

**NATIONAL WEATHER SERVICE INSTRUCTION 10-812**  
**SEPTEMBER 27, 2022**  
**Operations and Services**  
**Aviation Weather Service, NWSPD 10-8**  
**AVIATION WIND AND TEMPERATURE ALOFT FORECASTS**

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**NOTICE:** This publication is available at: <http://www.nws.noaa.gov/directives/>.

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**OPR:** W/AFS24 (M. Graf)

**Certified by:** W/AFS24 (C.B. Entwistle)

**Type of Issuance:** Routine

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**SUMMARY OF REVISIONS:** This directive supersedes NWS Instruction 10-812, “*Aviation Wind and Temperature Aloft Forecasts*,” dated October 25, 2016. No content changes were made. Minor editorial and format changes only.

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September 13, 2022  
Date

**Aviation Wind and Temperature Aloft Forecasts**

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**1 Purpose**

This instruction provides guidance to National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) offices, outlining the preparation and format of wind and temperature aloft forecasts in support of commercial and general aviation.

**2 Background**

The National Centers for Environmental Prediction (NCEP) produces scheduled wind and temperature aloft forecasts four (4) times daily for specified locations in the Continental United States (CONUS), the Hawaiian Islands, Alaska and coastal waters, and the Pacific Ocean. There is no requirement to issue amendments to the forecasts.

**3 Forecast Locations.**

Forecasts will be issued by NCEP for the locations listed alphabetically by state in Appendix A. Forecasts for intermediate locations may be determined by interpolation.

**4 Forecast Levels**

Wind and temperature aloft forecasts will be issued for the following levels. All levels are

referenced to Mean Sea Level (MSL) and all times are in Coordinated Universal Time which is indicated by “Z”.

Actual Altitude (feet)

3,000            6,000            9,000            12,000

The following actual altitude levels will be added for the Hawaiian and Pacific Ocean forecast bulletin series sites:

Actual Altitude (feet)

1,000            1,500            2,000            15,000

Pressure Altitude (feet)

18,000 (500 hPa)    24,000 (400 hPa)    30,000 (300 hPa)    34,000 (250 hPa)  
 39,000 (200 hPa)    45,000 (150 hPa)#    53,000 (100 hPa)#

#Available only for selected locations (see Appendix A).

Wind forecasts will not be issued for levels within 1,500 feet of a location's elevation. An exception is made for the altitudes listed above as extra levels for the Hawaiian and Pacific locations. Temperature forecasts will not be issued for levels within 2,500 feet of a location's elevation.

Forecasts for intermediate levels may be determined by interpolation.

**5 Bulletin Designators**

Wind and temperature aloft forecasts are issued in bulletins identified by the data type designator "FB" in the World Meteorological Organization (WMO) heading as follows:

a. 3,000- to 39,000-foot forecasts

	<b>6-Hour Forecast</b>	<b>12-Hour Forecast</b>	<b>24-Hour Forecast</b>
CONUS AWIPS ID	FBUS31 KWNO FD1US1	FBUS33 KWNO FD3US3	FBUS35 KWNO FD5US5
ALASKA AWIPS ID	FBAK31 KWNO FD1AK1	FBAK33 KWNO FD3AK3	FBAK35 KWNO FD5AK5

b. 45,000- and 53,000-foot forecasts

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	<b>6-Hour Forecast</b>	<b>12-Hour Forecast</b>	<b>24-Hour Forecast</b>
CONUS AWIPS ID	FBUS37 KWNO FD8US7	FBUS38 KWNO FD9US8	FBUS39 KWNO FD0US9
ALASKA AWIPS ID	FBAK37 KWNO FD8AK7	FBAK38 KWNO FD9AK8	FBAK39 KWNO FD0AK9

c. 1,000- to 24,000-foot forecasts

	<b>6-Hour Forecast</b>	<b>12-Hour Forecast</b>	<b>24-Hour Forecast</b>
HAWAII AWIPS ID	FBHW31 KWNO FD1HW1	FBHW33 KWNO FD3HW3	FBHW35 KWNO FD5HW5
PACIFIC SITES AWIPS ID	FBOC31 KWNO FD1OC1	FBOC33 KWNO FD3OC3	FBOC35 KWNO FD5OC5

d. 30,000- to 53,000-foot forecasts

	<b>6-Hour Forecast</b>	<b>12-Hour Forecast</b>	<b>24-Hour Forecast</b>
HAWAII AWIPS ID	FBHW37 KWNO FD8HW7	FBHW38 KWNO FD9HW8	FBHW39 KWNO FD0HW9
PACIFIC SITES AWIPS ID	FBOC37 KWNO FD8OC7	FBOC38 KWNO FD9OC8	FBOC39 KWNO FD0OC9

NOTE: The Hawaii/Pacific bulletins are separated at the 24,000 foot level instead of 39,000 feet because of the additional, lower levels noted in section 4.

**6 Format**

The symbolic form of the forecasts is "DDff+TT" in which "DD" is the wind direction, "ff" the wind speed, and "TT" the temperature.

Wind direction is indicated in tens of degrees (two digits) with reference to true north, and wind speed is given in knots (two digits). Light and variable wind or wind speeds of less than 5 knots are expressed by "9900." Forecast wind speeds of 100 through 199 knots are indicated by subtracting 100 from the speed and adding 50 to the coded direction. For example, a forecast of 250 degrees, 145 knots, is encoded as 7545. Forecast wind speeds of 200 knots or greater are indicated as a forecast speed of 199 knots.

Temperature is indicated in degrees Celsius (two digits) and is preceded by the appropriate algebraic sign for the levels from 6,000 through 24,000 feet. Above 24,000 feet, the sign is omitted since temperatures are negative.

**6.1 Format for levels 39,000 feet and below**

The bulletin format for levels 39,000 feet and below follows:

```
FBUS31 KWNO 190440
FD1US1
DATA BASED ON 190000Z
VALID 190600Z   FOR USE 0600-1200Z. TEMPS NEG ABV 24000

FT  3000      6000      9000      12000      18000      24000      30000      34000      39000
PHX 0207 0611+13 0805+07 9900+02 2524-14 2535-27 248139 259647 269455
PRC           0507+05 9900+00 2516-16 2531-29 246942 257347 267353
TUS...
```

NOTE: For Hawaii and Pacific bulletins, the additional levels of 1000, 1500, 2000, and 15000 will be added to this format. This will not require modification for receipt since the data will still be one line per site.

**6.2 Format for 45,000- and 53,000-Foot Levels**

The bulletin format for the 45,000- and 53,000-foot levels follows:

Forecasts for these levels are available in the Federal Aviation Administration's (FAA's) Weather Message Switching Center Replacement (WMSCR) only for selected locations listed in Appendix A with a number symbol (#).

```
FBUS37 KWNO 191900
FD8US7
DATA BASED ON 281800Z
VALID 290000Z   FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT  45000  53000
DBQ 295353 304958
DSM 297253 294759
```

**7 Delayed Forecasts**

If the scheduled FB transmission is delayed, users should continue using the valid FB's based on 6-hour earlier data until NCEP transmits the new forecast.

**Appendix A - Forecast Locations**

# - Indicates locations for which 45,000- and 53,000-foot forecasts are available.

Latitude and Longitude are in degrees and minutes. West longitude and south latitude are indicated as negative (-). Elevation is in feet.

STATE	Identifier	Location	Latitude	Longitude	Elevation
<b>ALABAMA</b>					
	BHM #	Birmingham	33° 33'	-86° 44'	620
	HSV	Huntsville	34° 33'	-86° 46'	629
	MGM	Montgomery	32° 13'	-86° 19'	221
	MOB #	Mobile	30° 41'	-88° 14'	190
<b>ALASKA</b>					
	ADK #	Adakak	51° 56'	-176° 25'	133
	ADQ #	Kodiak	57° 46'	-152° 35'	112
	AKN #	King Salmon	58° 44'	-156° 45'	49
	ANC #	Anchorage	61° 14'	-149° 33'	131
	ANN #	Annette Island	55° 03'	-131° 37'	112
	BET #	Bethel	60° 35'	-161° 35'	51
	BRW #	Barrow	71° 17'	-156° 31'	13
	BTI #	Barter Island	70° 10'	-143° 55'	49
	BTT #	Bettles	66° 54'	-151° 30'	673
	CDB #	Cold Bay	55° 11'	-162° 22'	102
	CZF #	Cape Romanzof	61° 47'	-166° 02'	457
	EHM #	Cape Newenham	58° 39'	-162° 04'	541
	FAI #	Fairbanks	64° 43'	-148° 11'	453
	FYU #	Fort Yukon	66° 35'	-145° 05'	431
	GAL #	Galena	64° 44'	-156° 56'	152
	GKN #	Gulkana	62° 09'	-145° 27'	21
	HOM #	Homer	59° 39'	-151° 29'	78
	JNU #	Juneau	58° 26'	-134° 41'	23
	LUR #	Cape Lisburne	68° 53'	-166° 07'	12
	MCG #	McGrath	62° 49'	-155° 24'	338
	MDO #	Middleton Island	59° 30'	-146° 18'	72
	OME #	Nome	64° 37'	-165° 05'	23
	ORT #	Northway	63° 04'	-142° 04'	1,722
	OTZ #	Kotzebue	66° 39'	-162° 54'	16
	SNP #	St. Paul	57° 09'	-170° 37'	30
	TKA #	Talkeetna	62° 19'	-150° 06'	358

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UNK #	Unalakleet	63° 53'	-160° 48'	21
YAK #	Yakutat	59° 37'	-139° 30'	30
IKO #	Nikolski	52° 57'	-168° 51'	73
AFM #	Ambler	67° 06'	-157° 51'	289

**GULF OF ALASKA**

5AB #		52° 25'	176° 00'	0
5AC #		52° 00'	-135° 00'	0
5AD #		54° 00'	-145° 00'	0
5AE #		55° 00'	-155° 00'	0
5AF #		56° 00'	-137° 00'	0
5AG #		58° 00'	-142° 00'	0

**ARKANSAS**

FSM	Fort Smith	35° 23'	-94° 16'	468
LIT #	Little Rock	34° 40'	-92° 10'	258

**ARIZONA**

PHX	Phoenix	33° 25'	-111° 53'	1,132
PRC #	Prescott	34° 42'	-112° 28'	5,042
TUS #	Tucson	32° 07'	-110° 49'	2,630

**CALIFORNIA**

BIH #	Bishop	37° 22'	-118° 21'	4,120
BLH #	Blythe	33° 35'	-114° 45'	397
FAT #	Fresno	36° 53'	-119° 48'	332
FOT	Fortuna	40° 40'	-124° 14'	390
ONT	Ontario	34° 03'	-117° 36'	952
RBL #	Red Bluff	40° 05'	-122° 14'	354
SAC	Sacramento	38° 26'	-121° 33'	21
SAN #	San Diego	32° 44'	-117° 11'	15
SBA #	Santa Barbara	34° 30'	-119° 46'	10
SFO #	San Francisco	37° 37'	-122° 22'	11
SIY	Montague	41° 47'	-122° 27'	2,648
WJF	Lancaster	34° 44'	-118° 13'	2,347

**COLORADO**

ALS #	Alamosa	37° 20'	-105° 48'	7,535
DEN #	Denver	39° 48'	-104° 53'	5,333
GJT #	Grand Junction	39° 03'	-108° 47'	4,858
PUB	Pueblo	38° 17'	-104° 25'	4,726

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CONNECTICUT

BDL	Windsor Locks	41° 56'	-72° 41'	174
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FLORIDA

EYW	Key West	24° 35'	-81° 48'	4
JAX #	Jacksonville	30° 26'	-81° 33'	30
MIA #	Miami	25° 57'	-80° 27'	10
MLB	Melbourne	28° 06'	-80° 38'	33
PFN	Panama City	30° 12'	-85° 40'	20
PIE #	St. Petersburg	27° 54'	-82° 41'	11
TLH #	Tallahassee	30° 33'	-84° 22'	81

GEORGIA

ATL #	Atlanta	33° 37'	-84° 26'	1,026
CSG	Columbus	32° 36'	-85° 01'	397
SAV	Savannah	32° 09'	-81° 06'	50

HAWAII

ITO #	Hilo	19° 43'	-155° 03'	38
HNL #	Honolulu	21° 19'	-157° 55'	13
LIH #	Lihue	21° 59'	-159° 20'	153
OGG #	Kahului	20° 54'	-156° 26'	54
LNK #	Lanai	20° 47'	-156° 57'	1,308
KOA #	Kailua-Kona	19° 44'	-156° 03'	47

IDAHO

BOI #	Boise	43° 34'	-116° 14'	2,858
LWS	Lewiston	46° 22'	-116° 52'	1,438
PIH #	Pocatello	42° 52'	-112° 39'	4,448

ILLINOIS

JOT #	Joliet	41° 32'	-88° 19'	582
SPI	Springfield	39° 50'	-89° 40'	597

INDIANA

EVV	Evansville	38° 02'	-87° 31'	418
FWA	Fort Wayne	40° 58'	-85° 11'	800
IND #	Indianapolis	39° 48'	-86° 22'	797

IOWA

BRL	Burlington	40° 43'	-90° 55'	698
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DBQ #	Dubuque	42° 24'	-90° 42'	1,076
DSM #	Des Moines	41° 26'	-93° 38'	957
MCW	Mason City	43° 05'	-93° 19'	1,213

**KANSAS**

GCK #	Garden City	37° 55'	-100° 43'	2,888
GLD #	Goodland	39° 23'	-101° 41'	3,654
ICT #	Wichita	37° 43'	-97° 27'	1,332
SLN	Salina	38° 52'	-97° 37'	1,272

**KENTUCKY**

LOU #	Louisville	38° 06'	-85° 34'	546
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**LOUISIANA**

LCH	Lake Charles	30° 08'	-93° 06'	16
MSY #	New Orleans	30° 01'	-90° 10'	4
SHV #	Shreveport	32° 46'	-93° 48'	258

**MAINE**

BGR	Bangor	44° 50'	-68° 52'	192
CAR #	Caribou	46° 52'	-68° 01'	623
PWM	Portland	43° 38'	-70° 18'	74

**MARYLAND**

EMI #	Westminster	39° 29'	-76° 58'	820
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**MASSACHUSETTS**

ACK	Nantucket	41° 16'	-70° 01'	48
BOS #	Boston	42° 21'	-70° 59'	20

**MICHIGAN**

ECK #	Peck	43° 15'	-82° 43'	810
MKG	Muskegon	43° 10'	-86° 02'	628
MQT	Marquette	46° 31'	-87° 35'	1,419
SSM #	Sault Ste. Marie	46° 24'	-84° 18'	690
TVC	Traverse City	44° 40'	-85° 32'	624

**MINNESOTA**

AXN	Alexandria	45° 57'	-95° 13'	1,425
DLH	Duluth	46° 48'	-92° 12'	1,428
INL #	International Falls	48° 33'	-93° 24'	1,184
MSP #	Minneapolis-St Paul	45° 08'	-93° 22'	841

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MISSOURI

CGI	Cape Girardeau	37° 13'	-89° 34'	342
COU	Columbia	38° 48'	-92° 13'	889
MKC #	Kansas City	39° 16'	-94° 35'	758
SGF #	Springfield	37° 21'	-93° 20'	1,267
STL #	St. Louis	38° 51'	-90° 28'	589

MISSISSIPPI

JAN #	Jackson	32° 30'	-90° 10'	346
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MONTANA

BIL #	Billings	45° 48'	-108° 37'	3,605
DLN #	Dillon	45° 14'	-112° 32'	5,238
GPI #	Kalispell	48° 12'	-114° 10'	2,972
GGW #	Glasgow	48° 12'	-106° 37'	2,293
GTF #	Great Falls	47° 27'	-111° 24'	3,674
MLS	Miles City	46° 22'	-105° 57'	2,628
HAT	Cape Hatteras	35° 16'	-75° 33'	11
ILM #	Wilmington	34° 21'	-77° 52'	32
RDU #	Raleigh-Durham	35° 52'	-78° 47'	437
DIK #	Dickinson	46° 51'	-102° 46'	2,589
GFK	Grand Forks	47° 57'	-97° 11'	844
MOT	Minot	48° 15'	-101° 17'	1,715

NEBRASKA

BFF #	Scottsbluff	41° 53'	-103° 28'	3,965
GRI	Grand Island	40° 59'	-98° 18'	1,846
OMA	Omaha	41° 10'	-95° 44'	983
ONL #	O'Neill	42° 28'	-98° 41'	2,030

NEVADA

BAM #	Battle Mountain	40° 34'	-116° 55'	4,532
ELY #	Ely	39° 17'	-114° 50'	6,255
LAS #	Las Vegas	36° 04'	-115° 09'	2,174
RNO #	Reno	39° 31'	-119° 39'	4,412

NEW HAMPSHIRE

BML	Berlin	44° 38'	71° 11'	1,158
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NEW JERSEY

ACY	Atlantic City	39° 27'	-74° 34'	76
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NEW MEXICO

ABQ #	Albuquerque	35° 02'	-106° 48'	5,352
FMN #	Farmington	36° 44'	-108° 05'	5,503
ROW	Roswell	33° 20'	-104° 37'	3,669
TCC	Tucumcari	35° 10'	-103° 35'	4,063
ZUN	Zuni	34° 57'	-109° 09'	6,454

NEW YORK

ALB #	Albany	42° 44'	-73° 48'	285
BUF #	Buffalo	42° 55'	-78° 38'	725
JFK #	New York	40° 37'	-73° 46'	12
PLB #	Plattsburgh	44° 48'	-73° 24'	371
SYR	Syracuse	43° 09'	-76° 12'	421

OHIO

CLE #	Cleveland	41° 21'	-82° 09'	792
CMH	Columbus	39° 59'	-82° 55'	816
CVG	Covington	39° 00'	-84° 42'	891

OKLAHOMA

GAG	gage	36° 20'	-99° 52'	2,223
OKC #	Oklahoma City	35° 24'	-97° 38'	1,295
TUL	Tulsa	36° 11'	-95° 47'	676

OREGON

AST	Astoria	46° 09'	-123° 52'	11
IMB #	Kimberly	44° 38'	-119° 42'	5,220
LKV #	Lakeview	42° 29'	-120° 30'	4,728
OTH #	North Bend	43° 24'	-124° 10'	14
PDX #	Portland	45° 44'	-122° 35'	26
RDM	Redmond	44° 15'	-121° 18'	3,077

PENNSYLVANIA

AGC	Pittsburgh	40° 16'	-80° 02'	1,252
AVP	Wilkes-Barre/ Scranton	41° 16'	-75° 41'	957
PSB #	Phillipsburg	40° 54'	-77° 59'	1,948

SOUTH CAROLINA

CAE #	Columbia	33° 51'	-81° 03'	236
CHS	Charleston	32° 53'	-80° 02'	45

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FLO	Florence	34° 13'	-79° 39'	147
GSP	Greer	34° 53'	-82° 13'	972
<b>SOUTH DAKOTA</b>				
ABR #	Aberdeen	45° 25'	-98° 22'	1,301
FSD	Sioux Falls	43° 38'	-96° 46'	1,429
PIR	Pierre	44° 23'	-100° 09'	1,742
RAP #	Rapid City	43° 58'	-103° 00'	3,182
<b>TENNESSEE</b>				
BNA #	Nashville	36° 07'	-86° 40'	599
MEM #	Memphis	35° 03'	-89° 58'	332
TRI #	Bristol/Johnson	36° 28'	-82° 24'	1,519
TYS	Knoxville	35° 54'	-83° 53'	981
<b>TEXAS</b>				
ABI #	Abilene	32° 28'	-99° 51'	1,790
AMA #	Amarillo	35° 17'	-101° 38'	3,605
BRO #	Brownsville	25° 55'	-97° 22'	22
CLL	College Station	30° 36'	-96° 25'	319
CRP #	Corpus Christi	27° 54'	-97° 26'	44
DAL #	Dallas	32° 50'	-96° 51'	487
DRT #	Del Rio	29° 22'	-100° 55'	999
ELP #	El Paso	31° 48'	-106° 16'	3,956
HOU #	Houston	29° 38'	-95° 16'	47
INK #	Wink	31° 52'	-103° 14'	2,818
LBB	Lubbock	33° 42'	-101° 54'	3,281
LRD #	Laredo	27° 28'	-99° 25'	508
MRF	Marfa	30° 17'	-103° 37'	4,848
PSX	Palacios	28° 45'	-96° 18'	15
SAT #	San Antonio	28° 38'	-98° 27'	809
SPS	Wichita Falls	33° 59'	-98° 35'	1,015
<b>UTAH</b>				
BCE #	Bryce Canyon	37° 41'	-112° 18'	7,586
SLC #	Salt Lake City	40° 51'	-111° 58'	4,227
<b>VIRGINIA</b>				
ORF	Norfolk	36° 53'	-76° 12'	27
RIC #	Richmond	37° 30'	-77° 19'	168
ROA	Roanoke	37° 20'	-80° 04'	1,175

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WASHINGTON

GEG #	Spokane	47° 33'	-117° 37'	2,372
SEA #	Seattle	47° 26'	-122° 18'	429
YKM	Yakima	46° 34'	-120° 26'	1,095

WEST VIRGINIA

CRW #	Charleston	38° 20'	-81° 46'	982
EKN	Elkins	38° 54'	-80° 05'	1,987

WISCONSIN

GRB #	Green Bay	44° 33'	-88° 11'	695
LSE	La Crosse	43° 52'	-91° 15'	653

WYOMING

CZI #	Crazy Woman	43° 59'	-106° 26'	4,798
LND	Lander	42° 48'	-108° 43'	5,586
MBW	Medicine Bow	41° 50'	-106° 00'	7,000
RKS #	Rock Springs	41° 35'	-109° 00'	6,760

ATLANTIC OCEAN

2XG #	Gauge	30° 20'	-78° 30'	0
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GULF OF MEXICO

T01	West Cameron	28° 30'	-93° 30'	0
T06	Ship Shoal	28° 30'	-91° 00'	0
T07	S Mobile South	28° 30'	-88° 00'	0
4J3	S Apalachicola South	28° 30'	-85° 00'	0
H51	Bay City	26° 30'	-95° 00'	0
H52	Mid Gulf	26° 00'	-89° 30'	0
H61	W Fort Myers West	26° 30'	-84° 00'	0

PACIFIC OCEAN

JON #	Johnston Island	16° 44'	-169° 32'	7
MAJ #	Majuro	07° 04'	171° 16'	6
KWA #	Kwajalein	08° 43'	167° 44'	16
MDY #	Midway Island	28° 12'	-177° 23'	13
PPG #	Pago Pago	-14° 20'	-170° 43'	30
TTK #	Kosrae	05° 21'	162° 58'	11
AWK #	Wake Island	19° 17'	166° 39'	14
GRO #	Rota	14° 11'	145° 14'	607
GSN #	Saipan	15° 07'	145° 44'	215

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TNI #	West Tinian	15° 00'	145° 37'	271
GUM #	Guam	13° 29'	144° 48'	298
TKK #	Chuuk, FSM	07° 28'	151° 51'	10
PNI #	Pohnpei, FSM	06° 59'	158° 13'	8
ROR #	Koror, Palau	07° 22'	134° 33'	176
T11 #	Yap, FSM	09° 30'	138° 05'	91