind shift. Moreover, the forecasters at the time considered their 974 mb observation to be a center fix as shown on the 00Z August 23<sup>rd</sup> microfilm map.**

5. In the 23 August daily metadata, it is mentioned that a reconnaissance aircraft passed “over the Sun [a ship]”. Are any reports available from this ship?

**Yes, this ship was routinely plotted on the microfilm maps. The observation at 21Z August 23<sup>rd</sup> of 35 kt NW and 1007 mb was already included in the Raw database file. This was apparently the highest observation that they had taken.**

6. There is a microfilm map in the binder for 0300 UTC 24 August that is centered just north of the Lesser Antilles. Is this supposed to be a map for another cyclone?

**In the upper right corner of this map, there are relevant aircraft radar fixes for this hurricane. These have been utilized in the reanalysis.**

7. Please re-write or remove the discussion about the passage of the eye over the Diamond Shoals lightship. The only question that needs answering is was the minimum pressure measured inside the radius of maximum winds (RMW)? A detailed record of the Diamond Shoals obs should answer that question. It also might answer the question of the anemometer height.

**The “Original Record of 6-Hourly Synoptic Observations” for Diamond Shoals was obtained from the EV2 website. However, these records do not contain the information about the minimum pressure or the maximum winds (only the six hourly measurements) and no other documents for this station are available. The discussion in the metadata has condensed with regards to the passage of the eye over the Diamond Shoals lightship.**

8. For the reports from the French ship Marseille, is there any log of the temperatures the ship may have reported? This could help determine whether the system was extratropical at the time of the encounter and also help refine the intensity.

**Unfortunately, a time series of this ship is not available within COADS, nor was it plotted in real-time as it does not appear in the microfilm maps.**

9. In the first paragraph of the metadata summary, the section starting “Although it is very likely...” is repetitious.

**This has been removed.**

10. Was the Hatteras Original Monthly Record (OMR) checked for additional information?

**The Original Monthly Record format ended in 1948. However, obtaining the Surface Weather Observations via the EV2 website did provide sub-hourly information regarding the hurricane. This did not change the peak values already noted, but has been added into the Raw database file.**

11. Do the proposed track changes on 25 August produce a consistent speed?

**Agreed that the revised position make the forward speed too jumpy on the 25<sup>th</sup>. The position at 12Z has been shifted a half degree westward to make for a smoother, more realistic motion.**

1949 Storm #2:

1. Has the Meteorological Service of the Bahamas been contacted for additional data, particularly any detailed obs from Nassau or other stations the center passed over?

**We have contacted the Bahamian Weather Service, but they do not have any additional information available.**

2. What is the anemometer height at Lake Worth where the 110 kt sustained wind was recorded? Is there any information on whether the winds increased after the anemometer was destroyed, and if so, for how long did they increase?

**The anemometer height was standard 10 m above the ground. There is no additional qualitative information about what happened to the winds after the anemometer was destroyed.**

3. Please re-examine the RMW at the landfall in Florida. The re-analysis is going with an RMW of 25 n mi, which would be consistent with an eye nearly 50 n mi across. However, portions of the eye passed over Delray Beach (left side 15 minute calm) and West Palm Beach (right side 22 minute calm) for a short time, and these stations are less than 18 n mi apart. These suggest the eye was smaller than 50 n mi and the RMW was smaller than 25 n mi (unless concentric eyewalls were present). Indeed, since the forward speed at landfall was 13 kt, a normal eye large enough to support a 25 n mi RMW should have produced 2-3 hours of calm at some locations, and there are no apparent reports of calms that long. After determining the new RMW, please re-examine the landfall intensity.

**After a re-examination of the RMW, it is concluded that the RMW was likely some value in the range of 16 to 19 n mi. In the U.S. landfall line, the RMW has been revised down from 25 to 20 nmi, but it is certainly possible that 15 n mi may be a better estimate than 20 n mi. Although West Palm**

Beach only had 22 minutes of dead calm, they had a 1 hour lull (inside the RMW). This produces a chord of 13 n mi drawn inside the RMW circle somewhere in the right half of the RMW (right of the center of the eye). Assuming the center of the eye made its closest approach to West Palm Beach of around 7 nmi, a likely RMW of 16 to 19 n mi is arrived at using geometry.

An RMW of 25 nmi would be more consistent with an eye closer to 40 n mi across according to some published studies that relate RMW to eye radius.

The new analyzed RMW size is about equal to the climatological value of 18 nmi for this latitude and central pressure. This does not change the analyzed landfall intensity of 115 kt. A central pressure of 954 mb equals an intensity of 109 and 104 kt for southern and north of 25N, respectively, according to the Brown et al. (2006) southern pressure-wind relationships for intensifying systems. 115 kt is analyzed based on wind observations.

4. Please better explain the reasoning for holding the intensity at 70 kt on 27 August while the center was over the Florida peninsula.

**Agreed to lower the winds to 65 kt at 12Z and 18Z on the 27<sup>th</sup>.**

5. In the metadata summary, the portion starting “While it is possible this wind is correct...” is confusing. Please re-write it for clarity.

**Done.**

6. Is there any detailed data from Canada for the extratropical phase?

**No additional information is available from Canada for the extratropical portion of this system.**

1949 Storm #3:

1. The 30 August daily metadata states that the system was discovered by aircraft on 30 August. **Please locate the aircraft data that were apparently available to the forecasters at the time.**

**The maps used by the forecasters at the time had an eastern boundary of 58W at 15N. Thus any aircraft reconnaissance observations were not plotted and not available within microfilm. Unfortunately, these aircraft data are not able to be located today. In part because of this, no change is made to the timing of genesis on the 30<sup>th</sup> or the initial location of the tropical cyclone.**

2. What data is available for this storm from Barbados and the rest of the Lesser Antilles? Resolving this system may require higher temporal resolution data than those on the microfilm maps.

**Typically, observations at these locations were taken four times a day at the synoptic times. These data are consistent with the system impacting the Lesser Antilles as a minimal tropical storm.**

3. Using the southern wind-pressure relationship, what wind would the 1005 mb pressure on 31 August yield? If it is 35 kt or more, is the aircraft data sufficient coverage to rule out the system being a tropical storm at 1800 UTC that day?

**1005 mb peripheral pressure suggests peak winds of at least 37 kt from the Brown et al. south of 25N pressure-wind relationship. It is agreed to indicate tropical storm intensity beginning at 12Z on the 31<sup>st</sup> and 40 kt by 18Z on the 31<sup>st</sup>, at the time of the first 1005 mb reading.**

4. Is upper air data available from San Juan prior to 3 September? This could help resolve the Storm 3/Storm 4 question discussed in the metadata summary.

**Within the Historical Weather Maps are contained 12Z 500 mb observations and analyses. These indicated NE 15 kt winds at San Juan on the 1<sup>st</sup>, E 10 kt on the 2<sup>nd</sup>, and WNW 20 kt on the 3<sup>rd</sup>. These observations are consistent with there being two separate tropical cyclones for storm #3 and storm #4.**

5. Please remove the statement in the metadata summary that starts “The formation of Storm 4 might have been...”. This speculation is unnecessary.

**So removed.**

1949 Storm #4:

1. Do the various land reports from the Caribbean islands help refine the genesis time? If so, please mention them in the 3 September metadata or metadata summary.

**Agreed to add in ships and Puerto Rico/Virgin Islands to the summary about genesis timing.**

2. There was apparently a rise in central pressure on 4 September from 987 mb to 995 mb. Is there a need to show that the system weakened a little as this occurred?

**Agreed to reduce the winds from 70 kt to 60 kt as the cyclone filled some.**

3. Is the anemometer height for the 55 kt observation on Bermuda known?

**These observations were taken from the Kindley Air Force Base in Bermuda, which was reclaimed land barely above sea level. Thus the anemometer height is likely to be standard height above ground with the elevation above sea level quite small.**

4. Is more Canadian data available for the extratropical phase in New Foundland?

**No additional observations are available from New Foundland for this storm.**

1949 Storm #5:

1. Is the New Orleans OMR available for this system? Is any data available from Baton Rouge?

**The original Grand Isle Weather Observations were obtained, as were the Baton Rouge, New Orleans (Airport Station), and Naval Air Station New Orleans Surface Weather Observations, as well as the Burrwood Original Records. (The Original Monthly Record series ended in 1948.) The couple of low pressure and tropical storm force wind readings have been included in. However, these did not require any change in the reanalysis.**

2. There is a need to locate whatever pressure data may be available from Houma when the center passed over. Perhaps local newspapers would have more information?

**Obtaining local newspaper accounts which are not available on-line for a tropical storm landfall is beyond the scope of this project.**

3. While it is uncertain, it seems unlikely that the radar used in the 4 September daily metadata was on Grand Isle. Perhaps it was somewhere in the New Orleans area?

**It is unknown where the radar was located, but it likely was somewhere in the New Orleans area.**

4. How was the intensity 35-kt intensity at 0000 UTC 5 September determined? What does the Inland Decay model suggest the intensity should be at that time?

**The 35 kt at 00Z 5<sup>th</sup> was obtained from assuming a gradual weakening after landfall. Usually, runs of Kaplan and DeMaria model are not needed for tropical storms. However, it was run at it gives 37 kt at 18Z 4<sup>th</sup> and 31 kt at 00Z 5<sup>th</sup>. Given the swampy nature of the land in southern Louisiana, somewhat less weakening is reasonable: 40 kt at 18Z 4<sup>th</sup> and 35 kt at 00Z 5<sup>th</sup>. This is unchanged from what was originally done in the reanalysis.**

1949 Storm #6:

1. It is noted on the 7 September binder map there is a 1019 mb pressure close to the proposed center position. Does this require any change in the track or intensity?

**Agreed that this ship observation requires a significant shift in the position toward the east-southeast. Given that on the 6<sup>th</sup> a ship reported 35 kt winds, maintaining a 40 kt intensity with limited observations nearby is reasonable.**

1949 Storm #7 (new):

1. The committee concurs with adding this system to HURDAT.

**Agreed.**

2. The proposed best track starts at the time the cyclone is proposed to have become tropical. Should the earlier extratropical phase be included as well?

**Actually, the best track begins as ET at 18Z on the 11<sup>th</sup> through 06Z on the 12<sup>th</sup>. A tropical transition is then indicated at 12Z on the 12<sup>th</sup>.**

3. This is a system that needs a discussion of the associated upper-air patterns.

**Agreed. This has been added in.**

4. Is it possible the transition to a tropical cyclone needs to be later than 1800 UTC 11 September? Perhaps as late as early on 13 September?

**Agreed that the transition to a tropical cyclone needs to be later than 18Z 11<sup>th</sup>. It is indicated to have occurred at 12Z on September 12<sup>th</sup>.**

1949 Storm #8 (was #7):

1. Is any map available for 17 September? Otherwise the committee concurs with the proposed changes.

**The HWM map is provided, but microfilm was not available that far east.**

2. A line for 16 September seems to be missing in the HURDAT selection at the start of the submission.

**The line for the 16<sup>th</sup> is not repeated, as there were no changes made on that date.**

1949 Storm #9 (was #8):

1. The microfilm maps for this storm are in many instances blurry over the southwestern Gulf of Mexico. In particular, the 0000 UTC 23 September map is almost illegible. Can they be re-scanned or re-printed?

**Unfortunately, the printing reflects the clarity of the microfilm available.**

2. Please re-examine the possibility that this cyclone is actually two different storms – one over the northwestern Gulf of Mexico and one over the southwestern Gulf of Mexico. The maps for 1200 UTC 21 September, 0000 UTC 22 September, and 1200 UTC 23 September suggest the possibility that two centers were present. For example, the 1200 UTC 23 September map suggests the possibility of a center near the Texas coast and a second one well to the south. In addition, while the metadata summary mentions a ship report at 2200 UTC 22 September that “somewhat” supports the one-storm scenario, the aircraft data for that day does not seem to support the observation from the ship.

**Agreed that this system is somewhat ambiguous and may have been two different storms. It is agreed that at the very least that there existed substantial troughing in the southwestern Gulf on the 21<sup>st</sup> and 22<sup>nd</sup>. The 12Z 23<sup>rd</sup> map, however, had an observation plotted that is very likely incorrect. The pressure is much too high, temperature too low, and the ship (#4581 from COADS) does not agree with nearby ship and station data. (For example, see 18Z on the 23<sup>rd</sup> for a nearby ship comparison.) For the aircraft data late on the 22<sup>nd</sup>, it is agreed that this is not consistent with the ship at the same time. This is now so noted. The balance of the evidence is suggestive that the one storm scenario shown in HURDAT is correct. Thus no large-scale changes were made.**

3. The 0000 UTC 21 September map shows a ship with 1009.5 mb and east-northeast winds of 50 kt south of the proposed center position. Does the position need to be modified to fit this report? Is the data from or position of the ship wrong? Please clarify this.

**The wind speed is likely wrong and was questioned by the original forecasters as seen by the microfilm “?”. Note that the ship – the Halifax – subsequently provided observations around 06Z that had wind direction and pressure, but no wind speed.**

4. The 1800 UTC 22 September map has what looks like a 1006 mb aircraft ob. Is this correct? If so, please include it in the daily metadata.

**The value plotted is actually 1000.6 mb, which cannot be correct given the nearby ships showing 1010 mb and very little wind.**

5. In the metadata summary, there is a mention of revising the intensities based on the aircraft radar appearance as the center made landfall in Mexico. While the inferred intensities may be correct, this is not quantitative enough of data to justify changing the HURDAT intensities. Please restore the original values.

**Agreed – original HURDAT intensity values late on the 25<sup>th</sup> and on the 26<sup>th</sup> are retained.**

1949 Storm #10 (was #9):

1. Are there any detailed reports from the Lesser Antilles from this system, especially pressures?

**No additional detailed reports are available from the Lesser Antilles.**

2. Is it known whether the 65-kt wind at St. Croix is a sustained wind or a gust? Are more detailed observations available from this station?

**On the NCDC EV2 site, the only U.S. Virgin Island observing site available is for St. Thomas (which showed no strong winds or low pressures). It is suspected that this wind in St. Thomas is an estimated gust and not a measured quantity.**

3. Is an OMR available for San Juan for this time? If so, there might be a summary of the cyclone included.

**The Original Monthly Record series ended in 1948. The Local Climatological Data for San Juan is available from the EV2 site, which did have a short summary. Additionally, detailed observations from four stations in Puerto Rico were available through the Surface Weather Observations in the EV2 site. Of these, only the Ramey Air Force Base in Aguadilla contained tropical storm force sustained winds. These are now included.**

4. In the metadata summary, the passage starting “The cyclone does not make landfall in the Dominican republic...” is confusing. Please re-write for clarity.

**Rewritten.**

1949 Storm #11 (was #10):

1. Please contact the meteorological services of Guatemala and El Salvador for more data on this system. It is needed to help resolve whether the cyclone originated in the eastern Pacific, or whether a genesis in the Bay of Campeche is more correct.

**The weather services of Guatemala and El Salvador have been contacted, but neither were able to provide any additional information about this storm.**



2. This data also may help resolve whether the system actually was a tropical storm for three days while the center was over land. On the surface, this appears unlikely. In addition, the committee notes that there are no observations of gales prior to 2 October, and that low pressures in this part of the world do not always mean high winds. Please consider revising the intensity downward based on whatever data is obtained from Central America.

**Given that no additional information was available from Guatemala and El Salvador, it is agreed to indicate that the system was a tropical depression while over Central America, rather than a tropical storm. Development to a tropical storm is then delayed until the system reached the Gulf of Mexico.**

3. Please provide the appropriate Texas OMRs for this case.

**The OMRs stopped in 1948. The EDADS website was searched (the Climatological Data and Local Climatological Data) but there was no additional useful information there near the RMW. However, there were additional obs obtained (please see response to question #5).**

4. A central pressure of 970 mb is added to HURDAT for 1200 UTC 3 October based on an aircraft observation outside the eye. How is it known that the RMW at that time was 15 n mi, and is this calculation appropriate?

**Three of the four variables needed in the Schloemer equation are known with a high degree of accuracy. The fourth variable (the RMW) was likely known with a good amount of accuracy as well considering the following aircraft data from the 12Z microfilm map from Oct. 3: "Hurricane center located at 031348Z at 25N 9535W. Max winds north 80 kts WNW 12 miles of eye, west 90 kts 20 miles SSW of eye, south 100 kts 20 miles SSE of eye. Lowest pressure 981 mbs WNW 12 miles of eye." These distances average 17 miles (15 nmi). In addition, at 1830Z on the 3<sup>rd</sup>, the Freeport land-based radar operator reported an eye diameter of 30 miles (eye radius of 15 miles – this implies an RMW of ~20 nmi). However, it is agreed that while the Schloemer equation may be useful for giving a ballpark estimate of what the central pressure could have been, we cannot assume that the results will yield an accurate enough answer to place a central pressure in HURDAT. Thus, the 970 mb central pressure has been removed at 1200 UTC on 3 October.**

5. Please re-examine the landfall pressure in Texas. The proposed 960 mb is based on somewhat peripheral data and is a bit suspect. The committee notes that the eye passed over the town of Sweeney northwest of Freeport shortly after landfall. Have local sources (e. g. Lew Fincher) in Texas been asked to see if any pressure obs were collected there or elsewhere along the track? Has any landfall pressure been calculated working backwards from the data in Houston? Given the magnitude of the proposed changes in the landfall intensity, an extra effort to determine the central pressure is warranted.

**We have contacted Lew Fincher, but he has no additional observations available. We had previously calculated a 960 mb central pressure, which is nearly identical to the central pressure value inferred from the Wiggert et al study. The only variable that we used from that study was the 15 nmi RMW because it matched up fairly reasonably with the available data we had (see response to question #6 below).**

**The EDADS website was checked again very thoroughly. There are some obs obtained from the EDADS website (some of which further confirm obs that are already in the Excel spreadsheet), which does lead to a change in the analyzed intensity: "The center passed between the [Houston] airport and the city office. The lowest pressure at the city office was 29.17" at 4:50 am [1050Z]. The**

lowest pressure at the airport was 29.12” at 4:28 am [1028Z].” I believe that this is Houston Hobby Airport.

Min p at Galveston Municipal Airport: 996.2 mb at 0945Z.

The Houston WBAS reported the following obs:

10/04 0828 UTC: 90 mph E (estimated), SLP 993.2 (falling rapidly)

10/04 1028 UTC: 23 mph, SLP 986.1 mb (min p)

There are many more obs listed which indicate a near 180 degree wind shift and that the center passed nearly directly over this station. The central pressure around 1028 UTC was likely around 982 mb. A run of the Ho et al. inland pressure decay model to back out the landfall central pressure suggests a value of 970 mb. The combination of the Scholemer equation result (960 mb) and the Ho et al. decay model (970 mb) along with the previous estimates (Wiggert et al. – 960 mb, Connor/Jarrell et al. – 972 mb, Ho et al. – 978 mb) leads to an analysis of 965 mb. 965 mb central pressure at landfall suggests maximum winds of 90 kt from the north of 25N pressure-wind relationship and 94 kt from the subset of intensifying systems. Given a near average speed, but slightly smaller RMW than climatology and a slightly lower environmental pressure than average, a 95 kt intensity is analyzed at landfall.

6. Please also re-examine the landfall RMW. It is noted that Sweeney had a 30 minute lull as the eye passed over (MWR), but it is unclear how close to the center of the eye they were. What was the last eye diameter reported by the radar in Freeport before it shut down? What was the last aircraft-reported eye diameter? Are they consistent with the proposed 15 n mi RMW?

Landfall occurred on the 4<sup>th</sup> at 05Z. At 1513Z on the 3<sup>rd</sup>, the Navy aircraft gave a report from when the plane was located within 20 miles of the eye at various spots around 13-15Z, along with the azimuth from the eye and the wind speeds encountered, and also gave a pressure. This information indicates an RMW of less than or equal to 15 nmi (discussed above in the response to question #4). Since the flight-level was less than 1,000 ft, the flight-level RMW was likely not significantly different from the surface RMW. At 1830Z on the 3<sup>rd</sup>, the Freeport land-based radar operator reported an eye diameter of 30 miles (eye radius of 15 miles – this implies an RMW of 20-22 nmi). At 2145Z on the 3<sup>rd</sup>, Freeport radar operator reported “width of open area 30 miles” implying that the eye diameter was unchanged from 1830 UTC. Since recent studies have shown that the RMW is often located not where the highest reflectivity is, but inside that, it is estimated that the RMW was likely around 20 nmi at the time of the land-based radar fixes. If Sweeney had been in the center of the eye, then the RMW could have been as small as 5.5 nmi since the storm was moving with a forward speed of 11 kt. Based on the study of Wiggert et al. as well as all other available data, 15 nmi appears to be a reasonable value for the RMW (rounded to the nearest 5 nmi).

7. What is the basis for maintaining the system as a 25-kt tropical depression so far to the north? Is it possible the intensity dropped below 25 kt, then increased again when the cyclone became extratropical?

The 25 kt intensity was maintained late on the 5<sup>th</sup> and on the 6<sup>th</sup> on the basis of observed 20 kt winds present at each synoptic time (microfilm). Note also that it is agreed (see below) to indicate extratropical transition 12 hours earlier.

8. Is there a possibility the cyclone became extratropical before 1800 UTC 6 October?

It is agreed to indicate extratropical transition at 06Z on the 6<sup>th</sup>, given the flow around the low and the temperature gradients observed.

9. In the HURDAT extract at the start of the submission, a line for 28 September is missing.

**There were no proposed changes to track or intensity on 28 September, thus no repeated line. However, after addressing #1, there is a decrease in intensity now, thus a line has been added below it.**

1949 Storm #12 (new):

1. The committee does not concur with adding the system to HURDAT at this time. The committee has concerns that until 5 October that the gale-force wind reports are a significant distance from the center, and that the system appears to have some frontal character through its entire life as indicated on the various maps.

**Four key ship observations indicate gale force winds relatively close to the center: 12Z 3<sup>rd</sup> – 35 kt S about 60 nm from center, 18Z 4<sup>th</sup> – 50 kt NE about 150 nm from center, 12Z 5<sup>th</sup> – 45 kt WSW about 20 nm from center, and 06Z 6<sup>th</sup> – 35 kt SW about 100 nm from center. Moreover, while fronts were shown in HWM and in some of the microfilm maps, the analyses indicate a fairly symmetric vortex, with maximum winds near the center (with most being on the southern semicircle), with almost no baroclinicity from the 3<sup>rd</sup> to the 6<sup>th</sup>. Thus the evidence shows that the system was a tropical storm.**

2. The 29 September HWM shows a ship with 1014 mb and 25 mph winds near the trough axis. This should be noted where appropriate.

**Added.**

3. The submission mentions an aircraft flight on 4 October that sampled a system that was apparently west of the proposed new storm. What was the aircraft sampling? Is this a possible new system that should be added to the 1949 suspects list? It is noted that the 4 October microfilm maps for this area show two lows connected by a front, which relates to point 1.

**The aircraft was sampling a different system, which has now been added to the suspect list.**

4. Please provide a detailed map for 1200 UTC 5 October. At this time, a gale is reported relatively close to the cyclone center, which is the best evidence that the system became a tropical or subtropical cyclone. Is a microfilm maps available for this time?

**Unfortunately, microfilm is not available for this time. A newly analyzed map has been provided. It again is consistent with a small tropical cyclone not entangled with any frontal boundaries (though – at this specific date/time – the data are somewhat sparse near the cyclone).**

1949 Storm #13 (was Storm #11):

1. The committee notes that the 1800 UTC 12 October microfilm map show a second low north of the developing tropical cyclone. Where did this low go and what role did it play, if any, in this storm?

**This low apparently was short-lived and either dissipated in place within a day or moved off to the northeast. It did not though play a significant role in this storm.**

2. Is it possible that the genesis of this system occurred later that current shown in HURDAT, more along the lines of what is stated in the MWR? Perez includes this system as a tropical storm in

Cuba, but the data on the various maps does not confirm this. Has Perez been contacted for more detailed information?

**Agreed to delay the genesis of this system until 06Z on the 13<sup>th</sup> north of Cuba. Perez has been contacted to see if this change would be consistent with his available observations.**

3. Given the uncertainty in the actual pressure value at 1200 UTC 16 October, the committee does not favor adding the analyzed value of 981 mb to HURDAT as a central pressure.

**Agreed.**

4. Are there any observations of note from when the cyclone passed near Sable Island?

**Yes, the strongest wind observation at Sable Island was 40 kt E with 1007 mb at 18Z on the 19<sup>th</sup> from the microfilm. This is consistent with the 50 kt intensity estimate for the cyclone that was extratropical at the time.**

5. Please remove the section in the metadata summary regard the Eric Blake personal communication.

**Agreed.**

1949 Storm #14 (was #12):

1. In the 17 October daily metadata, there is a line saying “eastward through the feature of interest (remnants of storm 12)”. What is this referring to, and does it need to be re-written?

**It was trying to refer to the cyclone itself, but was poorly written. Here is what is written in the daily summary now: “HWM analyzes a closed low of at most 1010 mb centered near 39N, 47.0W, now completely embedded within the frontal system. The same front extends from the low to the west (north of storm #13) and to the northeast.”**

2. In the HURDAT extract at the start of the submission, a line for 13 October is missing.

**When the row of HURDAT is now repeated, this simply means that there were no changes for that date.**

Storm #15 (new):

1. On the 1800 UTC 2 November microfilm map, there is a report from the ship NYBORG of 1000.6 mb. The report is not referenced in either the daily metadata or the metadata summary. Please add a reference to this report, along with either a notation of why it was not used or an adjusted analysis based on it.

**The Nyborg – measured 1003 mb with 25 kt NE at 14Z on the 2<sup>nd</sup>, 1001 mb with 25 kt NNE at 18Z, and 1001 mb with 15 kt SE at 02Z on the 3<sup>rd</sup>. However, it appears based upon comparison with other nearby ships, that the barometer was perhaps several millibars too low. This is now added to the daily writeup and discussed in the summary.**

2. Is there more data from the aircraft that flew the system on 2 November than what is plotted on the microfilm maps? Was 1008 mb the lowest pressure reported by the aircraft?

**All of the aircraft observations were plotted on the microfilm. 1008 mb was the lowest pressure observed, but the reconnaissance mission did not go far enough southeast to reach the center.**

3. There was apparently a reconnaissance flight on 4 November based on the microfilm maps. Is there any data available from this other than that plotted on the maps?

**Unfortunately, this is all that is available of the aircraft reconnaissance on this date.**

4. The committee generally concurs with including this system in HURDAT. However, it is quite concerned on how far away the gales seem to be from the center. Are there any gale wind observations – ship or aircraft - that are closer than 150 n mi? Perhaps it was a tropical cyclone only on 4 November, and it was a broad low prior to that?

**The closest gale was 150 nm from the center late on the 2<sup>nd</sup>. The only gale on the 4<sup>th</sup> (from aircraft) was about 175 nm northeast of the center. The reanalysis indicates that the system began as a tropical storm around 12Z on the 1<sup>st</sup> through 12Z on the 4<sup>th</sup> before weakening late on the 4<sup>th</sup> and then becoming extratropical early on the 5<sup>th</sup>. It is discussed that the system today would likely be considered a subtropical storm with the availability of satellite imagery, but also acknowledge the possibility that this was a broad (occluded) low and not a true tropical (or subtropical) cyclone.**

Storm #16 (was #13):

1. Is any additional data available from the meteorological services of Honduras and Nicaragua regarding the landfall of this storm?

**No, there are no additional data available from either Honduras or Nicaragua for this system.**

2. Unless there is a strong case that the trough that spawned this storm originated from a front, please remove that part of the origin discussion.

**Agreed to remove this discussion.**

1949 Additional Notes:

1. Suspect #3: First, please add the appropriate Climatological Data's (CDs) and OMRs to the data compilation for this system. Second, there are only a few maps for this system in the binder. Please provide a complete set of maps, including any available microfilm maps.

**Additional maps have been included to cover the entire life cycle of this cyclone. There are no microfilm available for this system. Additionally, all of the state Climatological Data have been obtained and all of the local stations have been searched. There were no observed tropical storm force winds on the coast, with the highest wind being 28 kt E early on the 16<sup>th</sup> at Charleston, SC and 27 kt SE early on the 17<sup>th</sup> at Hatteras, NC. Thus this system does not have enough evidence to add into HURDAT as a new tropical storm, but is included in the additional notes sections.**

2. Suspects #4 and #5: Please add the appropriate CDs and OMRs to the data compilation for this system. Are there any microfilm maps or reconnaissance data for these systems? It is unlikely these system were tropical storms, but the additional data is needed to rule them out.

**Unfortunately, microfilm is not available for these systems. The state Climatological Data have been obtained and all of the local stations have been searched for both suspect #4 and #5. However, neither were observed to have tropical storm force winds at any time from any source.**

3. Suspect #7: While the committee concurs that this case should not be included in HURDAT, it also needs a set of detailed maps/analyses in the binder.

**These have now been added to the binder.**

4. Suspect #7: Please re-examine this system, including providing detailed maps. While the 45 kt ship report on 26 September has a very high pressure, the HWM suggest it is not embedded in a strong gradient associated with an anticyclone. Instead, it suggests the possibility that this was a small, tight wind circulation in an area of higher than normal pressures. Please find a detailed history of the ship that reported 45 kt to see how the winds, pressures, and temperatures varied as it passed the system. Second, please look at all ship-reported pressures in the area, bearing in mind that the normal wind-pressure relationships may not apply for this system.

**It is agreed that such a strong wind with a high pressure may be reasonable, as the environmental pressures are very high. There is no time series available for this ship, which was from the Historical Weather Maps. The lowest pressure near the system was 1017 mb on the 26<sup>th</sup> and 1013 mb on the 27<sup>th</sup>. Neither of these observations by themselves would support tropical storm intensity, even given higher than usual environmental pressures. Thus without only one gale observed while the system had a closed low, this is not enough evidence to indicate it was a tropical storm and add it into HURDAT.**

5. Suspect #9: While the committee concurs with leaving this system out of HURDAT, there is a need for additional binder maps for both before and after the times in the submission.

**These have been added into the binder.**

6. Suspect #10: What is meant by “compact cyclonic turning”? It might be a good idea to rephrase that.

**This meant that there was a well-defined center. This is now so stated.**

7. The committee concurs with leaving the remainder of the suspect systems out of HURDAT.

**Agreed.**