**WG/HWSOR 2016 ACTION ITEM SUMMARY**

**(Planning Documents rev- 15Mar2016)**

**Red Highlight – submitted item pending review or further action**

**Gray Highlight – ongoing item requiring no action**

**Green highlight – edits completed and action item closed**

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| **NEW ACTION ITEMS 70th IHC/TCRF** | | | |
| **1** | **Title**  **Submitter**  **Submitted**  **Discussion**  **Recommendation**  **Status:** | | **Revision of NHOP 2015 Para. 5.7.8, Observation Numbering and Content**  USAF/53rd WRS (Lt Col K.Woods) and Steve Feuer, CARCAH  14 March 2016 (Revised)  The first and last two sentences in the paragraph contain content that is either obsolete or no longer applicable. The remaining content about observation numbering should be retained but better stated.  Change para. 5.7.8 as follows:  **5.7.8. Observation Numbering ~~and Content~~.**  ~~Air Force aircraft movement information (i.e., departure time and location, and ETA’s to locations) will not be included in observation remarks. That information should be passed to CARCAH via SATCOM administrative messages. The mission identifier will be the first mandatory remark followed by the observation number. All observations (RECCO, vortex, dropsonde) from the first to the last will be numbered sequentially. HDOBs will be automatically numbered sequentially but separately from other observations. When an aircraft is diverted from its original mission to fulfill NHC requirements, conclude the original mission by using the last report remark.~~  ~~The next observation from the diverted aircraft will use the CARCAH-assigned mission 5-16 identifier, will be numbered OB 01, and will include the time of diversion.~~  ~~EXAMPLE~~  ~~RMK AF306 0lBBA INVEST OB 01 DPTD AF306 WXWXA AT 05/1235Z~~  All aerial weather reconnaissance messages will contain the mission identifier followed by an observation number as the first mandatory remark. Standard observation messages (RECCO, vortex, and dropsonde) will be sequentially numbered in the order they are transmitted from the aircraft. The final message will contain a "LAST REPORT" remark. High-density observation (HDOB) messages will also be numbered sequentially but separately from the other messages. |
| **2** | **Title**  **Submitter**  **Submitted**  **Discussion**  **Recommendation**  **Discussion**  **Recommendation**  **Discussion**  **Recommendation**  **Status:** | | **Miscellaneous Administrative Changes, Corrections, and Additions to the NHOP**  Warren Madden and Steve Feuer, CARCAH  9 February 2016  14 March 2016 (Revised)  ***A. TEMP DROP Code Message Table G-6 in Appendix G***  A minor correction needs to be made to the Standard Isobaric Surfaces section so that it is in accordance with WMO 306 Vol. 1, p. A-195.  For the "Identifier: h1h1h1” description, the third sentence should be changed to “Add 500 to the absolute value of hhh for negative 1000 mb or 925 mb heights.”  ***B. Communications Headings for SAB Dvorak Analysis Products Table 7-1 in Chapter 7***  The entries in the WMO heading and oceanic area columns are erroneously transposed for "North Indian" and "TXIO" and for "South Indian" and "TXXS."  Switch the content in the columns.  ***C. HD/HA Data Line Format for HDOB Messages Table G-5 in Appendix G***  A correction needs to be made to the description of the “XXXX” field regarding how negative D-values are encoded.  The second to last sentence should be changed to “Negative D-values are encoded by adding 5000 to the absolute value of the D-value.” |
| **3** | | **Title**  **Submitter**  **Submitted**  **Discussion**  **Recommendation**  **Status:** | **Miscellaneous Administrative Changes, Corrections, and Additions to the NHOP Chapter 5 to Adhere to USAF Doctrine Language**  Lt. Col. Kait Woods/53rd WRS USAFR  11 February 2016  There appears to have been an administration error last year and we need to change back paragraphs 5.5.1.1 and 5.5.3.1.1.1 below to the 2014 verbiage in order to adhere to AF doctrine language.  *Note – highlighted text is the desired change to NHOP Chapter 5*  **Change sections below as highlighted (others are renumbered):**  **Previous Version:**  **5.5.1.1. Coordination.** Any NOAA/NWS facility requesting aircraft reconnaissance (e.g., the NWS Environmental Modeling Center (EMC), the Central Pacific Hurricane Center (CPHC)) should contact the National Hurricane Center (NHC) no later than 1630 UTC the day prior to the requirement, and within the constraints of paragraph 5.5.2.1. NHC will compile the list of the total DOC requirements for data on tropical and subtropical cyclones or disturbances for the next 24-hour period (1100 to 1100 UTC) and an outlook for the succeeding 24-hour period. This coordinated request will be provided to CARCAH as soon as possible, but no later than 1630 UTC each day in the format of Figure 5-5.  **5.5.3.1.1**. CARCAH will coordinate the TCPOD with NHC, the 53 WRS, and NOAA AOC before publication. 5.5.3.1.1.1. Combatant command headquarters and their air component command headquarters will coordinate on missions by reviewing the proposed TCPOD posted at http://www.nhc.noaa.gov/reconlist.shtml, then click ‘For Tomorrow’ under ‘Plan of the Day.’  **5.5.3.1.1.2**. Combatant command headquarters and their air component command headquarters will pull current DOD missions from http://www.nhc.noaa.gov/reconlist.shtml, then click ‘For Today’ under ‘Plan of the Day.’ Additionally, the 403rd Current Operations provides a mission setup sheet with reason of deviation from TCPOD, as required, to the combatant command and their air component operations/command centers.  **5.5.3.1.2**. The TCPOD will list all DOC/NOAA AOC and DOD required tropical and subtropical cyclone operational reconnaissance missions. Research missions will also be listed in the TCPOD when provided to CARCAH before transmission time.  **New Version:**  **5.5.1.1** **Coordination.** Any NOAA/NWS facility requesting aircraft reconnaissance (e.g., the NWS Environmental Modeling Center (EMC), the Central Pacific Hurricane Center (CPHC)) should contact the National Hurricane Center (NHC) no later than 1630 UTC the day prior to the requirement, and within the constraints of paragraph 5.5.2.1. NHC will compile the list of the total DOC requirements for data on tropical and subtropical cyclones or disturbances for the next 24-hour period (1100 to 1100 UTC) and an outlook for the succeeding 24-hour period. This coordinated request will be considered the agency’s request for assistance (RFA) to DOD and will be provided to CARCAH as soon as possible, but no later than 1630 UTC each day in the format of Figure 5-5.  **5.5.3.1.1.**CARCAH will coordinate the TCPOD with NHC, the 53rd WRS, and NOAA AOC before publication.  **5.5.3.1.1.1.1**   The coordinated TCPOD is the agency’s RFA to DOD. Since DOD’s support to NOAA is congressionally mandated and funded through the DOD Appropriations Act, the coordinated TCPOD is considered a validated and approved RFA.  **5.5.3.1.1.1.2**  Combatant command headquarters and their air component command headquarters will coordinate on missions by reviewing the proposed TCPOD posted at [http://www.nhc.noaa.gov/reconlist.shtml,](http://www.nhc.noaa.gov/reconlist.shtml) then click ‘For Tomorrow’ under ‘Plan of the Day.’ |
| **4** | | **Title**  **Submitter**  **Submitted**  **Discussion**    **Recommendation**  **Action**  **Status** | **Next Generation Vortex Message**  Mike Dion, NWS Tropical Program Leader; James Franklin and Eric Blake, NHC  8 February 2016  The current form of the Vortex Message (VDM) has limitations that detract from the VDM’s utility. Most of these result from the historical emphasis on the inbound portion of the typical figure 4 pattern. Over time, some additional information has been added to the remarks section of the VDM (Item P), but data conveyed there are neither as complete nor as easily decoded as the regular coded items. This forces users to work through the HDOB data to make sure important data haven’t been missed. For example, the current VDM often does not include the maximum observed surface wind on an outbound leg, even when the maximum outbound surface wind is greater than the maximum inbound value.  What we envision are modifications to the VDM to make it a more complete representation of the state of the tropical cyclone vortex, and improve the consistency in the way key observations are reported. Conceptually, we’d like to see a message that gives equal standing to outbound flight-level and surface wind observations, and would like to move most of the information currently in the remarks to their own dedicated line entries. We recognize that there is interest in conveying the center information as quickly as possible, and therefore we may need to consider whether there should be “preliminary” and “final” versions of the transmitted message.  Begin discussion involving Operational forecast centers (NHC) and aircraft operators (53rd WRS, AOC) on how to improve the utility of the VDM, with the goal of presenting a specific proposal for an updated message format to the 2017 Interdepartmental Hurricane Conference. |
|  | |  | ***Informational Items from NWS/HQ for 7oth IHC/TCRF*** |
| **I.1** | | **Title**  **Submitter**  **Discussion** | **Probabilities of Significant Wave Heights in Tropical Cyclones**  **NOAA/NHC (Dr. Chris Landsea)**  Informational Item  The National Hurricane Center currently provides probabilistic guidance to the public on a range of phenomenon:  tropical cyclone genesis, tropical cyclone wind speed probabilities, and storm surge probabilities.  One tropical cyclone related feature that often causes damaging and life-threatening conditions over the open oceans are large oceanic waves.  Steep, short-period, tall waves - commonly occurring in hurricanes - striking a ship broadside are most dangerous.  Unfortunately, there are examples of ships encountering severe wave conditions within hurricanes and suffering disastrous results (the Fantome in 1998's Hurricane Mitch, the Bounty in 2012's Hurricane Sandy, and most recently the El Faro in 2015’s Hurricane Joaquin being the most infamous).  Currently, NHC (through the Hurricane Specialist Unit) issues a quadrant-based analysis of the current radial extent of 12' seas.  (The height here refers to the significant wave height, which is the average height of the highest one-third of the waves experienced at a particular location.  Individual waves may be more than twice the significant wave height.)  NHC also provides wave height forecasts (through the Tropical Analysis and Forecast Branch), which are expressed deterministically out through six days and available in text, graphical, and gridded formats.  These are provided by TAFB not only when active tropical cyclones are occurring but the remainder of the year as well for NHC's area of responsibility (eastern tropical Pacific Ocean, tropical North Atlantic Ocean, Gulf of Mexico, and Caribbean Sea). Similarly, the Ocean Prediction Center and the Central Pacific Hurricane Center provide similar text, graphical, and gridded wave height forecasts that include tropical cyclones for their areas of responsibility.  However, such deterministic forecasts of wave heights during tropical cyclones do not take into account the uncertainties of the predicted track, intensity, and size.  Moreover, the lack of a tropical cyclone specific wave height graphical product may diminish the visibility of existing NHC predictions.  Thus to fill this need, it is proposed to develop tropical cyclone focused Wave Height Probabilities.  Such a public product could be issued for active tropical cyclones with graphics depicting the likelihood of wave heights exceeding two or three thresholds (say, 12' and 20', or 12', 18', and 24').  The output could be expressed, like that for wind speed probabilities, in increments of 12 or 24 h, along with a 5 day cumulative probability.  See the below figure for how such output could be provided. Such new information could be invaluable for mariners over the open ocean in making better decisions in and around dangerous tropical cyclones.  Technically, the approach for such development of a new product is straightforward.  Currently, one has access to the wind fields of the 1000 simulated tropical cyclones as part of the Monte Carlo wind speed probability program that is driven by the NHC deterministic tropical cyclone forecast.  The wind field from these 1000 simulated tropical cyclones can be used to drive an ensemble of wave models (perhaps a simplified version of the Wave Watch III model) in which the wave height output can then be expressed probabilistically for various wave height thresholds.  (It is noted that there already exists wave height probabilities from the GFS-ensemble runs of the Wave Watch III model.  However, these are currently not accurate enough for this purpose because of the lack of strong, inner core winds in the GFS-ensemble members, lack of sufficient dispersion in the GFS-ensemble tracks, and lack of consistency with the NHC official forecast.)  Currently, NOAA (at the NOAA Hurricane Conference in December) approved the concept to develop Probability of Significant Wave Heights in Tropical Cyclones graphical products. A team has been established within NOAA to formulate long-term plans needed to develop the products. Technical development is anticipated to occur during 2017 and 2018. |
| **I.2** | | **Title**  **Submitter**  **Submitted**  **Discussion** | **INFORMATIONAL ITEM: Use of Mixed Case for Tropical Weather Discussions (TWDAT, TWDEP)**  Michael Dion, NWS Tropical Program Leader; Chris Landsea, NHC  8 February 2016  The NWS (and the Weather Bureau before it) has long used all capital letters and limited punctuation (“…”) for its text products, initially for dissemination via teletype machines. That era has long-since ended, yet the all-capital-letter and lack of punctuation format remains. This format is difficult to read by our customers and likely leads to lack of clarity and less effective communication. Moreover, all WMO Region IV member countries that responded to an informal survey early in 2013 were in favor of switching to mixed case format for NHC’s text products. In 2014 and 2015, NHC / Hurricane Specialist Unit (HSU) successfully transitioned most of their text products from all capital letters to mixed case. These have been very well received by our customers and there have been no issues in receiving the products with mixed case.  Transition the Tropical Weather Discussions for both the Atlantic (TWDAT) and Northeast Pacific (TWDEP) to mixed case. Below is an example of how this would look for the revamped TWDAT:  AXNT20 KNHC 051800  TWDAT  TROPICAL WEATHER DISCUSSION  NWS NATIONAL HURRICANE CENTER MIAMI FL  205 PM EDT SAT OCT 05 2013  Tropical Weather Discussion for North America, Central America, Gulf of Mexico, Caribbean Sea, northern sections of South America, and Atlantic Ocean to the African coast from the equator to 32N. The following information is based on satellite imagery, weather observations, radar, and meteorological analysis.  Based on 0000 UTC Surface Analysis and satellite imagery through 0545 UTC.  ...Special Features...  Major Hurricane Joaquin is centered near 22.9N 74.6W at 02/0300 UTC or about 19 nm ESE of Clarence Town, Long Island, Bahamas, moving W at 3 kt. Estimated minimum central pressure is 935 mb. Maximum sustained wind speed is 115 kt with gusts to 140 kt. Numerous strong convection is from 21N-24N between 73W-76W. Numerous moderate convection is elsewhere from 20N-25N between 70W and 78W. Scattered moderate convection and thunderstorms are over the northern-central Caribbean from 17N-21N between 68W-81W. See latest intermediate advisory at http://www.nhc.noaa.gov/ for more details.  A 1004 mb low is centered near 26N54W with a remnant frontal boundary analyzed as a surface trough extending from 25N64W into the low center then to 26N47W. This current non-tropical area of low pressure is showing some signs of organization. However, environmental conditions are forecast to be conducive for the low to obtain more tropical characteristics and a tropical cyclone is likely to form within a couple of days while the low moves NE and then N. Gale force winds prevail N of 26N between 50W and 60W with associated seas of 9 to 13 ft. These conditions are forecast to continue during the next 48 hours. In terms of intensification of the system, there is a high chance it will develop into a tropical cyclone during the next 48 hours. Scattered moderate convection and thunderstorms are occurring from 21N to 29N between 44W and 65W.  ...Tropical Waves...  A tropical wave is over the E Atlantic west of the Cape Verde Islands with axis extending from 17N28W to a 1010 mb low near 11N26W, moving W at 5-10 kt. CIRA layered precipitable water imagery shows the wave is embedded in a moderate moist environment from the surface to nearly 700 mb that along with middle to upper level diffluence in the wave region support scattered moderate convection and thunderstorms from 11N to 17N between 23W and 30W.  A tropical wave is in the central Atlantic with axis near 43W, moving W at 5 kt. CIRA layered precipitable water imagery shows the wave is embedded in a moderate moist environment from the surface to 700 mb. However, some dry air intrusion is also depicted in the N-NW wave environment, where METEOSAT enhanced imagery shows dry air. Strong deep layer wind shear in the wave region influences lack of convection at the time.  ...ITCZ/Monsoon Trough...  The monsoon trough extends from the African coast near 14N17W to a 1010 mb low near 11N26W to 12N33W. A cluster of moderate to strong convection and thunderstorms is from 06N to 14N E of 18W. The other area of convection is associated with the easternmost tropical wave. See tropical waves section.  ...Discussion...  Gulf of Mexico...  A sharp middle- to upper-level trough extends from Illinois to Alabama S-SW to a base over the eastern Bay of Campeche. This upper trough supports a frontal system analyzed as a cold front from 27N80W to 26N82W to 23N90W to the SW Gulf near 20N94W. Except for the SE Gulf and the Yucatan Channel, the CIRA layered precipitable water imagery shows low-level dry air across the basin that along with strong deep-layer environmental wind shear hinders convection. Otherwise, isolated showers are possible within 100 nm S of the cold front W of 84W. Looking ahead, expect for the cold front to start dissipating over the SE Gulf Friday night. Fresh to strong northerly flow associated with the front will continue through late Friday night. Northwesterly flow of 15 to 20 kt associated with the large area of low pressure from Hurricane Joaquin in the SW N Atlantic will dominate the eastern basin Saturday and Sunday.  Caribbean Sea...  The outer rain bands of Major Hurricane Joaquin over the central Bahamas continue to affect the north-central Caribbean. Heavy rain and coastal flooding has been reported across NE Cuba and Hispaniola and marine warnings continue in effect across the Atlantic coast of both islands. Thunderstorm activity is observed over southern Haiti, the Windward Passage, and Caribbean waters between Jamaica and eastern Cuba. Joaquin also has disrupted the trade wind flow across the basin, showing to be variable and less than 15 kt S of 16N W of 70W. Northwesterly wind flow of 15 kt is noted along Cuba’s southern offshore waters while west-southwest wind flow of 20-25 kt is between Jamaica and eastern Cuba and the Windward Passage. Except for isolated showers and thunderstorms over the far NW Caribbean and the Lesser Antilles S of 16N, fair weather dominates being influenced either by dry air or strong deep layer wind shear. Looking ahead, areas of convective precipitation are expected to continue impacting Cuba and portions of Hispaniola through late Saturday as Joaquin tracks northward.  ...Hispaniola...  Currently, the outer rain bands of Major Hurricane Joaquin extend across the island supporting periods of heavy rainfall particularly across the western half of the island. A marine warning is in effect for the Atlantic coast of Hispaniola as Hurricane Joaquin remains just N of the island. The convection is expected to persist during the next 24 hours as the hurricane moves northward.  Atlantic Ocean...  The main feature across the Atlantic is Major Hurricane Joaquin over the central Bahamas. Please refer to the Special Features section above for more details. The second area of interest is a 1004 mb low centered near 26N54W with a remnant frontal boundary analyzed as a surface trough extending from 25N64W into the low center then to 26N47W. This current non-tropical area of low pressure is showing some signs of organization and there is a high chance it will develop into a tropical cyclone during the next 48 hours. Gale force winds are N of the low center between 50W and 60W with associated seas of 9 to 13 ft. See Special Features section above for further information. NW of Joaquin, a middle- to upper-level trough supports a frontal system analyzed as a stationary front from 30N79W to a 1003 mb low near 27N80W where the front transitions to a cold front across Florida and into the southern Gulf of Mexico waters. Scatted moderate convection and thunderstorms are N of 29N W of 79W. A dissipating stationary front extends from 29N27W to 27N37W with scatted showers within 200 nm either side of the boundary. A surface ridge prevails across the NE Atlantic.  For additional information, please visit: http://www.nhc.noaa.gov/marine/.  $$  NR  **Begin issuing mixed case TWDAT and TWDEP products on or around 15 May 2016.** |
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| **ACTION ITEMS: FROM 62nd IHC (2008)** | | | |
| **10** | | **Title**  **Submitter**  **Discussion**  **Recommendation**  **Status**  **(2/24/09)**  **Status**  **(01/26/10)**  **Status**  **(03/10/10)**  **Status**  **(01/18/2011)**  **Status**  **(03/09/2011)**  **Status**  **(11/18/2011)**  **Status**  **(02/26/2012)**  **Status**  **(11/19/2012)**  **(3/4/2013)**  **As of 3/20/2013:**  **As of 3/2/2015:**  **As of 2/12/2016:** | Update Memorandum of Agreement between United States Air Force Reserves and NOAA  NOAA / Mike Dion (Tropical Cyclone Program Manager)  The Memorandum of Agreement (MOA) between the U.S. Air Force Reserves and NOAA was last updated in 2000, seven years ago.  AOC recently received a couple of phone calls from other DOD agencies inquiring about revision and update to this MOA.  Request Office of the Federal Coordinator for Meteorology (OFCM) to facilitate the update of the MOA.  *MOA has been updated and completely reorganized. NOAA/NWS has signed the MOA (Dr. Jack Hayes); AFRC is reviewing the MOA.*  *AFRC still has not signed the MOA.*  *The Joint Staff is staffing a tasking to AFRC to take action on the MOA.*  The MOA is now at USTRANSCOM, which will be the DoD signatory element.  USTRANSCOM working with AFRC to staff to signatory element.  USTRANSCOM internal coordination still underway.  USTRANSCOM internal coordination still underway.  At the 66th IHC (5 March 2012) meeting, the following actions were identified:   1. USTRANSCOM is awaiting AFRC MOA signature before commencing formal signatory coordination with the NWS. 2. Federal agency representatives need more time to review, discuss, and work solutions within their respective agencies before the annual WG/HWSOR meeting. Therefore, the WG/HWSOR Executive Secretary will solicit action items from the working group members by mid-December of each year instead of the former January-February timeframe. NOAA has agreed to try to provide its action items in December. The WG/HWSOR Executive Secretary will then consolidate and distribute action items NLT 60 days prior to the annual working group meeting. This will give members more time to coordinate, work solutions, obtain consensus, and request leadership approval (if needed) within their respective agencies before the annual working group meeting.   Awaiting DOD signatures on revised MOA. USTRANSCOM corrected para 3.J. of revised MOA, and then passed to AFRC for concurrence/signature.  CLOSE, merge with related 66th IHC action item #14. Repeat of above; MOA still needs coordination on DoD side and re-coordinate through NWS.  OPEN  The Exec Sec and Chair further discussed this AI and determined leaving the AI OPEN and not merging it with the 66th IHC AI #14 would be in the best interest of tracking this action to completion. Significant coordination remains in coordinating the MOA between USTRANSCOM, AFRC, and NOAA.  WG/HWSOR Meeting Decisions: OPEN  OFCM will re-initiate discussion between AFRC and NOAA regarding a bilateral MOA, without TRANSCOM involvement.  OFCM still trying to track it down within the USAF. NOAA awaiting USAF action.  This issue may be rendered obsolete by the proposed clarification wording in Ch5, Action Item#3 herein. |

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| **ACTION ITEMS: FROM 65th IHC (2011)** | | |
| **2** | **Title**  **Submitter**  **Discussion**  **Recommendation**  **Status**  **(1/16/2012)**  **Status**  **(3/4/2012)**  **Status**  **(1/11/2013)**  **Status**  **(3/4/2013)**  **Status**  **(1/6/2014)**  **Status**  **(2/6/2015)**  **Action**  **3 Mar 2015** | **Reconnaissance Support for Development of In-Situ Ocean Data Base for use in Initializing/Validating Navy and NOAA Operational Air-Sea Coupled Tropical Cyclone Prediction Models**  Peter Black, Naval Research Lab, Marine Meteorology Division and SAIC, Inc.  CDR Elizabeth Sanabia, United States Naval Academy  Overcoming earlier restrictions in obtaining ocean thermal structure data via AXBT deployment, NRL has developed a Mobile Ocean Observing System (MOOS) consisting of two portable processing-receiving-recording units for use on WC-130J reconnaissance aircraft and demonstrated the capability for real-time processing and transmission of ocean thermal profiles, accomplishing data ingest into Navy TC and ocean prediction models. A supply of several thousand de-militarized AXBT probes has been identified for future use at minimal cost for shipping and fumigation. Deployment of 1,000 of these probes over 2 years has demonstrated an overall 92% success rate. Over 100 additional AXBTs were deployed from operational reconnaissance flights in 2011 with similar results. The capability to transmit AXBT data in real time for real-time QC and assimilation into COAMPS-TC was successfully demonstrated. In 2012, the Navy coupled COAMPS-TC model, in addition to NOAA coupled models, will be run operationally, requiring ocean as well as atmospheric data inputs for initialization and validation.  53rd WRS is requested to support Navy TC coupled operational numerical model forecast development by deploying AXBT data during operational TC missions tasked by the National Hurricane Center on a not-to-interfere basis with normal reconnaissance operations for a minimum of two additional seasons on a trial basis. AFRC is requested to support crew augmentation by one addition loadmaster with dropsonde and AXBT deployment training.  NOAA/NCEP/EMC is planning on operational implementation of their regional hurricane model (HWRF) coupled to HYCOM for the 2012 hurricane season. This coupled modeling system has advanced real-time ocean DA capabilities within the system. EMC and NRL are designing a work plan in collaboration with AOML and RSMAS to demonstrate impact of assimilating AXBT datasets (collected during past TC research missions and potential future deployment of AXBTs using operational and research flights of opportunity from both WC-130J and WP-3D aircraft) on hurricane intensity forecasts using their respective coupled models. NRL will work with the 53rd WRS to refine WC-130J AXBT launch and data acquisition procedures for use on requested hurricane reco flights on a not-to-interfere basis with routine mission requirements.  The first year of the hurricane ABXT demo project mandated at the 65th Interdepartmental Hurricane Conference Working Group for Hurricanes and Winter Storms has been completed.  A total of 107 AXBTs were deployed and transmitted in near-time from WC-130J aircraft on 12 flights in 4 storms, including Hurricane Irene where 40 ABXTs were deployed.  A total of 85 AXBTs passed the quality control tests and were ingested into the Stennis ocean model and the coupled COAMPS-TC model. Initial model runs for Emily and Irene showed that including AXBT data resulted in a significant change in initial ocean analyses with a small impact on intensity prediction.  Item remains OPEN at 66th IHC. The 53 WRS received approval for the next 2 seasons. Work will ultimately require significant aircraft upgrade (potential modification to launcher and receiver equipment, pending requirement from NHC). Estimated 3000 AXBTs remaining. Need to pursue additional sensors if research warrants continued usage. Explore deployment strategy for operations. Progress and results will be presented during the NOAA Hurricane Conference in December 2012 and the 67th IHC in 2013.  Continued analysis of 2011 cases (Emily and Irene) confirmed that AXBTs significantly increased the accuracy of the initial ocean analyses (in both NCOM and HYCOM), resulted in slight improvements to coupled model track and intensity forecasts in 33% of coupled COAMPS-TC data denial studies, and provided a mechanism by which to identify possible errors in SHIPS intensity forecasts.  During the summer of 2012, 294 AXBTs were dropped in 23 flights in 3 storms (and a training flight), including 80 AXBTs in 7 back-to-back WC-130J flights into TS Ernesto and 130 in 12 WC-130J flights into Hurricane Isaac.  Of these, 248 were accepted into the Stennis’s ocean models and uploaded to the GTS in near-real-time.  Initial analysis of the Isaac case (using the NCODA adjoint) revealed that AXBTs were the most valuable ocean observation type in reducing error to the HYCOM model between 24 August - 04 September 2012.  Coupled model data denial studies are in progress as is a SHIPS intensity analysis. Coordination is in progress with HFIP Physics group to quantify AXBT impact and with HRD / AOC to improve operations planning and data distribution.  Status update: Program will continue through last programmed/planned year. CDR Sanabia will provide a more detailed status update and projected way-ahead to be included with this summary.  While substantial progress was made in the first two years of this project, due to TC inactivity, operational missions during 2013 were limited to 4 invest flights, 1 fix mission, and several training flights. As a result, an extension of the current operational reconnaissance support provided by the 53rd WRS is requested for an additional 3-year period to increase the number of cases, and to evaluate coupled model performance for higher-intensity TCs. Funding and AXBTs to support the continuation of this AXBT demonstration project have been procured, enabling it to be conducted on a no cost/not-to-interfere basis for the 53rd WRS. The data have been shown to improve both initialization of the ocean and ocean forecasts in HYCOM, and to improve forecasts of track and intensity in the coupled COAMPS-TC model. Continued analyses of these ocean data and the Isaac case is underway at NRL MRY (coupled COAMPS-TC), NOAA/NCEP/EMC (HWRF), URI (GFDL), and USNA/NOAA/NRL MRY (SHIPS), and available results will be presented at the next working group meeting.  During the 2014 season, 257 AXBTs and 6 ALAMO profiling floats were deployed from USAF 53rd WRS WC-130J aircraft during 38 flights over the Atlantic and Pacific Oceans and transmitted to NAVO and the GTS in near-real-time. During Iselle and Julio, the AXBTs had the greatest impact reducing error in the HYCOM (measured by the NCODA adjoint method). Assessment of the impact on TC forecasts still in progress. The coupled TC models capable of ingesting these data in real time were not run operationally in 2014, although there are plans to do so in 2015. The 2014 data will be utilized in case studies (along with the Isaac data from 2012) as part of a coordinated effort led by HFIP Ocean Model Tiger Team (OMITT). The goal of this effort is to evaluate ocean model impacts on coupled HWRF and COAMPS-TC intensity forecasts and the sensitivity of these impacts to oceanic, surface flux, and atmospheric storm parameters.    Path forward:  1.  Two years remain in the extension granted by the WG in 2014.  2.  Request to continue both collect ocean data in partnership with the 53rd WRS and to analyze the impact on TC forecast accuracy in coupled numerical prediction models through that time period.  **WG/HWSOR Meeting Decisions: ONGOING INFORMATIONAL / OPEN**  WG recommends continuing support for this endeavor. **Accepted.** |

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| **ACTION ITEMS FROM 66TH IHC (2012)** |

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| **ACTION ITEMS FROM 67TH IHC (2013)** | | |
| **16** | **Title**  **Submitter**  **Date Submitted**  **Discussion**  **Recommendation**  **Action**  **3 Mar 2014**  **Status:**  **As of 3/2/2015:**  **As of 3/17/2015:**  **As of 4/03/2015:**  **As of 04/10/2015:**  **As of 04/20/2015:**  **As of 04/22/2015:**  **As of 02/09/2016:** | **Appendix K Maps**  Wolfgang Lerch, FAA New York ARTCC, [wolfgang.lerch@faa.gov](mailto:wolfgang.lerch@faa.gov), 631-468-1018  3 January 2012  Appendix K  Add maps to depict the RADAR coverage, as it extend into or overlies the New York Oceanic CTA/FIR for the following ARTCC’s:  New York, Miami, Jacksonville, San Juan  New York Center to provide maps displaying non radar airspace and the extent of radar coverage.  **WG/HWSOR Meeting Decisions: OPEN**  Wolfgang Lerch will provide RADAR coverage maps to OFCM for inclusion in Appendix K of the NHOP. Maps should be forwarded to Paul.roelle@noaa.gov and [daniel.melendez@noaa.gov](mailto:daniel.melendez@noaa.gov).  **As of Jan2015, maps not received. Was to be subsumed as part of 68th IHC Item #12, which was left unaddressed due to lack of stakeholder presence. /DM**  **Should have new maps by the end of this week.**  **Maps requested but not received.**  **Wolfgang will send ZNY radar coverage maps. ZJX, ZMA, and ZSJ will need to be contacted separately per the POCs provided by Lerch.**  **ZNY coverage map received.**  **ZJX and ZMA maps coming per ZMA/Palazzo**  **ZSJ and ZMA maps received and inserted in Appendix K.**  **ZJX and revised ZNY maps requested and expected to be received in time for WG meeting.** |

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| **ACTION ITEMS FROM 68TH IHC (2014)** | | |
| **12** | **Title**  **Submitter**  **Date Submitted**  **Discussion**  **Recommendation**  **Action**  **3 Mar 2014**  **8 Jan 2015**  **27 Feb 2015**  **3/2/15**  **02Apr15**  **12 Jan 2016**  **As of 29Feb2016**  **As of 04Mar2016** | **FAA Directed Separation Changes**  *Karen Chiodini, FAA*  30 Jan 2014 rev.12 Jan 2016  FAA proposes revising Chapter 6 of the NHOP with a full Chapter 6 with revised numbering. Expect changes to paragraphs 6.2.1.2. (International Airspace) and 6.2.1.3. (IFR Procedures and Clearance).  Discuss. Exec Sec recommends accepting the revision in full. [Group could not reach consensus or approval of this Action Item as further discussion and coordination is needed.  **WG/HWSOR Meeting Decisions: DEFERRED / OPEN**  Tabled for further coordination internally by FAA (goal to resolve internal coordination within 45 days) before WG/HWSOR will consider making changes to NHOP. POC: AJV-8  Issue appears still unresolved. AOC, FAA and 53rd WRS are discussing a draft MOU that would allow MARSA self-separation. OFCM will explore option of having senior  NOAA leadership request NOAA aircraft be recognized under MARSA flight rules, and discuss further with DoD ATSC and NOAA AOC.  **WG/HWSOR Meeting Decisions: DEFERRED / OPEN**  This action item will not likely be resolved by Monday. Discussion with FAA suggests tabling but leaving it open. An exemption to allow self-separation is separately being pursued with FAA Flight Standards by NOAA.  At the request of the submitter, this item will **be continued**.  FAA (B. Beauchat) requests tabling pending in-depth examination.  MOA between FAA and NOAA/AOC undergoing FAA/GC review. Expected to be in place for the beginning of 2016 hurricane season.  Focused NOAA-FAA-AFRES-OFCM Working Group is revising a draft Chapter 6 (and concomitant appendices) for review by WG-HWSOR at the IHC/TCORF meeting in March. A new FAA-AOC-53 WRS MOU is expected as an appendix, as well as new terminology for Appendix M.  NOAA GC cleared /LT Abitbol |

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| **ACTION ITEMS FOR 69TH IHC (2015)** | | |
|  |  | **Action Items #1, 6, 7, 10-20 closed as planned** |
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