1. OPERATIONAL PROCEDURES

1.1 GENERAL

The Joint Typhoon Warning Center (JTWC) provides a variety of routine products and services to the organizations within its area of responsibility, including:

1.1.1 SIGNIFICANT TROPICAL WEATHER ADVISORIES — Issued daily or as needed, to describe all tropical disturbances and their potential for further development during the advisory period.

1.1.2 TROPICAL CYCLONE FORMATION ALERTS — Issued when synoptic or satellite data indicate the development of a tropical cyclone is likely within 24 hours in a specified area.

1.1.3 TROPICAL CYCLONE/ TROPICAL DEPRESSION WARNINGS — Issued periodically throughout each day to provide forecasts of position, intensity, and wind distribution for tropical cyclones in JTWC's area of responsibility (AOR).

1.1.4 PROGNOSTIC REASONING MESSAGES — Issued with warnings for tropical depressions, tropical storms, typhoons and super typhoons in the western North Pacific to discuss the rationale for the content of JTWC's warnings.

1.1.5 PRODUCT CHANGES — The contents and availability of the above JTWC products are set forth in USCINCPACINST 3140.1 (series). Changes to USCINCPACINST 3140.1 and JTWC products and services are proposed and discussed at the Annual Tropical Cyclone Conference. Significant changes this year to the warning system include: more involved procedures for intensity forecasting and a redefiniition of the boundary between ocean basins in the Southern Hemisphere from 100° east to 135° east longitude for the significant tropical weather advisories.

1.2 DATA SOURCES

1.2.1 COMPUTER PRODUCTS — Numerical and statistical guidance are available from the USN Fleet Numerical Oceanography Center (FNOC) at Monterey, California. These products along with selected ones from the National Meteorological Center (NMC) are received through the Naval Environmental Data Network (NEDN), the Naval Environmental Satellite Network (NESN), and by microcomputer dial-up connections using military and commercial telephone lines. Numerical guidance is also received from Air Force Global Weather Center (AFGWC) at Omaha, Nebraska via the Pacific Digital Information Graphics System (PACDIGS), and from indigenous sources within our AOR.

1.2.2 CONVENTIONAL DATA — These data sets are comprised of land and shipboard surface observations, and enroute meteorological observations from commercial and military aircraft (AIREPS) recorded within six hours of synoptic times, and cloud-motion winds derived from satellite data . The conventional data is hand- and computer-plotted, and hand-analyzed in the tropics for the surface/gradient and 200-mb levels. These analyses are prepared twice daily from 0000Z and 1200Z synoptic data. Also, FNOC supplies JTWC with computer generated analyses and prognoses, from 0000Z and 1200Z synoptic data, at the surface, 850-mb, 700-mb, 500-mb, 400-mb, 200-mb levels, and deep layer mean winds.

1.2.3 SATELLITE RECONNAISSANCE — Meteorological satellite imagery recorded at USAF/USN ground sites and USN ships supply day and night coverage in JTWC's area of responsibility. Interpretation of these satellite data provides tropical cyclone positions and estimates of current and forecast intensities (Dvorak, 1984). The USAF tactical satellite sites and Air Force Global Weather Central currently receive and analyze special sensor microwave/imager (SSM/I) data to provide estimates of 30-knot wind radii near tropical cyclones. Use of satellite reconnaissance is discussed further in section 2. Reconnaissance and Fixes.

1.2.4 RADAR RECONNAISSANCE — Land-based radar observations are used to position tropical cyclones. Once a well-defined tropical cyclone moves within the range of land-based radar sites, radar reports are invaluable for determination of position and movement. Use of radar reports during 1990 is discussed in section 2. Reconnaissance and Fixes.

1.2.5 AIRCRAFT RECONNAISSANCE – In support of the Tropical Cyclone Motion (TCM-90) experiment the NASA DC-8 aircraft provided a limited number of fixes. These were the first high-level fixes from aircraft ever provided to JTWC and used in support of the official warnings.

1.2.6 DRIFTING METEOROLOGICAL BUOYS - In 1990, 18 mini-drifting buoys were specifically deployed in the western North Pacific for tropical cyclone warning support. Twelve buoys were deployed by the JTWC in support of the TCM90 experiment. Six buoys were deployed from Cubi Point NAS during the last part of the year. Several of these buoys took direct hits from typhoons. In 1989 Commander, Naval Oceanography Command put into action the NAVOCEANCOM Integrated Drifting Buoy Plan 1989-1994 to provide mini-drifting buoys to meet USCINCPACFLT requirements including tropical cyclone warning support.

JTWC acquires drifting buoy data directly through its Local User Terminal (LUT). The buoys transmit data to the TIROS-N polar orbiting satellites, which in turn relay the data to JTWC's LUT. JTWC transmits buoy data on the AWN under the header SSVE 01 PGTW. Additionally, the data stored aboard the satellites are recovered via Service ARGOS at NOAA/NESDIS in Suitland, Maryland. NOAA/NESDIS processes and distributes the Meteorological data to users via the Global Telecommunications System (GTS) and the Automated Weather Network (AWN).

1.2.7 AUTOMATIC WEATHER OBSERVING STATIONS (AMOS) — Through a cooperative effort between the Naval Oceanography Command, the Department of the Interior, and NOAA, a network of 20 AMOS stations are being installed in the Micronesian islands. In the Commonwealth of the Northern Mariana Islands, there are now stations on Saipan, Rota, and Pagan. In the Federated States of Micronesia, there is a station on Kosrae. In the Republic of the Marshall Islands,there are now stations on Ujae,

Table 1-1. AUTOMATIC WEATHER OBSERVING STATIONS SUMMARY

Site	Location	Callsign	ID#	Type	System	Installed
Saipan	(15.2°N, 145.7°E)	15D151D2	-----	HANDAR	ARC	1986
Rota	(14.2°N, 145.2°E)	15D16448	-----	HANDAR	ARC	1987
Faraulep*	(8.6°N, 144.6°E)	FARP2	52005	AMOS	C-MAN/ARGOS	1988
Ujae	(8.9°N, 165.8°E)	UJAP2	91365	AMOS	C-MAN	1989
Enewetak	(11.4°N, 162.3°E)	ENIP2	91251	AMOS	C-MAN	1989
Pagan	(18.1°N, 145.8°E)	PAGP2	91222	AMOS	C-MAN	1990
Kosrae	(5.3°N, 163.0°E)	KOSP2	91356	AMOS	C-MAN	1990
Mili	(6.1°N, 171.8°E)	MILP2	91377	AMOS	C-MAN	1990

* Prototype site, which was destroyed in November, will not be reestablished.

ARC = Automated Remote Collection system (via GOES West)
ARGOS = System ARGOS data collection (via TIROS-N)
C-MAN = Coastal-Marine Automated Network (via GOES West)

Enewetak, and Mili. JTWC receives AMOS data from all sites via the AWN under the bulletin headers SMPW01 KWBC, SIPW01 KWBC, and SNPW01 KWBC. The prototype site on Faraulep was destroyed during Super Typhoon Owen on 28 November. An AMOS summary appears in Table 1.1.

1.3 COMMUNICATIONS

Primary communications support is provided by the Naval Telecommunications Center (NTCC), Nimitz Hill, a component of the Naval Communications Area Master Station, Western Pacific (NAVCAMS WESTPAC). JTWC uses the following communications systems:

1.3.1 AUTOMATED DIGITAL NETWORK (AUTODIN) — AUTODIN is used for dissemination of warnings, alerts and other related bulletins to Department of Defense (DOD) and other US Government installations. These messages are relayed for further transmission over Navy Fleet Broadcasts, and Coast Guard continuous wave Morse code and voice broadcasts. AUTODIN messages can be relayed to commercial telecommunications for delivery to non-DOD users. Inbound message traffic for JTWC is received via AUTODIN addressed to NAVOCEANCOMCEN GQ//JTWC// or DET 1 1WW NIMITZ HILL GQ//CC//.

1.3.2 AUTOMATED WEATHER NETWORK (AWN) - The AWN provides weather data over the Pacific Meteorological Data System (PACMEDS). The PACMEDS, operational at JTWC since April 1988, allows Pacific-Theater agencies to receive weather information at 1200 baud. JTWC uses a software package called AWNCOM/WINDS on a microcomputer to send and receive data via the PACMEDS. This system will eventually provide effective storage and manipulation of the large volume of meteorological reports available from throughout JTWC's vast Area of Responsibility (AOR). Through the AWN, JTWC has access to data available on the Global Telecommunications System (GTS). JTWC's AWN station identifier is PGTW

1.3.3 DEFENSE SWITCHED NETWORK (DSN) — DSN, formerly AUTOVON, is a world-wide general purpose switched telecommunications network for the DOD. The network provides a rapid and vital voice link for JTWC to communicate tropical cyclone information to DOD installations. The DSN telephone numbers for JTWC are 344-4224 or 321-2345.

1.3.4 NAVAL ENVIRONMENTAL DATA NETWORK (NEDN) — The NEDN is the primary link to FNOC to obtain computer generated analyses and prognoses. It is also a backup communication line for requesting and receiving the objective tropical cyclone forecast aids from FNOC's mainframe computers. The NEDN allows JTWC to communicate directly to the other Naval Oceanography Command Centers around the world.

1.3.5 PUBLIC DATA NETWORK (PDN) — A commercial packet switching network that provides low-speed interactive transmission to users of FNOC products. The PDN is now the primary method for JTWC to request and receive FNOC produced objective tropical cyclone forecast aids. The PDN allows direct access of FNOC products via the Automated Tropical Cyclone Forecast (ATCF) system. The PDN also serves as an alternate method of obtaining FNOC analyses and forecast fields. TYMNET is the contractor providing PDN services to FNOC.

1.3.6 DEFENSE DATA NETWORK (DDN) —The DDN is a DOD computer communications network utilized to exchange data files. Because the DDN has links, or gateways, to non-military information networks, it is primarily used to exchange data with the research community. JTWC's address is 1WW JTWC @ SACEMNET .AF. MIL

1.3.7 TELEPHONE FACSIMILE (TELEFAX) — TELEFAX provides the capability to rapidly scan and transmit, or receive, documents over commercial telephone lines or DSN. TELEFAX is used to disseminate tropical cyclone advisories and warnings to key agen-cies on Guam and, in special situations, the other Micronesian Islands. Inbound documents for JTWC are received via commercial telephone at (671) 477-6186. If inbound through DSN, the Guam DSN operator 322-1110 can transfer the call to the commercial number 477-6186.

1.3.8 NAVAL ENVIRONMENTAL SATELLITE NETWORK (NESN) — The NESN's primary function is to pass satellite data from the satellite global data base at FNOC to regional centers. Similarly, it can pass satellite data from NOCC/JTWC to FNOC or other regional centers. It can also provide a limited back-up for the NEDN.

1.3.9 AIRFIELD FIXED TELECOMMUNICATIONS NETWORK (AFTN) — AFTN was installed at JTWC in January 1990. Though AFTN is primarily for the exchange of aviation information; weather information and warnings are also distributed via this network. AFTN also provides point-to-point communication with other warning agencies. JTWC's AFTN identifier is PGUMYMYT.

1.3.10 LOCAL USER TERMINAL (LUT) — JTWC uses a LUT, provided by the Naval Oceanographic Office, as the primary means of receiving real-time data from drifting meteorological buoys and ARGOS-equipped AMOS via the polar orbiting NOAA satellites.

1.3.11 COMPUTER FACSIMILE - The JTWC Rapid Response Team (RRT) uses a microcomputer to transmit facsimile messages to agencies on Guam and the Northern Marianas when a typhoon threatens the Mariana Islands. The RRT can be reached at (671)-344-7116 or (671)-344-7119.

1.4 DATA DISPLAYS

1.4.1 NAVAL ENVIRONMENTAL DISPLAY STATION (NEDS) — The NEDS receives, processes, stores, displays and prints copies of FNOC environmental products. It drives the fleet facsimile broadcast and can also be used to generate the requests for objective tropical cyclone forecast techniques.

1.4.2 AUTOMATED TROPICAL CYCLONE FORECAST SYSTEM (ATCF) — The ATCF cuts message preparation time and reduces the number of corrections to JTWC's alerts and warnings. The ATCF automatically computes the myriad of statistics calculated by JTWC. Links have been established through a Local Area Network (LAN) to the NOCC Operations watch team to facilitate the generation of tropical cyclone warning graphics for the fleet facsimile broadcasts and their local metwatch and warning products for Micronesia. A module permits satellite reconnaissance fixes to be input from Det 1, 1WW into the LAN. Several other modules are still under development including: direct links to NTCC, the LUT, and AWNCOM/WINDS.

1.4.3 PACIFIC DIGITAL INFORMATION GRAPHICS SYSTEM (PACDIGS) — The PACDIGS is a communications circuit that was expanded to include JTWC in 1988. Air Force Global Weather Central (AFGWC) at Omaha, Nebraska provides a standard set of numerical products to the PACDIGS circuit which can be used for additional evaluation in the development of tropical cyclone warnings.

1.4.4 NAVAL SATELLITE DISPLAY SYSTEM (NSDS) — The NSDS functions as a display of FNOC stored Defense Meteorological Satellite Program (DMSP) imagery and low resolution geostationary imagery . It is the primary means for JTWC to observe areas of cloudiness in the Indian Ocean.

1.4.5 NAVAL SATELLITE DISPLAY SYSTEM-GEOSTATIONARY(NSDS-G) — The NSDS-G is the primary system used to process high resolution geostationary imagery for tropical cyclone positioning and intensity estimates for the western Pacific Ocean. Its built-in sectorizer allows scale expansion and downloading of electronic files to evaluate the data effectively, and monitor several cyclones or suspect areas at once.

1.5 ANALYSES

The JTWC Typhoon Duty Officer (TDO) routinely performs manual streamline analyses of composite surface/gradient-level (3000 ft (914 m)) and upper-tropospheric (centered on the 200-mb level) data for 0000Z and 1200Z each day. Manual sea-level pressure analyses concentrating on the mid-latitudes are available from the NOCC Operations watch team. Computer analyses of the surface, 850-, 700-, 500-, 400-, and 200-mb levels, deep layer mean winds, and frontal boundaries are available from the 0000Z and 1200Z FNOC data bases. Additional sectional charts at intermediate synoptic times and auxiliary charts, such as station-time plot diagrams and pressure-change charts, are analyzed during periods of significant tropical cyclone activity.

1.6 FORECAST PROCEDURES

1.6.1 INITIAL POSITIONING — The warning position is the best estimate of the center of the surface circulation at synoptic time. It is estimated from an analysis of all fix information received from one hour before to one and one-half hours after that synoptic time. The analysis is aided by a computer-generated objective best track scheme that weights fix information based on its statistical accuracy. The TDO includes synoptic observations and other information to adjust the position, testing consistency with the past direction, speed of movement and the influence of the different scales of motions. If the fix data are not available due to reconnaissance platform malfunction or communication problems, or are considered unrepresentative, synoptic data and/or extrapolation from previous fixes are used.

1.6.2 TRACK FORECASTING — In preparing the JTWC official forecast, the TDO evaluates a wide variety of information, and employs a number of objective and subjective techniques. Because tropical cyclone track forecasting has and continues to require a significant amount of subjective input from the TDO, detailed aspects of the forecast-development process will vary somewhat from TDO to TDO, particularly with respect to the weight given to any of the available guidance. However, throughout 1990, JTWC has developed a standardized, three phase tropical cyclone motion forecasting process to improve not only forecast accuracy, but also forecast-to-forecast consistency.

1.6.2.1 Field Analysis Phase — NOGAPS analyses and prognoses at various levels are evaluated for position, development, and movement of not only the tropical cyclone, but also relevant synoptic features such as: i) subtropical ridge circulations, ii) mid-latitude short/long-wave troughs and associated weaknesses in the subtropical ridge, iii) monsoon surges, and iv) other tropical cyclones. This process permits the TDO to develop an initial impression of the environmental steering influences to which the tropical cyclone is and will be subjected as depicted by NOGAPS. The NOGAPS analyses are then compared to the hand-plotted and analyzed charts prepared by the TDO and to the latest satellite imagery in order to determine how well the NOGAPS-initialization process has conformed to the available synoptic data, and how well the resultant analysis fields agree with the synoptic situation inferred from the imagery. Finally, the TDO compares both the computer and hand-analyzed charts to monthly climatology in order to make a preliminary determination of to what degree the tropical cyclone is and will continue to be (according to NOGAPS) subjected to a climatological or aclimatological synoptic environment. Noting latitudinal and longitudinal displacements of subtropical ridge and long-wave midlatitude features is of particular importance, and will partially determine the relative weights given to climatologically or dynamically-based objective forecast guidance.

1.6.2.2 Objective Techniques Analysis Phase — After displaying latest set of forecasts given by JTWC's suite of objective techniques, the TDO then evaluates the pattern produced by the set of forecasts according to the following principles. First, the degree to which the current situation is considered to be and will continue to be climatological is further refined by comparing the forecasts of the climo-based objective techniques, dynamically-based techniques, and past motion of the present storm. This assessment partially determines the relative weighting given the different classes of objective techniques. Second, the spread of the pattern determined by the set of objective forecasts is used to provide a measure of the predictability of subsequent motion, and the advisability of including a low or moderate probability alternate forecast scenario in the prognostic reasoning message or warning (outside the western North Pacific). The spread of the objective techniques pattern is typically small well-before or well-after recurvature (providing high forecast confidence) and large near recurvature or during a quasi-stationary phase (increasing likelihood of alternate scenarios).

1.6.2.3 Construct Forecast Phase — The TDO then constructs the JTWC official forecast giving due consideration to the: i) extent to which the synoptic situation is and is expected to remain climatological, ii) past statistical performance of the various objective techniques on the current storm, and iii) known properties of individual objective techniques given the present synoptic situation. The following guidance for weighting the objective techniques is applied:

a) Weight persistence strongly in the first 12 to 24 hours of the forecast period.
b) Give significant weight to the last JTWC forecast at all forecast times, unless there is significant evidence to warrant a departure. (Also utilize latest forecasts from regional warning centers, if applicable.)
c) Give more weight to the techniques that have been performing well on the current storm and/or are expected to perform well in the current and expected synoptic situation.
d) Stay within the "envelope" determined by the spread of objective techniques forecasts unless there is a specific reason for not doing so (eg., all objective forecasts start out at a significant angle relative to past motion of the current storm.

1.6.3 INTENSITY FORECASTING—The empirically derived Dvorak (1984) technique is used as a first guess for the intensity forecast. The TDO then adjusts the forecast after evaluating climatology and the synoptic situation. An interactive climatology scheme allows the TDO to define a situation similar to the system being forecast in terms of location, time of year, and current intensity. Synoptic influences such as the location of major troughs and ridges, and the position and intensity of the Tropical Upper Tropospheric Trough (TUTT) all play a large part in intensifying or weakening a tropical cyclone. JTWC incorporates a checklist into the intensity forecast procedure. Such criteria as upper-level outflow patterns, neutral points, sea-surface temperatures, enhanced monsoonal or cross-equatorial flow, and vertical wind shear are evaluated for their tendency to enhance or inhibit normal development. In addition to climatology and synoptic influences, the first guess is modified for interactions with land, with other tropical cyclones, and with extratropical features.

1.6.4 WIND-RADII FORECASTING — After the loss of aircraft reconnaissance, JTWC began over-estimating the extent of damaging winds by as much as 100%. The algorithm previously used at JTWC involved knowledge of the intensity and radius of maximum winds derived from aircraft data and based on a statistical average. Det 1 Techniques Development incorporated techniques from various sources, leading to development of the Martin-Holland wind radii technique. Wei and Gray, in an unpublished study, showed that cloud shield size related to the extent of damaging winds - tropical cyclones with large cloud shields generally had damaging winds much further from the center than tropical cyclones with small cloud shields. Holland (1980) described an analytic model of tropical cyclone wind profiles which could estimate extent of damaging wind. Holland's equation uses a logarithmic wind profile outside the radius of maximum winds. It is based on size and shape parameters. The size parameter uses the cloud shield size (based on the size of the minus 65°C isotherm outside the central convection) to determine the areal extent of damaging winds. The shape parameter uses the Dvorak intensity estimate to determine the maximum wind intensity. Asymmetry is added based on system motion and latitude.

1.6.5 EXTRATROPICAL TRANSITION — When a tropical cyclone is forecast to become an extratropical system, JTWC coordinates the transfer of warning responsibility with the appropriate Naval Oceanography Command Regional Center, which assumes warning responsibilities for the extratropical system.

1.6.6 TRANSFER OF WARNING RESPONSIBILITIES — JTWC coordinates the transfer of tropical warning responsibility for tropical cyclones entering or exiting its AOR. For tropical cyclones crossing the dateline in the North Pacific Ocean, JTWC coordinates with the Central Pacific Hurricane Center (CPHC), Honolulu via the Naval Western Oceanography Center (NWOC), Pearl Harbor, Hawaii. For the South Pacific Ocean, JTWC coordinates with NWOC.

In the event JTWC should become incapacitated, the Alternate Joint Typhoon Warning Center (AJTWC), collocated with NWOC assumes JTWC's functions. Assistance in determining satellite reconnaissance requirements, and in obtaining the resultant data, is provided by the PACAF Weather Support Unit, Hickam AFB, Hawaii.

1.7 WARNINGS

JTWC issues two types of warnings: Tropical Cyclone Warnings and Tropical Depression Warnings.

Tropical Cyclone Warnings — are issued when a closed circulation is evident and maximum sustained winds are forecast to reach 34 kt (18 m/sec) within 48 hours, or when the tropical cyclone is in such a position that life or property may be endangered within 72 hours.

Each Tropical Cyclone Warning is numbered sequentially and includes the following information: the current position of the surface center; estimate of the position accuracy and the supporting reconnaissance (fix) platforms; the direction and speed of movement during the past six hours (past 12 hours in the Southern Hemisphere); and the intensity and radial extent of over 30-, 50-, and 100-kt surface winds, when applicable. At forecast intervals of 12, 24, 48, and 72 hours (12, 24, and 48 hours in the Southern Hemisphere), information on the tropical cyclone's anticipated position, intensity and wind radii is provided. Vectors indicating the mean direction and mean speed between forecast positions are included in all warnings. In addition, a 3-hour extrapolated position is provided in the remarks section.

Warnings in the western North Pacific and North Indian Oceans are issued every six hours valid at standard times: 0000Z, 0600Z, 1200Z and 1800Z (every 12 hours: 0000Z, 1200Z or 0600Z, 1800Z in the Southern Hemisphere). All warnings are released to the communications network no earlier than synoptic time and no later than synoptic time plus two and one-half hours, so that recipients are assured of having all warnings in hand by synoptic time plus three hours (0300Z, 0900Z, 1500Z and 2100Z). By area, the warning bulletin headers are: WTIO31-35 PGTW for northern latitudes from 35° to 100° east longitude, WTPN31-36 PGTW for northern latitudes from 100° to 180° east longitude, WTXS31-36 PGTW for southern latitudes from 35° to 135° east longitude, and WTPS31-35

PGTW for southern latitudes from 135° to 180° east longitude.

Tropical Depression Warnings — are issued only for western North Pacific tropical depressions that are not expected to reach the criteria for Tropical Cyclone Warnings, as mentioned above. The depression warning contains the same information as a Tropical Cyclone Warning except the Tropical Depression Warning is issued every 12 hours at standard synoptic times and extends only to the 36-hour forecast period.

Both Tropical Cyclone and Tropical Depression Warning forecast positions are later verified against the corresponding best track positions (obtained during detailed post-storm analyses) to determine the most probable path and intensity of the cyclone. A summary of the verification results for 1990 is presented in section 5. Summary of Forecast Verification.

1.8 PROGNOSTIC REASONING MESSAGES

The plain language messages provide meteorologists with the rationale for the forecasts for tropical cyclones in the western North Pacific Ocean. They also discuss alternate forecast scenarios. Prognostic reasoning messages (WDPN21-26 PGTW) are prepared to complement warnings. In addition to these messages, prognostic reasoning information is provided in the remarks section of warnings when significant forecast changes are made or when deemed appropriate by the TDO.

1.9 TROPICAL CYCLONE FORMATION ALERTS

Tropical Cyclone Formation Alerts are issued whenever interpretation of satellite imagery and other meteorological data indicates that the formation of a significant tropical cyclone is likely. These alerts will specify a valid period not to exceed 24 hours and must either be cancelled, reissued, or superseded by a warning prior to expiration. By area, the alert bulletin headers are: WTIO21-25 PGTW for northern latitudes from 35° to 100° east longitude, WTPN21-26 PGTW for northern latitudes from 100° to 180° east longitude, WTXS21-25 PGTW for southern latitudes from 35° to 135° east longitude, and WTPS21-25 PGTW for southern latitudes from 135° to 180° east longitude.

1.10 SIGNIFICANT TROPICAL WEATHER ADVISORIES

This product contains a description of all tropical disturbances in JTWC's area of responsibility (AOR) and their potential for further (tropical cyclone) development. In addition, all tropical cyclones in warning status are briefly discussed.

Two separate messages are issued daily and each is valid for a 24-hour period. The Significant Tropical Weather Advisory for the Western Pacific Ocean is issued by 0600Z. The Significant Tropical Weather Advisory for the Indian Ocean is issued by 1800Z. These are reissued whenever the situation warrants. For each suspect area, the words "poor", "fair", or "good" are used to describe the potential for development. "Poor" will be used to describe a tropical disturbance in which the meteorological conditions are currently unfavorable for development. "Fair" will be used to describe a tropical disturbance in which the meteorological conditions are favorable for development, but significant development has not commenced. "Good" will be used to describe the potential for development of a disturbance covered by an alert. By area, the advisory bulletin headers are: ABPW10 PGTW for northern latitudes from 100° to 180° east longitude and southern latitudes from 135° to 180° east longitude and ABIO10 PGTW for northern latitudes from 35° to 100° east longitude and southern latitudes from 35° to 135° east longitude.