CHAPTER 3

GENERAL OPERATIONS AND PROCEDURES OF THE NATIONAL WEATHER SERVICE HURRICANE CENTERS

3.1. General. This chapter briefly describes the products, procedures, and communications headers used by the National Hurricane Center (NHC) and the Central Pacific Hurricane Center (CPHC). See Appendix A for a description of local National Weather Service (NWS) office products which support the tropical cyclone forecasting and warning program. Additional details of the products, including transmission times, can be found in National Weather Service Instruction 10-601, located at: http://www.weather.gov/directives.

3.2. Products.

3.2.1. Tropical Weather Outlook (TWO). NHC and CPHC prepare the TWO during their respective tropical cyclone seasons. The outlook covers tropical and subtropical waters and discusses areas of disturbed weather and the potential for tropical cyclone development during the next 48 hours. The outlook will mention tropical cyclones and subtropical cyclones, including the system's location (in either general terms or map coordinates), status, and change in status.

3.2.2. Tropical Cyclone Public Advisories (TCP). The TCP is the primary tropical cyclone information product issued to the public. The TCP comprises five sections: Summary, Watches and Warnings, Discussion and Outlook, Hazards, and Next Advisory. The NHC, the CPHC, and WFO Guam issue TCPs. The following pertains to the tropical storm/hurricane/typhoon watches and warnings contained in the TCP:

- NHC. NHC issues tropical storm/hurricane watches/warnings for the Atlantic, Pacific, and Gulf of Mexico coasts of the continental United States, the US Virgin Islands, and Puerto Rico. NHC issues watches when conditions along the coast are *possible* within 48 hours. NHC issues warnings when conditions along the coast are *expected* within 36 hours.

NOTE: Because hurricane preparedness activities become difficult once winds reach tropical storm force, NHC issues the hurricane/typhoon watches *48 hours in advance of the anticipated onset of tropical-storm-force winds*.

- CPHC and WFO Guam. CPHC and WFO Guam issues tropical storm/hurricane/typhoon watches/warnings for the islands of Hawaii, northwest Hawaiian Islands, Johnston Atoll, Guam, Northern Mariana Islands and selected points in the Micronesian countries. CPHC and WFO Guam issue watches when conditions along the coast are *possible* within 48 hours. CPHC and WFO Guam issue warnings when conditions are *expected* along the coast within 36 hours.

NOTE: Because hurricane/typhoon preparedness activities become difficult

once winds reach tropical storm force, CPHC and WFO Guam issue the hurricane/typhoon watches *48 hours in advance of the anticipated onset of tropical-storm-force winds*.

Intermediate public advisories will be issued in between scheduled or special advisories when watches or warnings are in effect. They will continue to be issued when a tropical storm or hurricane is inland, even after coastal watches/warnings have been discontinued. These will retain the number of the last advisory they update plus an alphabetic designator (e.g., HURRICANE ALLISON INTERMEDIATE ADVISORY NUMBER 20A).

3.2.3. Tropical Cyclone Forecast/Advisories (TCM). NHC and CPHC will prepare TCMs for all tropical cyclones within their area of responsibility. See Section 4.3 for content and format of the advisories. The TCM provides critical tropical cyclone watch, warning, and forecast information for the protection of life and property.

Note: In the Western Pacific, tropical cyclone forecasts/advisories are issued by the JTWC. Appendix C provides a listing of the abbreviated communications headings and titles for JTWC products. Information on the broadcast of tropical cyclone information to coastal and high-seas shipping can be found in Chapter 9, Marine Weather Broadcasts.

3.2.4. Tropical Cyclone Discussions (TCD). The TCD is a primary tropical cyclone product explaining forecaster's reasoning behind analysis and the forecast for a tropical cyclone. It also provides coordinated 12-, 24-, 36-, 48-, 72-, 96-, and 120-hour tropical cyclone forecast positions and maximum sustained wind speed forecasts; other meteorological decisions; and plans for watches and warnings.

3.2.5. Tropical Cyclone Updates (TCU). TCUs are issued to inform users of unexpected changes in a tropical cyclone, such as to convey a significant change in the intensity, and/or to alert users a special advisory is about to be issued. The TCU may also be used to announce changes to international watches or warnings made by other countries, and to cancel U.S. watches or warnings. A TCU should only be used to issue a U.S. watch or warning if that TCU precedes a special advisory that will contain the same watch/warning information, and indicates the special advisory will be issued shortly.

When a TCU is issued to change the status of a tropical cyclone (e.g., from a tropical storm to a hurricane), or to update storm intensity, location, or motion information, the TCU will include a storm summary section identical in format to the storm summary section found in the TCP. A TCU may be issued without a storm summary section to provide advance notice that significant changes to storm information will be conveyed shortly, either through a subsequent TCU or through a Special Advisory. TCUs issued to convey changes to watches or warnings will not require a storm summary section.

3.2.6. Tropical Cyclone Position Estimates (TCE). This product ensures a continuous flow of information regarding the center location of a tropical cyclone when it nears the coast and thus provides up to date location information to emergency managers and other public officials. The TCE is a brief alphanumeric product containing information derived from WSR-

88D radar or appropriate satellite data about tropical cyclone positions near coasts in latitude/longitude coordinates, distance, and direction from a well known point.

3.2.7. Graphical Tropical Cyclone Surface Wind Speed Probabilities. This graphical product portrays probabilistic surface wind speed information which will help users prepare for the potential of tropical storm or hurricane conditions. This product shows probabilities for three wind speed thresholds: 34, 50 and 64 knots. It provides cumulative probabilities through each 12 hour interval (e.g. 0 -12 hours, 0- 24 hours, etc.) from 0 through 120 hours. They are available in graphical forms in a static and an animated display. These wind speed probabilities are based on the track, intensity, and wind structure uncertainties in the official forecasts from the tropical cyclone centers.

3.2.8. Tropical Cyclone Surface Wind Speed Probabilities Text Product (PWS). This product portrays probabilistic wind speed information helping users prepare for the potential of tropical storm or hurricane conditions.

The probabilities in this product are statistically based on the errors in the official track and intensity forecasts issued during the past five years by NHC and CPHC. Variability in tropical cyclone wind structure is also incorporated. New probability values are computed for each new official forecast issued by NHC or CPHC.

The first section of the product provides categorical maximum wind speed (intensity) probabilities at standard forecast hours (12, 24, 36, 48, 72, 96, and 120) for various intensity stages (dissipated, tropical depression, tropical storm and hurricane) and for the five categories on the Saffir-Simpson Hurricane Wind Scale. These probabilities apply to the maximum sustained surface wind associated with the cyclone, and not to winds that could occur at specific locations.

Probabilities for specific locations are provided in the second section for sustained wind speeds equal to or exceeding three wind speed thresholds: 34, 50 and 64 knots. Two types of probability values are provided in this table: individual period and cumulative. Individual period probabilities are provided for each of the following time intervals: 0-12 hours, 12-24 hours, 24-36 hours, 36-48 hours, 48-72 hours, 72-96 hours, and 96-120 hours. These individual period probabilities indicate the chance that the particular wind speed will *start* during each individual period at each location. Cumulative probabilities are produced for the following time periods: 0-12 hours, 0-24 hours, 0-36 hours, 0-48 hours, 0-72 hours, 0-96 hours, and 0-120 hours. These cumulative probabilities indicate the overall chance the particular wind speed will occur at each location during the period between hour 0 and the forecast hour.

3.2.9. Tropical Cyclone Watch Warning Product (TCV). The TCV summarizes all new, continued, and cancelled tropical cyclone watches and warnings issued by the NHC for the U.S. Atlantic and Gulf coast, southern California coast, Puerto Rico, and U.S. Virgin Islands. The CPHC will issue a TCV for the main islands of the State of Hawaii. The product is issued each time a U. S. tropical cyclone watch and/or warning is issued, continued, or discontinued for

all Atlantic, portions of the North East Pacific, and the North Central Pacific Ocean basin tropical cyclones.

3.2.10. Hydrometeorological Prediction Center (HPC) Public Advisories (TCP). The National Centers for Environmental Prediction's HPC issues public advisories after NHC discontinues its advisories on subtropical and tropical cyclones that have moved inland in the conterminous United States or Mexico, but still pose a threat of heavy rain and flash floods in the conterminous United States or Mexico. The last NHC advisory will normally be issued when winds in an inland tropical cyclone drop below tropical storm strength, and the tropical depression is not forecast to regain tropical storm intensity or re-emerge over water. Therefore HPC will only handle tropical depressions or remnants. HPC advisories will terminate when the threat of flash flooding has ended.

3.2.11. Other Tropical Cyclone Products. Several other tropical cyclone related products are issued to support the tropical cyclone forecasting and warning program. Refer to NWS Instruction 10-601, located at http://www.weather.gov/directives, for further details on these products, which include:

- Satellite Interpretation Message (SIM).
- Tropical Weather Discussion (TWD).
- Tropical Weather Summary (TWS).
- Tropical Cyclone Summary – Fixes (TCS).
- Tropical Cyclone Danger Area Graphic
- Aviation Tropical Cyclone Advisory (TCA)
- Tropical Cyclone Reports (TCR)
- Tropical Cyclone Track and Watch/Warning Graphic
- Cumulative Wind Distribution
- Tropical Cyclone Surface Wind Field Graphic
- Maximum Wind Speed Probability Table
- Tropical Cyclone Storm Surge Probabilities

3.3. Numbering and Naming of Tropical and Subtropical Cyclones. The hurricane centers will number tropical depressions in their areas of responsibility. Depression numbers are always spelled out (e.g., "ONE," "TWO," "THREE," etc.). Depression numbers are assigned to match the seasonal cyclone number, even if a previous cyclone has bypassed the depression stage. For example, if the first tropical cyclone of the season forms directly as a storm (e.g., a fast-moving tropical wave becomes a tropical storm without ever becoming a depression), then the depression number "ONE" would simply be skipped and not used until the following year. For ease in differentiation, tropical depression numbers shall include the suffix "E" for Eastern Pacific, "C" for Central Pacific, or "W" for Western Pacific, after the number.

In both the Atlantic and Pacific, once the depression has reached tropical storm intensity, it shall be named and the depression number dropped. The depression number will not be used again until the following year. Give tropical cyclones a name in the first advisory after intensifying to 34 knots (39 mph) or greater. In the Western Pacific, WFO Guam will use the JTWC cyclone number for all non-named systems. For RSMC Tokyo named systems, WFO Guam will use the RSMC Tokyo name with the associated JTWC number in parentheses.

The following rules apply for tropical cyclones passing from one basin to another: Retain the name if a tropical cyclone passes from one basin into another basin as a tropical cyclone; i.e., advisories are continuous. An unnamed tropical depression will also retain its number (e.g. Tropical Depression Six-E remains Tropical Depression Six-E) if it crosses into another area of responsibility. For unnamed tropical depressions moving from west to east across 180°, CPHC will use the associated Joint Typhoon Warning Center's (JTWC) number and indicate JTWC in parentheses following the number. For named systems, CPHC will use the associated RSMC Tokyo name and provide the associated JTWC number in parentheses.

Within a basin, if the remnant of a tropical cyclone redevelops into a tropical cyclone, it is assigned its original number or name. If the remnants of a former tropical cyclone regenerate in a new basin, the regenerated tropical cyclone will be given a new designation.

3.3.1. Atlantic Basin. Depression numbers, ONE, TWO, THREE, will be assigned by the NHC after advising the Naval Atlantic Meteorology and Oceanography Center (NAVLANTMETOCCEN) Norfolk. Annual lists of Atlantic storm names are provided in Table 3-1.

3.3.2. Pacific East of 140ºW. Depression numbers, with the suffix E, e.g., ONE-E, TWO-E, THREE-E, will be assigned by the NHC after advising JTWC, Pearl Harbor, HI. The assigned identifier shall be retained even if the depression passes into another warning area. Annual lists of Eastern Pacific storm names are provided in Table 3-2.

3.3.3. Pacific West of 140ºW and East of 180º. Depression numbers, with suffix C; e.g., ONE-C, TWO-C, THREE-C, will be assigned by the CPHC after advising JTWC. Rotating lists of Central Pacific storm names are provided in Table 3-3.

3.3.4. Pacific West of 180º and North of 0º. Depression numbers, with suffix W; e.g., ONE-W, TWO-W, THREE-W, are assigned by JTWC. Rotating lists of Western Pacific storm names are provided in Table 3-4.

3.3.5. Subtropical Depressions. A single list of numbers and names will be used for all tropical and subtropical cyclones in each basin. Therefore, numbering of subtropical depressions will follow the same procedure as tropical depressions. For example, if the first subtropical depression follows the first tropical depression, the subtropical depression will be given the designation SUBTROPICAL DEPRESSION TWO. If a subtropical depression becomes a subtropical storm, it receives the next available name in the tropical cyclone naming sequence.

3.4. Transfer of Warning Responsibility.

3.4.1. NHC to CPHC. When a tropical or subtropical cyclone approaches 140ºW, the coordinated transfer of warning responsibility from NHC to CPHC will be made and the appropriate advisory issued.

3.4.2. CPHC to JTWC/(RSMC, Tokyo)/WFO Guam. When a tropical or subtropical cyclone crosses 180º from east to west, the coordinated transfer of warning responsibility from CPHC to JTWC will be made and the appropriate advisory issued. At the same time, the CPHC will coordinate with the RSMC, Tokyo and WFO Guam so that they are aware that CPHC will be suspending the issuance of advisories.

3.4.3. JTWC/RSMC, Tokyo to CPHC. When a tropical or subtropical cyclone crosses 180º from west to east, the coordinated transfer of warning responsibility from JTWC to CPHC will be made. At the same time, the CPHC will coordinate with RSMC, Tokyo so that they are aware that CPHC will be assuming the issuance of advisories.

3.5. Alternate Warning Responsibilities.

3.5.1. Transfer to Alternate. In the event of impending or actual operational failure of a hurricane forecast center, tropical warning responsibilities will be transferred to an alternate facility in accordance with existing directives and retained there until resumption of responsibility can be made. Alternate facilities are as follows:

PRIMARY	ALTERNATE
NHC	Atlantic Basin: National Centers for Environmental Prediction Hydrometeorological Prediction Center (HPC), Camp Springs, MD Eastern Pacific Basin: CPHC
CPHC	NHC
CARCAH	53rd Weather Reconnaissance Squadron (53 WRS)
JTWC	Fleet Numerical Meteorology and Oceanography Center (FLENUMETOCCEN), Monterey, CA
WFO Guam	CPHC

3.5.2. Notification. The NAVLANTMETOCCEN, Norfolk, and JTWC, Pearl Harbor, will be advised by NHC, CARCAH, and CPHC, as appropriate, of impending or actual transfer of responsibility by the most rapid means available. JTWC will advise CPHC, NHC, and WFO Guam of impending or actual transfer of JTWC responsibilities. In the event of a CARCAH operational failure, direct communication is authorized between the 53 WRS and the forecast facility. Contact 53 WRS at DSN 597-2409/228-377-2409 or through the Keesler AFB Command Post at DSN 597-4181/4330; COM 228-377-4181/4330 (ask for the 53 WRS).

Table 3-1. Atlantic Tropical Cyclone Names

2011		**2012**		**2013**	
ARLENE	ar-LEEN	ALBERTO	al-BAIR-toe	ANDREA	AN-dree-uh
BRET	bret	BERYL	BER-ril	BARRY	BAIR-ree
CINDY	SIN-dee	CHRIS	kris	CHANTAL	shahn-TAHL
DON	dahn	DEBBY	DEH-bee	DORIAN	DOR-ee-an
EMILY	EH-mih-lee	ERNESTO	er-NES-toh	ERIN	AIR-in
FRANKLIN	FRANK-lin	FLORENCE	FLOOR-ence	FERNAND	fair-NAHN
GERT	gert	GORDON	GOR-duhn	GABRIELLE	ga-bree-EL
HARVEY	HAR-vee	HELENE	heh-LEEN	HUMBERTO	oom-BAIR-to
IRENE	eye-REEN	ISAAC	EYE-zik	INGRID	ING-grid
JOSE	ho-ZAY	JOYCE	joyss	JERRY	JEHR-ee
KATIA	~~ka-TEE-ah~~ KAH-tyah	KIRK	kurk	KAREN	KAIR-ren
LEE	kee	LESLIE	LEHZ-	LORENZO	loh-REN-zoh
MARIA	muh-REE-ah	MICHAEL	MY-kuhl	MELISSA	meh-LIH-suh
NATE	nait	NADINE	nay-DEEN	NESTOR	NES-tor
OPHELIA	o-FEEL-ya	OSCAR	AHS-kur	OLGA	OAL-gah
PHILIPPE	fee-LEEP	PATTY	PAT-ee	PABLO	PAHB-lo
RINA	REE-nuh	RAFAEL	ra-fah-ELL	REBEKAH	reh-BEH-kuh
SEAN	shawn	SANDY	SAN-dee	SEBASTIEN	suh-BASH-chuhn
TAMMY	TAM-ee	TONY	TOH-nee	TANYA	TAHN-ya
VINCE	vinss	VALERIE	VAH-lur-ee	VAN	van
WHITNEY	WHIT-nee	WILLIAM	WILL-yum	WENDY	WEN-dee
2014		**2015**		**2016**	
ARTHUR	AR-thur	ANA	AH-nah	ALEX	AL-leks
BERTHA	BUR-thuh	BILL	bill	BONNIE	BAH-nee
CRISTOBAL	krees-toh-bahl	CLAUDETTE	claw-DET	COLIN	KAH-lin
DOLLY	DAH-lee	DANNY	DAN-ee	DANIELLE	dan-YELL
EDOUARD	eh-DWARD	ERIKA	eh-RIH-kuh	EARL	URR-ull
FAY	fay	FRED	frehd	FIONA	fee-OH-nuh
GONZALO	gahn-ZAH-low	GRACE	grayss	GASTON	ga-STAWN
HANNA	HAN-uh	HENRI	ahn-REE	HERMINE	her-MEEN
ISAIAS	ees-ah-EE-ahs	IDA	EYE-duh	IAN	EE-ahn
JOSEPHINE	JO-seh-feen	JOAQUIN	wah-KEEN	JULIA	JOO-lee-uh
KYLE	KY-ull	KATE	kayt	KARL	KAR-ull
LAURA	LOOR-ruh	LARRY	LAIR-ree	LISA	LEE-sa
MARCO	MAR-koe	MINDY	MIN-dee	MATTHEW	MATH-you
NANA	NA-na	NICHOLAS	NIH-kuh-luss	NICOLE	ni-COLE
OMAR	OH-mar	ODETTE	oh-DEHT	OTTO	AHT-toh
PAULETTE	pawl-LET	PETER	PEE-tur	PAULA	PAHL-luh
RENE	re-NAY	ROSE	rohz	RICHARD	RIH-churd
SALLY	SAL-ee	SAM	sam	SHARY	SHAHR-ee
TEDDY	TEHD-ee	TERESA	tuh-REE-sauh	TOBIAS	toh-BYE-ahs
VICKY	VIH-kee	VICTOR	VIK-tur	VIRGINIE	vir-JIN-ee
WILFRED	WILL-fred	WANDA	WAHN-duh	WALTER	WALL-tur

Note: If over 21 tropical cyclones occur in a year, the Greek alphabet will be used following the W-named cyclone.

Table 3-2. Eastern Pacific Tropical Cyclone Names

2011		**2012**		**2013**	
ADRIAN	AY-dree-uhn	ALETTA	a LET ah	ALVIN	AL-vin
BEATRIZ	BEE a triz	BUD	buhd	BARBARA	BAR-bruh
CALVIN	KAL-vin	CARLOTTA	kar-LOT-uh	COSME	COS-may
DORA	DOR-ruh	DANIEL	DAN-yul	DALILA	dah-lay-lah
EUGENE	YOU-jeen	EMILIA	ee-MILL-ya	ERICK	EHR-ik
FERNANDA	fer NAN dah	FABIO	FAH bee o	FLOSSIE	FLOSS-ee
GREG	greg	GILMA	GIL mah	GIL	gill
HILARY	HIH-luh-ree	HECTOR	HEHK-tor	HENRIETTE	hen-ree-ETT
IRWIN	UR-win	ILEANA	ill-ay-AH-nah	IVO	eye-VOH
JOVA	~~JO-vah~~ HO-vah	JOHN	jahn	JULIETTE	jew-lee-ETT
KENNETH	KEH-neth	KRISTY	KRIS-tee	KIKO	KEE-ko
LIDIA	LIH-dyah	LANE	layne	LORENA	low-RAY-na
MAX	maks	MIRIAM	MEER-yim	MANUEL	mahn-WELL
NORMA	NOOR-muh	NORMAN	NOR-muhn	NARDA	NAHR-duh
OTIS	OH-tis	OLIVIA	uh-LIV-ee-uh	OCTAVE	AHK-tave
PILAR	pee-LAHR	PAUL	pall	PRISCILLA	prih-SIH-luh
RAMON	~~rah-MOWN~~ rah-MOHN	ROSA	ROH-zuh	RAYMOND	RAY-mund
SELMA	SELL-mah	SERGIO	SIR-gee-oh	SONIA	SONE-yah
TODD	tahd	TARA	TAIR-uh	TICO	TEE-koh
VERONICA	vur-RAHN-ih-kuh	VICENTE	vee-CEN-tay	VELMA	VELL-muh
WILEY	WY-lee	WILLA	WIH-lah	WALLIS	WAHL-lis
XINA	ZEE nah	XAVIER	ZAY-vee-ur	XINA	ZEE-nah
YORK	york	YOLANDA	yo-LAHN-da	YORK	york
ZELDA	ZEL dah	ZEKE	zeek	ZELDA	ZEL-dah
2014		**2015**		**2016**	
AMANDA	uh-MAN-duh	ANDRES	ahn-DRASE	AGATHA	A-guh-thuh
BORIS	bor-EES	BLANCA	BLAHN-kah	BLAS	blahs
CRISTINA	kris-TEE-nuh	CARLOS	KAR-loess	CELIA	SEEL-yuh
DOUGLAS	DUG-luss	DOLORES	deh-LOOR-ess	DARBY	DAR-bee
ELIDA	ELL ee dah	ENRIQUE	anh-REE-kay	ESTELLE	eh-STELL
FAUSTO	FOW sto	FELICIA	fa-LEE-sha	FRANK	frank
GENEVIEVE	jeh-nuh-VEEV	GUILLERMO	gee-YER-mo	GEORGETTE	jor-JET
HERNAN	her-NAHN	HILDA	HILL-duh	HOWARD	HOW-urd
ISELLE	ee-SELL	IGNACIO	eeg-NAH-see-oh	ISIS	EYE-sis
JULIO	HOO-lee-o	JIMENA	he-MAY-na	JAVIER	hahv-YAIR
KARINA	kuh-REE-nuh	KEVIN	KEH-vin	KAY	kay
LOWELL	LO-uhl	LINDA	LIHN-duh	LESTER	LESS-tur
MARIE	muh-REE	MARTY	MAR-tee	MADELINE	MAD-eh-luhn
NORBERT	NOR-bert	NORA	NOOR-ruh	NEWTON	NOO-tuhn
ODILE	oh-DEAL	OLAF	OH-lahf	ORLENE	or-LEEN
POLO	POH-loh	PATRICIA	puh-TRIH-shuh	PAINE	payne
RACHEL	RAY-chull	RICK	rik	ROSLYN	RAWZ-luhn
SIMON	SY-muhn	SANDRA	SAN-druh	SEYMOUR	SEE-mor
TRUDY	TROO-dee	TERRY	TAIR-ree	TINA	TEE-nuh
VANCE	vanss	VIVIAN	VIH-vee-uhn	VIRGIL	VUR-jill
WINNIE	WIN-ee	WALDO	WAHL-doh	WINIFRED	WIN-ih-fred
XAVIER	ZAY-vee-ur	XINA	ZEE-nah	XAVIER	ZAY-vee-ur
YOLANDA	yo-LAHN-da	YORK	york	YOLANDA	yo-LAHN-da
ZEKE	zeek	ZELDA	ZEL-dah	ZEKE	zeek

Table 3-3. Central Pacific Tropical Cyclone Names

COLUMN 1		COLUMN 2	
Name	**Pronunciation**	**Name**	**Pronunciation**
AKONI	ah-KOH-nee	AKA	AH-kah
EMA	EH-mah	EKEKA	eh-KEH-kak
HONE	HOH-neh	HENE	HEH-neh
IONA	ee-OH-nah	IOLANA	ee-OH-lah-nah
KELI	KEH-lee	KEONI	keh-ON-nee
LALA	LAH-lah	LINO	LEE-noh
MOKE	MOH-keh	MELE	MEH-leh
NOLO	NOH-loh	NONA	NOH-nah
OLANA	Oh-LAH-nah	OLIWA	oh-LEE-vah
PENA	PEH-nah	PAMA	PAH-mah
ULANA	oo-LAH-nah	UPANA	oo-PAH-nah
WALE	WAH-leh	WENE	WEH-neh
COLUMN 3		**COLUMN 4**	
Name	**Pronunciation**	**Name**	**Pronunciation**
ALIKA	ah-LEE-kah	ANA	AH-nah
ELE	EH-leh	ELA	EH-lah
HUKO	HOO-koh	HALOLA	hah-LOH-lah
IOPA	ee-OH-pah	IUNE	ee-OO-neh
KIKA	KEE-kah	KILO	KEE-lo
LANA	LAH-nah	LOKE	LOH-keh
MAKA	MAH-kah	MALIA	mah-LEE-ah
NEKI	NEH-kee	NIALA	nee-AH-lah
OMEKA	oh-MEH-kah	OHO	OH-hoh
PEWA	PEH-vah	PALI	PAH-lee
UNALA	oo-NAH-lah	ULIKA	oo-LEE-kah
WALI	WAH-lee	WALAKA	wah-LAH-kah

Note: Use Column 1 list of names until exhausted before going to Column 2, etc. All letters in the Hawaiian language are pronounced, including double or triple vowels.

Table 3-4. International Tropical Cyclone Names for the Northwest Pacific and South China Sea

Contributor	I	II	III	IV	V
	NAME	NAME	NAME	NAME	NAME
Cambodia	Damrey	Kong-rey	Nakri	Krovanh	Sarika
China	Longwang	Yutu	Fengshen	Dujuan	Haima
DPR Korea	Kirogi	Toraji	Kalmaegi	Maemi	Meari
HK, China	Kai-tak	Man-yi	Fung-wong	Choi-wan	Ma-on
Japan	Tembin	Usagi	Kammuri	Koppu	Tokage
Lao PDR	Bolaven	Pabuk	Phanfone	Ketsana	Nock-ten
Macau	Chanchu	Wutip	Vongfong	Parma	Muifa
Malaysia	Jelawat	Sepat	Nuri	Melor	Merbok
Micronesia	Ewiniar	Fitow	Sinlaku	Nepartak	Nanmadol
Philippines	Bilis	Danas	Hagupit	Lupit	Talas
RO Korea	Kaemi	Nari	Changmi	Sudal	Noru
Thailand	Prapiroon	Wipha	Mekkhala	Nida	Kulap
U.S.A.	Maria	Francisco	Higos	Omais	Roke
Viet Nam	Saomai	Lekima	Bavi	Conson	Sonca
Cambodia	Bopha	Krosa	Maysak	Chanthu	Nesat
China	Wukong	Haiyan	Haishen	Dianmu	Haitang
DPR Korea	Sonamu	Podul	Pongsona	Mindulle	Nalgae
HK, China	Shanshan	Lingling	Yanyan	Tingting	Banyan
Japan	Yagi	Kajiki	Kujira	Kompasu	Washi
Lao PDR	Xangsane	Faxai	Chan-hom	Namtheun	Matsa
Macau	Bebinca	Peipan	Linfa	Malou	Sanvu
Malaysia	Rumbia	Tapah	Nangka	Meranti	Mawar
Micronesia	Soulik	Mitag	Soudelor	Rananim	Guchol
Philippines	Cimaron	Hagibis	Molave	Malakas	Talim
RO Korea	Chebi	Noguri	Koni	Megi	Nabi
Thailand	Durian	Rammasun	Morakot	Chaba	Khanun
U.S.A.	Utor	Matmo	Etau	Aere	Vicente
Viet Nam	Trami	Halong	Vamco	Songda	Saola

NOTE: The official international name list was effective January 1, 2000. Names will be assigned in rotation starting with Damrey for the first tropical cyclone of the year 2000 which is of tropical storm strength or greater. When the last name in column 5 (Saola) is used, the sequence will begin again with the first name in column 1.

3.6. <u>Abbreviated Communications Headings</u>. Abbreviated communications headings are assigned to advisories on tropical and subtropical cyclones and other advisories based on depression numbers or storm name and standard communications procedures governed by the World Meteorological Organization (WMO). An abbreviated heading consists of three groups with ONE space between each of the groups. The first group contains a data type indicator (e.g.,

WT for hurricane), a geographical indicator (e.g. NT for Atlantic Basin), and a number. The second group contains a location identifier of the message originator (e.g., KNHC for NHC). The third group is a date-time group in UTC. An example of a complete header is: WTNT61 KNHC 180400. Table 3-5 provides the abbreviated communications headings for products issued by NHC, CPHC, and WFO Guam.

Table 3-5. Summary of Products and their Associated WMO Header

PRODUCT TITLE	WMO HEADER
Tropical Weather Outlook	
Atlantic Basin	ABNT20 KNHC
Eastern Pacific	ABPZ20 KNHC
Central Pacific	ACPN50 PHFO
Tropical Weather Discussion	
Atlantic Basin	AXNT20 KNHC
Eastern Pacific	AXPZ20 KNHC
Tropical/Subtropical Cyclone Public Advisory	
Atlantic Basin	WTNT31-35 KNHC
Eastern Pacific	WTPZ31-35 KNHC
Central Pacific	WTPA31-35 PHFO
Western Pacific	WTPQ31-35 PGUM
Tropical Cyclone Surface Wind Speed Probabilities Text Product	
Atlantic Basin	FONT11-15 KNHC
Eastern Pacific	FOPZ11-15 KNHC
Central Pacific	FOPA11-15 PHFO
Tropical/Subtropical Cyclone Forecast/Advisory	
Atlantic Basin	WTNT21-25 KNHC
Eastern Pacific	WTPZ21-25 KNHC
Central Pacific	WTPA21-25 PHFO
Tropical Cyclone Discussion	
Atlantic Basin	WTNT41-45 KNHC
Eastern Pacific	WTPZ41-45 KNHC
Central Pacific	WTPA41-45 PHFO
Tropical Cyclone Valid Time Event Code Product	
Atlantic Basin	WTNT81-85 KNHC
Eastern Pacific	WTPZ81-85 KNHC
Central Pacific	WTPA81-85 PHFO
Tropical Cyclone Position Estimate	
Atlantic Basin	WTNT51-55 KNHC
Eastern Pacific	WTPZ51-55 KNHC
Central Pacific	WTPA51-55 PHFO
Western North Pacific	WTPQ51-55 PGUM
Tropical Cyclone Update	
Atlantic Basin	WTNT61-65 KNHC
Eastern Pacific	WTPZ61-65 KNHC
Central Pacific	WTPA61-65 PHFO

Table 3-5 (continued). Summary of Products and their Associated WMO Header

PRODUCT TITLE	WMO HEADER
Tropical Weather Summary	
Atlantic Basin	ABNT30 KNHC
Eastern Pacific	ABPZ30 KNHC
Central Pacific	ACPN60 PHFO
Tropical Cyclone Position and Intensity from Satellite Data	
South Central Pacific 120W	TXPS40 PHFO
North Central Pacific 140W - 180	TXPN40 PHFO
Satellite Interpretation Message	
Hawaiian Islands	ATHW40 PHFO
West Pacific (Guam)	ATPQ40 PGUM
Satellite-Derived Rainfall	
Eastern Caribbean	TCCA21 KNHC
Central Caribbean	TCCA22 KNHC
Western Caribbean	TCCA23 KNHC
Aviation Tropical Cyclone Advisory Message	
Atlantic Basin	FKNT21-25 KNHC
Eastern Pacific	FKPZ21-25 KNHC
Central Pacific	FKPA21-25 PHFO
Tropical Cyclone Summary - Fixes	
South Central Pacific 120W	TXPS41-45 PHFO
North Central Pacific 140W - 180	TXPN41-45 PHFO

Note: Refer to Appendix C for abbreviated communications headers and titles for the products for which JTWC is responsible.

3.7. Hurricane Liaison Team (HLT). The HLT is a Department of Homeland Security's Federal Emergency Management Agency (FEMA)-sponsored team made up of federal, state, and local emergency managers who have extensive hurricane operational experience. Team members function as a bridge between scientists, meteorologists and the emergency managers who respond if the storm threatens the United States or its territories. Team members provide immediate and critical storm information to government agency decision makers at all levels to help them prepare for their response operations, which may include evacuations, sheltering, and mobilizing equipment. State and/or local officials, not the HLT, make decisions concerning evacuations.

3.7.1. National Weather Service (NWS) Responsibilities. The NWS supports the HLT through use of NHC meteorologists, Weather Forecast Office (WFO) personnel (typically warning coordination meteorologists and service hydrologists), and River Forecast Center (RFC) hydrologists. Eastern and Southern Region Headquarters will maintain a list of their available HLT candidates.

3.7.2. Activation/Deployment. On June 1st, or earlier if necessary, the NHC Director will request that the FEMA activate the HLT by contacting the Disaster Operations Directorate. The HLT will remain active throughout the season. When a tropical cyclone in the Atlantic or eastern North Pacific basins threatens the United States or its territories, the Director or Deputy

Director of TPC may request NWS meteorological and/or hydrological support by contacting the appropriate NWS Regional Director. NWS personnel should deploy to NHC within 24 hours of the request for assistance.

NWS personnel will remain deployed at the HLT until the hurricane threat has passed. However, if a significant rainfall threat is expected to persist after landfall, the HLT will remain staffed by the FEMA to facilitate coordination with the Hydrometeorological Prediction Center (HPC), who will assume briefing responsibilities until the rainfall threat has passed. TPC and HPC will coordinate the transfer of briefing responsibilities. During the inland event the HLT and HPC will coordinate with the appropriate WFOs and RFCs, and when needed, hydrologists from the RFCs will provide hydrological briefings.

If the HLT is deactivated, the HPC will assume the briefing duties provided the remnants of the tropical cyclone remain a threat to inland areas. TPC and HPC will coordinate prior to the transfer. During the inland event HPC will coordinate with the appropriate WFOs and RFCs and when needed, hydrologists from the RFCs will provide hydrological briefings.

3.7.3. Training. Completing NWS/FEMA's distance learning training module, Community Hurricane Preparedness, is required by HLT members. The module can be taken via the Internet at: http://meted.ucar.edu/hurrican/chp/index.htm. Other training opportunities are strongly encouraged. They are: FEMA's "Introduction to Hurricane Preparedness" conducted at NHC for emergency mangers and NWS personnel, and FEMA's annual HLT training session held at NHC.

3.7.4. Meteorological Duties. The HLT meteorologist will:

- Establish and maintain contact with the impacted WFOs, RFCs, and the HPC.
- Facilitate participation of the impacted NWS offices in conference calls, briefings, and in preparation and distribution of graphics.
- Provide meteorological interpretations on NHC advisories, WFO hurricane local statements, Hurrevac products, and storm surge forecasts for Federal, state and local agencies on request.
- Provide storm briefings via video/audio teleconferences for Federal, state and local organizations.
- Respond to meteorology-related incoming calls from Federal, state, and local emergency managers. Refer callers to the appropriate WFO for responses to localized special questions and issues.

3.7.5. Hydrologic Duties. The HLT hydrologist will:

- Establish and maintain contact with the impacted local WFOs, RFCs, and the HPC.
- Facilitate participation of the impacted NWS offices in conference calls, briefings, and in preparation and distribution of graphics.
- Provide hydrologic interpretation on NHC advisories, WFO hurricane local statements, and WFO and RFC hydrologic products for Federal, state and

local agencies on request.

- Provide technical support for RFC lead during hydrologic portion of video teleconference. In absence of the RFC, lead the hydrologic portion of the video teleconference.
- Respond to hydrology-related incoming calls from Federal, state, and local emergency managers. Refer callers to the appropriate WFO for responses to localized special questions and issues.