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UNITED STATES SPECIAL OPERATIONS COMMAND

MILITARY OPERATIONS

CRITICAL METEOROLOGICAL AND OCEANOGRAPHIC THRESHOLDS FOR SOF OPERATIONS

13 MARCH 1998

UNITED STATES SPECIAL OPERATIONS COMMAND
7701 Tampa Point Boulevard
MacDill Air Force Base, Florida 33621–5323

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Military Operations

CRITICAL METEOROLOGICAL AND OCEANOGRAPHIC THRESHOLDS FOR SOF OPERATIONS

FOREWORD

1. Purpose. This manual establishes critical meteorological and oceanographic (METOC) thresholds for Special Operations Forces (SOF) for use by SOF operators, planners, and METOC personnel. These thresholds are primarily used as planning tools.

2. Applicability. This manual is applicable to

a. Headquarters, United States Special Operations Command (HQ USSOCOM).

b. United States Army Special Operations Command (USASOC).

c. Air Force Special Operations Command (AFSOC).

d. Naval Special Warfare Command (NAVSPECWARCOM).

e. Joint Special Operations Command (JSOC).

3. References.

a. AFI 11-206, *General Flight Rules*, Jul 94.

b. FM 34-81-1, Battlefield Weather Effects, Dec 92.

c. AFSOCI 11-208, *Helicopter Operations,* Mar 97.

d. AFSOCI 11-202V10, *AC-130H Gunship Operations*, Jul 97

e. AFSOCI 11-202V14, *AC-130U Gunship Operations*, May 97

AFSOCI 11-202V11, *MC-130 Combat Talon Specific Employment*, Dec 95

g. AFSOCI 11-202V12, *MC-130H Employment*, Nov 95.

4. Proponent. The proponent for this manual is the Directorate of Operations, Plans and Policy (SOOP), Meteorology and Oceanographic Branch (SOOP-OM). Users are invited to send comments and suggested improvements directly to: USSOCOM, ATTN: SOOP, 7701 Tampa Point Blvd., MacDill AFB, FL 33621-5323.

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SUMMARY OF CHANGES

CORRECTED COPY

Updates Appendix C; deletes para C-4; replaces C-9 with 11m RIB; and renumbers entire appendix.

This revision updates Appendix A to include the startup and shut-down wind speeds for the MH47-E, icing for MH47-E flights and the gust spread for A/MH-6 startup and shut-down; also updates Appendix B to include AC-130 25MM ceiling limitations and lightning within five nautical miles for ammunition loading; adds wind criteria for tie down and hangaring thresholds for the MH53-J; 700ft/1NM ceiling threshold for the MH-60G; and High Speed, Low Level Aerial Delivery System (HSLLADS) criteria; updates Appendix C to include the deletion of the MK III Patrol Boat; also includes changes for threshold waveheight for Combat Rubber Raiding Craft (CRRC) and the Patrol Coastal (PC). All changes are bolded.

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MILITARY OPERATIONS

Critical Meteorological and Oceanographic Thresholds for SOF Operations

1. Background. Special operations missions are affected by a wide variety of METOC conditions. The term METOC incorporates all facets of Services' weather, meteorological, and oceanographic programs to include the whole range of atmospheric and oceanographic phenomena from the bottom of the earth's oceans to the surface of the sun. SOF mission planners must be aware of METOC factors that will affect their operations, ensuring the greatest chance of mission success. All SOF operators must be familiar with critical METOC thresholds to effectively use weapon systems and provide maximum safety for SOF personnel. METOC personnel must be knowledgeable about critical METOC thresholds for the weapon systems they support to ensure they provide important information required by decision-makers.

Policy

a. The METOC critical values listed in this publication are the critical thresholds which significantly reduce the effectiveness of or prevent execution of SOF tactical operations or weapon systems.

(1) SOF weapon systems have critical METOC values which define the operational limits beyond which it is not feasible to operate because of safety considerations or decreasing effectiveness. These values are used for general planning minimums for the weapon system.

(2) Operational limits are based on tests conducted during weapon system development or on the experience of weapon system users.

(3) METOC conditions which significantly vary above or below the critical values can prevent the successful accomplishment of SOF missions.

(4) Components may identify additional METOC parameters which may affect operations and should be considered in planning and operations.

b. Critical METOC thresholds are determined by operational SOF commanders. Operational commanders have the responsibility and experience to determine which thresholds are critical for their operation, weighing the safety and efficiency factors of SOF operations with the criticality of the mission.

3. Responsibilities.

a. During planning and execution, commanders at all levels must ensure consideration is given to the effects METOC variables will have on the mission. They must include qualified METOC personnel in mission planning at the earliest stage.

b. METOC personnel must be familiar with critical thresholds of the weapon systems they support. They must tailor METOC forecasts based upon those critical thresholds to help operational commanders make GO/NO GO decisions.

4. Use of Thresholds Tables. There are several ways the attached critical METOC thresholds tables can be used

Operational Mission Planning.

(1) Planner determines which SOF capabilities (i.e., AC 30 gunships, airborne operations, scuba/swim operations, etc) will be used.

(2) Planner coordinates with the METOC Officer to find the appropriate table to determine which METOC element will or might have an impact on their assigned mission.

(3) The METOC Officer provides climatological, forecast, or observed METOC conditions to aid in making operational decisions.

b. **Mission Training.**

(1) Weapon system operators, aircrews, and planners can use the critical METOC threshold tables to familiarize themselves with factors which affect their missions.

(2) METOC personnel use the critical METOC threshold tables to familiarize themselves with METOC elements which require close examination while preparing forecasts.

APPENDIX A

USASOC CRITICAL METOC THRESHOLDS TABLE

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
A-1. Army Special Operations Aviation/Airdrop.		
Ceiling/Visibility	500 ft/2 NM	Minimum required for rotary Wing aircraft flight.
	300 ft/0.5 NM	Minimum for Adverse Weather Aerial Delivery System (AWADS).
	1500 ft/3 NM (plus 1000 ft above drop altitude)	Minimum for visual airborne operations.
	Visual acquisition of release point	Required for jumpmaster-directed Military Free-Fall (MFF)
	Cloud free from surface to 1000 ft AGL over Impact Point (500 ft for combat)	MFF requirement.
	Cloud free from aircraft to 1000 ft below aircraft	MFF requirement.
Surface wind	30 kts	MH-47D: Maximum for engine start and shut-down.
		MH-47E. Maximum for engine start and shut-down.
	40 kts	A/MH-6: Maximum for engine start and shut-down.
		MH-60: Maximum for engine start and shut-down.
	13 kts	Personnel safety for paradrop operations; maximum allowable wind for training paradrops.
		Maximum allowable wind for tactical water airdrop.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
Surface wind	7 kts	Maximum allowable wind for equipment, heavy equipment, and container delivery system airdrop.
		Maximum allowable wind for MFF (ram-air canopy).
Gust spread	**20 kts**	A/MH-6: Maximum for engine start and shut-down.
Turbulence	Light	A/MH-6: Maximum for flight
	Moderate	MH-60, MH-47: Maximum for flight.
Icing	Trace	A/MH-6: Maximum for flight
		MH-47D: Maximum for flight
	Moderate	MH-60: Maximum for flight
		MH-47E: Maximum for flight.
Target-background	1.25F	FLIR threshold contrast.

A-2. Ground Operations.

Ceiling (cloud cover)	300 ft	Acquisition of target area while maintaining cover.
	1000 ft	Planning TACAIR support; keeping cover/concealment.
Visibility (surface)	¼ NM	Target acquisition while maintaining cover.
Temperature (surface)	Less than -40F	Troop safety; equipment support requirements.
	Greater than 95F	Troop safety; equipment support requirements.
Effective illumination	Less than 10exp-3 footcandles	Concealment; minimum light needed for operations.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
A-3. Communications/Electro-Optical/Infrared Operations.		
Wind (surface)	25 kts	Affects installation of antenna during set-up.
		Wind damage to main communication antenna
Sandstorm	Occurrence	Creates static; degrades reception
Snowfall rate	Greater than 1 inch per hour	Degrades transmission effectiveness.
Rainfall/Snowfall rate	Light to moderate rain or snow	Moderate degradation of E-O and IR systems.
	Heavy rain or snow	Severe degradation of E-O and IR systems.
Fog	Any occurrence	Moderate to severe degradation of E-O and IR systems.
Lightning	Within 3.1 NM	Degrades communication safety; of personnel and equipment.
Ionospheric conditions	N/A	Dictates most usable frequency for communications; disturbances degrade and disrupt communi-cations.
A-4. Maritime/SCUBA/Swim Operations.		
Wind (Surface)	20 kts	Mission planning; affects wave and surf conditions; personnel safety.
Tides	Greater than 6 ft between high and low water	Affects safety of landing operations.
State of the sea	Combined seas greater than 6 ft	Troop safety; mission accomplish ment; can dictate alternative delivery means.
Surf (breakers)	Greater than 4 ft	Troop safety; mission accomplish ment.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
Littoral current (beach operations)	kt cross current	Moderate impact; mission accomplishment.
Current/Flow (stream/river operations)	kt head current	Severe impact; safety cf personnel; mission accomplishment.
Water temperature	Less than 40F	Personnel safety.

A-5. Psychological Operations/Civil Affairs.

Precipitation	Greater than 0.1 inch per hour	Leaflet Drops: Affects rate of fall, dispersion and acquisition of target area.
Humidity	Greater than 80%	Leaflet drops: Causes paper to stick together; may freeze at altitude.

NOTES:

1. **ft:** Feet
2. **NM:** Nautical Miles.
3. **F:** Degrees Fahrenheit.
4. **kts:** Knots (Nautical Miles per hour).
5. **AGL:** Above Ground Level.
6. **Light Turbulence:** Intensity resulting from windspeed fluctuations of 5 to 15 knots and gust velocities of 5 to 20 feet per second.
7. **Moderate Turbulence:** Intensity resulting from windspeed fluctuations of 15 to 25 knots or gust velocities of 20 to 35 feet per second.
8. **Trace Icing:** Icing is perceptible, but the rate of accretion is approximately balanced by the rate of sublimation.
9. **Light Icing:** Icing rate of accretion is such as to create a hazard if flight is prolonged in the icing zone, but insufficient to make immediate diversionary action necessary.
10. **Moderate Icing:** The excessive rate of icing accretion makes even short encounters with these conditions hazardous. Diversion or use of deicing equipment is necessary.

APPENDIX B

AFSOC CRITICAL METOC THRESHOLDS TABLE

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-1. MC-130E/H/P, Combat Talon I & II.		
Ceiling/Visibility	Published airfield minimums	Prevent take-off/landing.
	1500 ft/3 NM	Tactical low-level minimums (Training minimum only).
Cross wind component (Surface wind)	35 kts	Prevent take-off/landing.
Surface wind	Day, one-person pickup: 15 kts Day, two-person pickup: 10 kts Night: 10 kts	Fulton Recovery System: Prevent use of system; safety of personnel.
Winds aloft (1300 ft)	20 kts	Fulton Recovery System: Prevent use of system; safety of personnel.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
Icing	Moderate	Damage to aircraft; prevent flight operations.
Flight level visibility	NM	Air Refueling: Prevent refueling operations.
Thunderstorm avoidance distance	Above FL230: 20 NM Below FL230: 10 NM Tactical Low Level: 5 NM	Safety of flight; damage to aircraft.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-2. MC-130P Combat Shadow.		
Ceiling/Visibility	Published airfield minimums	Prevent take-off/landing.
	AFI 11-206	Daytime tactical minimums
	1500 ft/3 NM	Night tactical low-level mins
	1500 ft/3 NM	Night vision Goggles: Prevent flight operations
Ambient light	0.87 Millilux	Night vision goggles: Prevent flight operations.
Cross Wind Component (Surface wind)	35 kts	Prevent take-off/landing.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
Icing	Moderate	Damage to aircraft; prevent flight operations.
Flight level wind	Greater than or equal to 25 kts	Precautionary low level operations
	Greater than or equal 40 kts	Cancel low level flight operations; safety of flight.
Thunderstorm avoidance Distance	Above FL230: 20 NM	Safety of flight; damage to aircraft.
	Below FL230: 10 NM	
	Tactical Low Level: 5 NM	
Flight level visibility	1NM	Air Refueling: Prevc refueling operations

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-3. AC-130H/U Spectre.		
Ceiling/Visibility	Published airfield minimums	Prevent take-off/landing
Ceiling/Visibility	1500 ft/3 NM	Tactical low-level minimums
	1500 ft/3 NM	Night vision Goggles: Prevent flight operations.
Ceiling	Less than 5000 ft	Mission Minimum: Can't fire 105mm/40mm guns.
	Less than 3000 ft	**Mission Minimum: Can't fire 25mm guns**
	Less than 3000 ft	Mission Minimum: Can't fire 20mm guns.
Moon illumination	Less than or equal to 5% total illumination	Night vision goggles: Prevent flight operations.
Cross wind component (Surface wind)	35 kts	Prevent take-off/landing.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
Icing	Moderate	Damage to aircraft; prevent flight operations.
Thunderstorm avoidance distance	Above FL230: 20 NM Below FL230: 10 NM Tactical Low Level: 5 NM	Safety of flight; damage to aircraft
Flight level visibility	NM	Air Refueling: Prevent refueling operations.
Lightning (ground ops)	**Within 5 NM**	Ammunition loading: Stop loading operations.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-4. C-130 Pathfinder.		
Ceiling/Visibility	Published airfield minimums	Prevent take-off/landing
	1500 ft/3 NM	Tactical low-level minimums
	300 ft/ 1/2 NM	Minimum for Adverse Weather Delivery System (AWDS).
Cross wind component (surface wind)	15 kts	Prevent take-off/landing
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
	Moderate	Damage to aircraft; prevent flight operations.
Thunderstorm avoidance distance	Above FL230: 20 NM	Safety of flight; damage to aircraft.
	Below FL230: 10 NM	
	Tactical Low Level: 5 NM	
B-5. C-141 SOLL II.		
Ceiling/Visibility	Published airfield minimums	Prevent take-off/landing
	1500 ft/3 NM	Tactical low-level minimums.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
	Moderate	Damage to aircraft; prevent flight operations.
Thunderstorm avoidance distance	Above FL230: 20 NM	Safety of flight; damage to aircraft.
	Below FL230: 10 NM	
	Tactical Low Level: 5 NM	
Flight level visibility	1 NM 1000 ft above, 500 ft below, 2000 ft horizontal from nearest cloud	Air refueling: prevent refueling operations.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-6. CASA 212.		
Ceiling/Visibility	1500 ft/3 NM	Peacetime minimum for take-off and landing.
	700 ft/3 NM	Contingency minimum for take-off and landing.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
	Moderate	Damage to aircraft; prevent flight operations.
Thunderstorm avoidance distance	Above FL230: 20 NM	Safety of flight; damage to aircraft.
Thunderstorm avoidance distance	Below FL230: 10 NM	Safety of flight; damage to aircraft
	Tactical Low Level: 5 NM	
B-7. MH-53J PAVE LOW III E/MH-60 PAVE HAWK.		
Ceiling/Visibility	500 ft/2 NM or 700 ft/1 NM	Day take-off and landing or minimum.
	500 ft/2 NM	Night take-off/landing minimum.
Flight level visibility	1 NM	Minimum for air refueling.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
	Moderate	Damage to aircraft; performance Degradation.
Sustained wind (surface)	30 kts	Maximum with non-instructor Pilot in command; flight discontinued.
	40 kts	Maximum with Instructor Pilot in command; flight discontinued.
	45 kts	**MH-53J tied down.**
	60 kts	**MH-53J hangared.**
Gust spread	20 kts	Maximum for take-off and landing; flight discontinued

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-8. MH-60G Shadow Hawk.		
Ceiling/Visibility	500 ft/2 NM or **700ft/1NM**	Minimum for take-off and landing.
	500 ft/2 NM	Minimum for tactical low-level operations.
Turbulence	Moderate	Damage to aircraft; prevent flight operations.
Icing	Moderate	Damage to aircraft; prevent flight operations.
Sustained winds (surface)	45 kts	Safety of flight; flight discontinued.
B-9. Airborne Operations: Personnel.		
Surface wind (including gusts)	13 kts	Maximum allowable for land jump round canopy (MC1-1B, MC1-1C, T-10).
Surface wind (including gusts)	18 kts	Maximum allowable for land jump, high performance main canopy with round reserve (Para-Commander, MT-1XX).
		Maximum allowable for land jump high performance main/reserve.
	17 kts	Maximum allowable for tree penetration, Para-Rescue personnel, round canopy.
		Maximum allowable for water jump, round canopy.
		Maximum allowable for water jump, para-rescue.
		Maximum allowable for tree--penetration jump, Para-Rescue personnel, high performance main/reserve.
Surface wind (including gusts)	20 kts	Maximum allowable for water jump, high performance ain/reserve

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
B-10. Airborne Operations: Equipment.		
Surface wind (including gusts)	13 kts	Equipment without Parachute Release System (PRS).
	17 kts	Equipment with PRS
	13 kts	Land delivery, Container Delivery System (CDS)/ Container Release System (CRS) G-12D/E.
	17 kts	Water delivery, CDS/CRS G-12D/E.
		Land or water delivery CDS/CRS G-13/14.
	Unlimited	HSLLADS (High speed, low level aerial delivery system) using 22 ft ring slot chutes.
		Surface Air Training Bundles (SATB).
	Unlimited	Free fall, high altitude equipment and load rigged with high velocity/ring slots parachutes.

NOTES:

1. **Ft:** Feet.
2. **NM:** Nautical Miles.
3. **kts:** Knots (Nautical Miles per hour)..
4. **FL:** Flight Level.
5. **Moderate Turbulence:** Intensity caused by windspeed fluctuations of 15 to 25 knots and gust velocities of 20 to
6. **Moderate Icing:** The excessive rate of accretion makes even short encounters with these conditions hazardous. Diversion or the use of deicing equipment is necessary.

*APPENDIX C

NAVAL SPECIAL WARFARE COMMAND CRITICAL METOC THRESHOLDS TABLE

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
C-1. Parachute Operations.		
Ceiling	Minimum 500 ft clearance B/W cloud deck and aircraft	Personnel Safety.
	Greater than 1000 ft below aircraft if parachuting above clouds	
Precipitation	>0.1 inch per hr liquid	Rate of parachute fall.
Thunderstorms and lightning	Any occurrence within 1 NM of drop zone	Personnel safety.
Visibility	3 NM Horizontal visibility	Target acquisition.
Wind surface	13 kts	Round canopy/over land Personnel safety.
	17.5 kts	RAM air/over land; personnel safety.
		Round canopy or RAM air/over water personnel safety.
	17 kts	Cargo drop planning.
	40 kts (at drop altitude)	Cargo drop planning.
Wave heights	4 ft combined seas or greater	Personnel safety.
Water depth	Less than 8 ft	Personnel safety.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
C-2. SEAL Delivery Vehicle (SDV) Operations.		
Current	Greater than 2.5 kts	Degradation of navigation /swimmer capabilities.
Wave Height	3 ft combined seas or greater	Launch and recovery.
Tides	Low water less than 8 ft with greater than 2 ft difference between high/low water	Detectability/Navigation
Water Clarity	Greater than 10 ft visibility from surface	Detectability.
Water Temperature	60F, wet suit Less than 50F, dry suit	Diver degradation/Hypothermia
Lunar Illumination	Full moon, clear sky	Detectability.
Bioluminescence	Any conditions that allow visible detection of an SDV submerged to 10 ft in ambient light	Platform/Swimmer detection.
C-3. Combat Rubber Raiding Craft (CRRC).		
Wave height	**8 ft** combined seas	Mission/Route planning, mission execution.
Temperature	Greater than 90F or less than 50F	Personnel and equipment support considerations.
Humidity	Any conditions that are favorable for surface based ducting or enhanced/decreased EO caps. TBD	Electromagnetic/Electro-optical signature vulnerability Detection/Counter detection.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
C-4. Mini-Armored Troop Carrier (MATC).		
Wave Height	6 ft combined seas	Mission/Route planning, mission execution.
	Above 35 kt	Seakeeping/Handling
C-5. Patrol Boat, Light (PBL). See Note 5.		
Wave Height	6 ft combined seas	Mission/Route planning, mission execution, seakeeping /Handling.
	Above 35 kts	Mission/Route planning, mission execution, seakeeping /Handling.
C-6. Patrol Boat, Riverine (PBR): See Note 5.		
Wave height	6 ft combined seas	Mission/Route planning, mission execution, seakeeping /Handling.
	Above 35 kts	Mission/Route planning, mission execution, seakeeping /Handling.
C-7. Rigid Inflatable Boat (RIBS). See Note 5.		
24 FT RIB: Wave Height	10 ft combined seas	Mission/Route planning mission execution, seakeeping /handling.
	Above 35 kts	Seakeeping/handling

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
30 FT RIB: Wave Height	10 ft combined seas	Mission/route planning, mission execution, seakeeping /handling.
	Above 35 kts	Mission/route planning, mission execution, seakeeping /handling.
10m RIB: Wave Height	6 ft combined seas	Mission/route planning, mission execution, seakeeping /handling.
	Above 35 kts	Mission/route planning, mission execution, seakeeping /handling.
***11m RIB Wave Height**	**10 ft combined seas**	Mission/route planning, mission execution, seakeeping /handling.
Wind	**Above 35 kts**	Mission/route planning, mission execution, seakeeping /handling.

C-8. Patrol Coastal (PC). See Note 5.

Wave Height		
Bow	**12 ft** combined seas	
Beam	**12 ft** combined seas	Mission/route planning, mission execution, seakeeping /handling.
Stern	12 ft combined seas	
Astern Refueling	8 ft combined seas	
Wind	Above 35 kts	Mission/route planning, mission execution, seakeeping /handling.

C-9. MK V Special Operations Craft (MK V SOC). See Note 5

Wave Height	10 ft combined seas	Mission/route planning, mission execution.
Wind	Above 35 kts	Mission/route planning, mission execution.

METOC ELEMENT	CRITICAL THRESHOLD	IMPACT ON OPERATIONS
C-10. Swimmer Operations.		
Bioluminescence	Any condition in which a swimmer submerged to 10 ft is visible in ambient light	Platform/personnel detectability.
Current	Greater than 1.0 kt.	Diver degradation
Lunar Illumination	Full moon, clear sky	Detectability.
Surf	Plunging, spilling, surging, 5 ft or greater	Personnel safety.
Water clarity	10 ft is visible from surface in ambient light	Diver submerged to detectability.
Water temperature	60F, wet suit less than 50F, dry suit	Diver degradation/hypothermia.

NOTES:
1. **ft:** Feet.
2. **NM:** Nautical Miles.
3. **kts:** Knots (Nautical Miles per hour).
4. **F:** Degrees Fahrenheit.

NOTE 5: For boat operations, conditions up to and including the critical threshold can impact accuracy of weapons, crew endurance/alertness, and speed of advance and may also diminish as seas increase. Above this threshold, damage to craft and equipment or serious injury to crew members is possible. Wave height alone is not an absolute indicator of crew/craft safety. Wave periodicity, direction of travel, and crew experience can lower or raise the critical threshold. For initial planning purposes, however, wave height is a primary consideration factor for safety of navigation, crew, and overall mission success.

General: For all NAVSPECWARCOM operations, the following METOC factors are considered throughout the mission planning process, although they may not have specific critical thresholds:

Wave direction and periodicity
Air and/or water temperature
Current direction and speed
Tidal information
Solar and/or lunar information
Biologics/Bioluminescence and extent
High resolution bathymetry
Sound propagation in water
Precipitation
Sky cover (including fog banks, extent of and position)
Storm phenomena