Best Track Committee Re-Analysis Comments for 1941 (with late comments received by Pasch included)

[Responses to comments – CWL- February 2013]

General comments:

1. There are two uses of 'close to a central pressure' in regards to storm #2. As a rule, it would be a good idea to avoid that terminology unless there is proof that the pressure was measured inside the radius of maximum wind (RMW).

[Agreed.]

1941 Storm #1:

1. The committee has a concern that the revised genesis time on at 1800 UTC 10 September may be too early. The microfilm maps suggest 0000 UTC 11 September appears better.

[Agreed.]

2. Please clarify the issue of the 64 kt ship report from Connor, his estimated 996 mb pressure, and the 6 barb ship on the microfilm map. What is the basis for believing this is a 52 kt report, as mentioned in the metadata summary? Note that Connor's NHRL publication map of this storm has a note about '**ships** in this area with winds 64 kt/75 mph' to the southeast of the Mouth of the Mississippi River, suggesting he had access to multiple reports of winds at or near hurricane force.

[An important point with the new usage of the microfilm maps: during 1941 these were plotted in mph, not knots. This is confirmed from multiple common ships in both microfilm and COADS as well as both microfilm and OMR. (This methodology changed in later hurricane seasons.) Thus the six barbs represent 60 mph, or 50-55 kt. Due to the good observational coverage in the area of that 52 kt ship and throughout the whole area around the storm, a peak lifetime intensity of 50 kt is analyzed from 18Z on the 12th – 00Z on the 13th (raised from the original peak lifetime intensity of 40 kt from 00Z on the 13th – 00Z on the 15th). Given the reports that Connor mentioned, it is possible that the cyclone was stronger, but with no additional substantiation, the system is not upgraded to a hurricane.]

3. The committee concurs with the proposed peak intensity of 50 kt pending the resolution of point 2.

[Agreed.]

4. The committee concurs with the rest of the proposed changes.

[Agreed.]

5. [Pasch] In the first line of the metadata, replace "9/13/1940" with "9/13/1941".

[Done.]

1941 Storm #2:

1. The committee concurs with the proposed delayed time of genesis. However. The discussion of the genesis timing in the metadata summary is awkward and should be re-written.

[The additional microfilm maps (see comment number 3) concur with delaying genesis by about a day. The writeup has been improved.]

2. A possible typo in the 24 September daily metadata: Alvino. While this is how Connor spells it on his map, I'm not aware of an Alvino, Texas in this area. There is an Alvin, Texas, though.

[This is now corrected.]

3. Are there microfilm maps available prior to 19 September? If so, please scan them and provide copies in the binder.

[These are available and have now been scanned in, included in the binder, and used in the reanalysis.]

4. The microfilm map for 1200 UTC 19 September has three highlighted gale observations which are not included in the spreadsheet file for this storm. Please correct this. Also, please ensure that all of the pertinent observations from previous and subsequent microfilm maps are included in the appropriate spreadsheet files.

[These were already included in the database for the storm, listed as "USWB".]

5. In the metadata summary, please better explain the basis for the 55 kt intensity at 1200 UTC 19 September.

[A ship which measured 35 kt E and 1000 mb was about 30 nm northwest of the cyclone. A second ship that observed 40 kt SE with 1003 mb at the same time was about 40 nm east of the cyclone. These observations are not consistent with a 75 kt hurricane as originally shown in HURDAT, but are consistent with around a 55 kt tropical storm.]

6. The metadata summary is unclear on whether the 993 mb pressure and 70 kt near 0900 UTC 21 September were co-incident. Please clarify this and how this data was used to create the revised intensities.

[The observations from this ship were obtained from the 12Z September 21st microfilm. It is ambiguous whether the 993 mb and 70 kt were measured simultaneous. The cyclone is analyzed to have reached hurricane intensity at 06Z on the 21st (66 hours later than originally – a major change), based upon interpolation from the 55 kt at 12Z on the 19th and subsequent landfall as a 100 kt major hurricane two days later. This is consistent with the available (but ambiguous) observations on the 21st.]

7. Examination of the Houston Original Monthly Record (OMR) data strongly suggests that the station was never inside the RMW, and thus the observed 970 mb pressure was not "likely close to a central pressure value". Please re-examine the track, the RMW size, and the landfall pressure in light of this. If possible, please try to explain how the observed pressure in Matagorda (near landfall and possibly near the RMW) could be 7 mb higher than that observed in Houston (outside the RMW seven hours later).

[Agreed that Houston was likely not inside the RMW. The track thus is adjusted slightly westward away from Houston. This also makes for a significant modification to the intensity, as the Schloemer equation indicates a central pressure of 948 mb seven hours after landfall at closest approach to Houston. Matagorda must have been outside of the RMW for them to have measured 7 mb higher than that observed in Houston seven hours later. The metadata is rewritten to accommodate this new interpretation.]

8. The committee concurs with the proposed landfall intensity of 100 kt, pending the resolution of point 7. It is noted that the hurricane had a large outer closed isobar and a large area of gales at landfall. Has the size been factored into the landfall intensity estimate?

[With the additional analysis, a landfall central pressure of 942 mb has been estimated. Because of the large ROCI and low OCI, the landfall intensity is assessed to be 110 kt, substantially lower than that suggested by the pressure-wind relationship.]

9. The committee concurs with the other proposed changes, including the delayed extratropical transition and dissipation. Please provide a little more explanation of why the dissipation was delayed 30 hours.

[Additional discussion is now included in the metadata writeup.]

10. [Pasch] Are the large downward adjustments in intensity for this TC on 18-20 September adequately justified? The inner core may have simply not been experienced by ships over the Gulf on those days. Concerning the significant upward adjustment of the Texas landfall intensity from Cat. 1 to Cat. 3 (major hurricane), I see this is now consistent with Jarrell et al. (1992), and also consistent with the impacts (tides and damage).

[Numerous additional observations were obtained on the dates of Sep. 18-19 with the microfilm data for this hurricane. These do substantiate the downward adjustment on these dates to the intensity. Also see response to #5 above.]

1941 Storm #3:

1. It is noted that while the first write-up of the storm in the Monthly Weather Review (MWR) said it did not reach hurricane strength, the season wrap-up article on page 363 said it did become a hurricane, along with a reference to an ESE wind Force 12 ship report (no date/time provided). It is likely that this was the basis for calling this system a hurricane in the earlier editions of HURDAT. Please review the proposed intensity changes in light of this.

[This report in the December seasonal summary is added in, which supports categorization of this system as a hurricane.]

1a. On a related note, in the spreadsheet there are two ship reports on 22 September of rather low pressures – 987 mb at 0630Z and 978 mb at 1300Z. These are not either acknowledged or refuted anywhere in the metadata. Please either change the proposed intensities to fit these observations or provide an explanation of why they are wrong.

[The 978 mb reading is clearly incorrect when compared with numerous other ship observations in the same vicinity at the same time. The 987 mb reading may very well be accurate and has been incorporated into the reanalysis now and does support hurricane intensity on the 22nd. It is noted though that this ship was not mentioned in any of the post-storm assessments back in 1941.]

2. Does the data support moving the genesis time up six hours to 0000 UTC 18 September?

[Agreed to begin genesis six hours earlier.]

3. The committee notes there is a ship with NNE winds 15 kt to the NNE of the center (along 70W) at 0000 UTC 24 September. While this ship is a good distance away, it suggests the possibility the center was farther east at that time. Please re-examine this.

[Agreed, the position has been adjusted eastward late on the 23rd and on the 24th.]

4. Even if the proposed peak intensity is not changed, the discussion of it in the metadata summary is awkwardly written. Please re-write it for clarity.

[The discussion has been revised for clarity.]

5. The committee concurs with the other proposed changes, pending the resolution of the issues in points 1 and 1a.

[Thank you.]

6. [Pasch] I question the downgrade from hurricane status of this TC for the entire period of 0000 UTC 19 September through 1800 UTC 22 September. Perhaps the ship report at 1830 UTC 19 September justifies the downgrade for the first day, but the COADS data lists a couple of 60 kt ship reports on 20 September.

[The intensity is now brought back to hurricane status all day on the 22nd, see reply to comments in #1a. However, the downgrade to the intensity on the 20th and 21st is justified by the central pressure values of 993 mb around 12Z on the 20th and 995 mb around 00Z on the 21st.]

1941 Storm #4:

1. Please delete the "stayed east of the United States" reference in the introduction, which is wrong for this storm.

[Agreed.]

2. Can the microfilm maps for this storm be re-scanned? It is very hard to see the geography on most of them.

[No, the quality of the scanned microfilm maps represent the quality of what is available on the microfilm itself. It is as good as possible.]

3. On the 23 September 1830 UTC microfilm maps, are the pressures at Barbados and Dominica 1009 mb or 1004 mb? If it's the latter, that supports the original HURDAT intensity of a tropical storm. Are any additional data available from the Windward Islands?

[The value is 1009 mb at both locations, as also evidenced by the 1008 mb contour in between.]

4. The committee has concerns about the increased intensities on 25 September. While the sunken ships may be an indication of hurricane strength, there is no rigorous data to support this. Please re-examine these intensities.

[Agreed to retain original intensities on the 25th.]

5. In the MWR season wrap-up on page 363, there is a footnote regarding a late-arriving report from a ship moored about 20 miles up the Rio Coco River from Cape Gracias a Dios on 27 September. The report stated that the barometer fell to an uncorrected 28.25 in (956.7mb) at about 3 PM. It also states that the calm eye was experienced at Broom (farther inland over Nicaragua) from 5-6 PM. This report is most likely the basis for the original HURDAT intensity. It should be noted that the proposed 2300 UTC landfall appears inconsistent with this

data. Please re-examine the proposed intensity and track to make sure they are consistent with this report.

[These observations have now been incorporated into the reanalysis and have necessitated changes of track and an increase in the landfall intensity.]

5a. The metadata summary mentions that the last observation at Cabo Gracias was at 2215 UTC. The MWR (page 265) reports that the observer left at 9:45 AM, which is not consistent with the metadata summary. Please reconcile this.

[The 982 mb with 45 kt NW at 2215Z was actually from a radio operator in a rural part of Nicaragua near 14.7N 83.3W about 20 nm south of Cabo Gracias. Notes on the microfilm indicate that "Radio operator stated: leaving radio for safe place" after his 2215Z report.]

6. The committee notes that Veracruz has a notable high bias in its winds due to funneling along the coast when the winds are from the north or northwest. Please re-examine the proposed intensities in that light.

[Agreed. These winds may not be representative of the circulation of the cyclone itself and thus the original intensities in HURDAT are retained late on the 29th and early on the 30th.]

7. The metadata summary states that "observations along the Mexican coast also clearly indicate that the cyclone did not make landfall". Which observations are these, and in particular, which one rules out landfall? Please be specific about this in the metadata summary given the proposed track change.

[Observations along the Mexican coast at 12 and 18Z on the 30th and 00Z on the 1st indicate the cyclone did not make a Mexican landfall (as originally suggested by HURDAT) as the coastal stations never switched to a southerly wind component.]

8. It is noted that the Historical Weather Map (HWM) for 30 September shows an apparent trough/tropical wave over the northwestern Caribbean Sea. This system seems to be over the central Gulf of Mexico on 1 October and near the Louisiana coast on 2 October. If this interpretation is correct, then: a) the alternative dissipation scenario given in the metadata summary could be removed since the Louisiana low was a separate system, and b) this system could be written up as a possible other system – albeit one that was likely not a tropical storm. Please look into this.

[Agreed, the other system is now clarified and also discussed in the Additional Notes section.]

9. The committee concurs with the rest of the proposed changes.

[Agreed.]

10. [Pasch] The metadata discussion does not clearly state the reasoning behind the downgrades of intensity on 28 September. It appears that the amount of reduction is a subjective compromise between the inland decay model and no weakening, since the center moved close to the coast that day. If so, then state this specifically.

[Agreed. The values are higher than the Kaplan-DeMaria model due to the hurricane's center remaining very close to the Honduras coastline after landfall.]

1941 Storm #5:

1. There is a typo in the metadata summary: "ntensification".

[Corrected.]

2. The committee has concerns about the estimated landfall pressure in South Florida, especially in light of how sensitive the pressure estimates from Schloemer equation are to the size of the RMW. Can a more precise estimate of the RMW be made? Are there any local newspaper accounts of how long the eye passage lasted that could help with this? If there is no other data, the proposed 85 kt/Category 2 estimate looks reasonable. However, some additional effort should be made to pin this down.

[The Scholemer equation is indeed sensitive to the RMW size. There are no indications available of the length of time of the eye passage except that it was observed in Goulds around 1045Z on the 6th. Obtaining local newspaper accounts is beyond the scope of this project. It is agreed that the 85 kt intensity at landfall is reasonable.]

3. Please replace the term "oceanfall" with "emerged over water" in the metadata summary.

[Done.]

4. Would the Sanibel Island pressure qualify as a central pressure to be used in HURDAT?

[Given that Sanibel Light and Punta Rassa are only a few miles from one another, the measurements of minimum pressure from each would have been nearly simultaneous. Not knowing whether the 998 mb at Sanibel Light or 997 mb at Punta Rassa was the best measure of central pressure, the slightly lower value is used and included into HURDAT.]

5. Could you please provide more information on the 56-65 kt winds at Albany, Georgia and Tallahassee, Florida? Were they estimates? Measured? Sustained winds? Gusts? More

information on these obs is needed to evaluate the proposed intensities after the final Florida landfall and the associated impacts.

[The Original Monthly Records were obtained for Tallahassee and Albany. These indicate peak observed winds of 56 kt ESE 1-min at Tallahassee (no time) and peak observed of 56 kt NW 1-min at Albany at 1858Z. This information is consistent with the intensities analyzed on the 8th.]

6. The HWM for 14 October shows a frontal wave that might be the former hurricane. Is the data for that day conclusive enough about dissipation to justify removing the original HURDAT points?

[There are no observations consistent with the system retaining a closed low and the available observations indicate very high pressures - two nearby ships (1021 and 1022 mb) and Bermuda (1025 mb). Thus the 14th is removed from HURDAT.]

7. The committee concurs with the rest of the proposed changes.

[Thank you.]

8. [Pasch] Upward adjustments to the intensity over the Bahamas and downward adjustments over South Florida seem reasonable based on the pressure and wind data. It appears that the hurricane encountered increased shear prior to reaching southeast Florida, which resulted in weakening and, perhaps, the lack of rainfall in that area.

[Thank you.]

1941 Storm #6:

1. In the HURDAT section, there is a typo in the proposed revision to line 31800: "18/18" should be "10/18".

[Corrected.]

2. The 0600 UTC microfilm map shows what looks like a 25 kt wind at Key West? Is this 25 kt or 25 mph? if it is the former, could the intensity at this time be raised to 30 kt?

[The microfilm maps in the early 1940s were plotted in mph.]

3. There are ship reports of WSW/SW winds at 24.4N and 24.7N at 1200 UTC 18 October. Based on this, could the position for this time be nudged a little northward?

[Agreed. The position on the 18th is adjusted northward.]

3a. It is also noted that the ship reports at this time show more of a sharp trough than a closed circulation. Is it possible that genesis was delayed to near 0000 UTC 19 October? Or did the system exist as a tropical cyclone over the Bahamas, dissipate, and then re-form?

[Given that the data are ambiguous at 12Z 19 October as to whether the system was closed or not, but were more definitive that a closed low was in place by 18Z 19 October and 00Z 20 October, the system will be kept as a tropical cyclone at 12Z on the 19th. However, this ambiguity will be mentioned in the writeup.]

4. The committee concurs with the rest of the proposed changes.

[Agreed.]

5. [Pasch] Positions on 1200 UTC and 1800 UTC 19 October were shifted westward and in the metadata discussion, it is stated "The reanalysis (as well as the real-time maps from the microfilm and HURDAT) assumed that the cyclone was centered substantially farther west than the ship? Why? It appears that the original HURDAT positions are easily compatible with this ship observation; why do they have to be shifted westward?

[**Agreed to retain original longitudes on 12 and 18Z on the 19th.]**

1941 Additional Notes:

1. The committee concurs with leaving system #1 out of HURDAT for now. However, the write-up makes it unclear how far the data search went. Was COADS checked? Were the Azores or Portuguese Meteorological Services consulted? As with other systems of this era, the door need to be left open for re-examination when additional data (i. e., World War II ship report/logs) comes to light.

[COADS data was checked and included. It is noted that while on the 7th, as the system passed through the Azores, it maintained a very large outer circulation consistent with an occluded low. But the low pressure with strong winds at about the same time suggests that a mesoscale inner core had developed. Unfortunately, the information available is not enough to determine if this system was a tropical or subtropical storm and therefore, it is not added to HURDAT.]

2. [Pasch] For the one system discussed, agreed that there is not enough data to support adding it to HURDAT.

[Agreed.]