



# Aviation Weather Center

**Marc J. Singer**

**Techniques Development Meteorologist**

*The trusted authority and leading innovator for  
aviation weather information.*

**May 12, 2009**

**Gray, Maine NWSFO  
Aviation Workshop**

# Mission Statement

*The AWC delivers*

consistent, timely and accurate  
weather information  
for the world airspace system

*We are a team of highly skilled people*

dedicated to working with  
customers and partners  
to enhance safe and efficient flight

# Weather for the National Airspace System (NAS)

## → AWC

### → Issues all en-route aviation forecasts

- clouds, visibility, turbulence, icing, thunderstorms, wind
- except for terminal areas.

## → Weather Forecast Offices (WFO)

### → Main source of collaborated mesoscale and synoptic weather

### → Issue TAFs

- 24 hour forecast for approx 610 airports

## → CWSU

### → Customized services for ARTCC

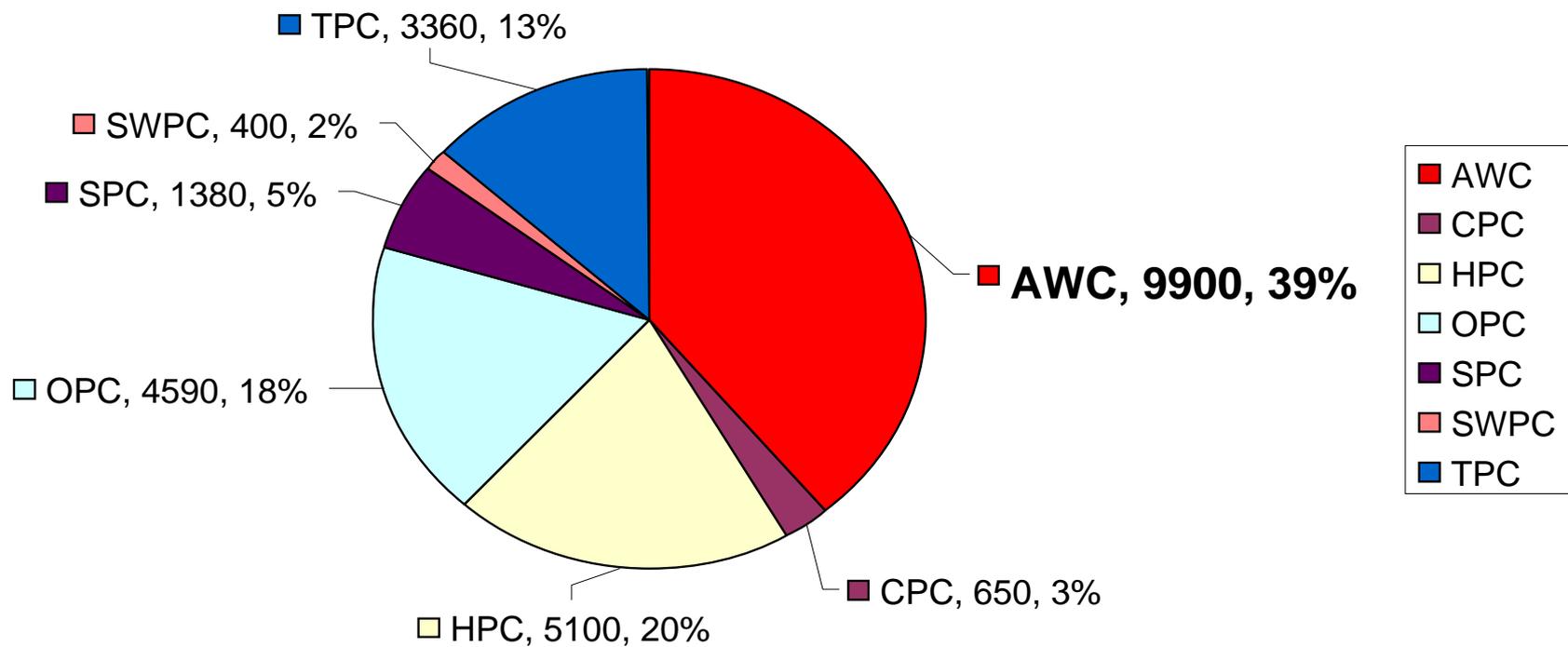
### → Supplements some of AWC's forecasts

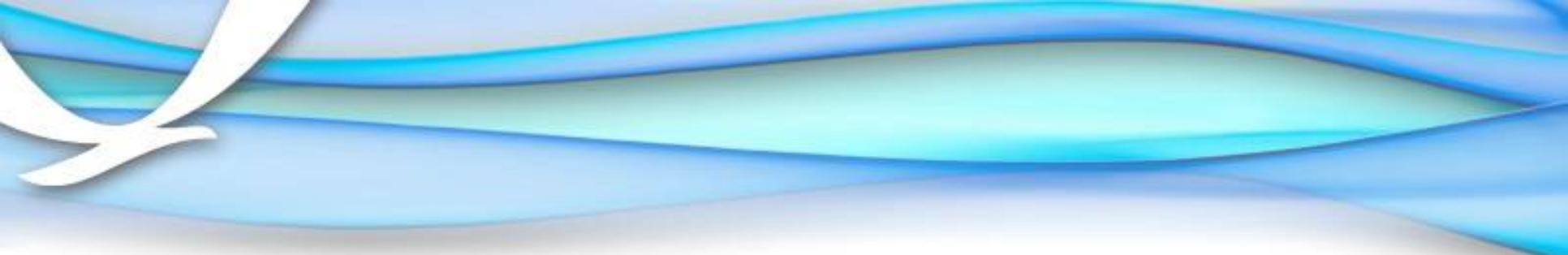
# AWC's Customers

- CWSUs
- WFOs
- FAA Air Traffic Operations
- Flight Service Stations
- Domestic and International Airlines, Charter, Corporate
- Gulf of Mexico's oil industry (helicopter operations)
- General Aviation
- Military
- Worldwide users of AWC website (ADDS)

# Forecaster Scheduled Products by NCEP Service Center by Month

Monthly number of forecaster issued products by NCEP Service Centers  
Total is 25,380





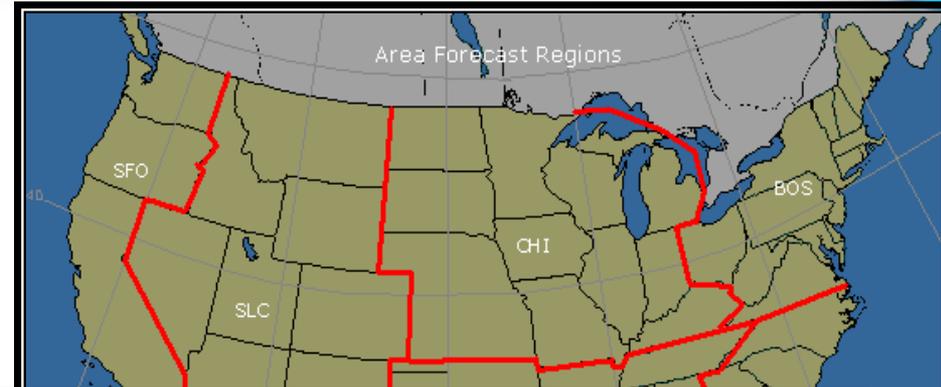
# Domestic OPERATIONS

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# Area Forecasts (FA)

- ➔ Staffing:
  - 15 forecasters 24/7
    - ➔ Simulating 6 offices
- ➔ Text-based Weather Forecasts for General Aviation Pilots.
  - ➔ Clouds (can't say IFR)
  - ➔ Visibility (can't say IFR)
  - ➔ Thunderstorms
  - ➔ Rain/Snow/Fog
  - ➔ Wind
- ➔ Area of responsibility:  
**CONUS** and coastal waters
- ➔ 6570 routine issues annually



SYNOPSIS...AT 02Z LOW PRES NWRN MN WITH CDFNT BJI-PIR-DDY LN AND WRMFNT BJI-EAU-PMM LN. TROF FSD-TBE LN. BY 20Z LOW PRES CNTRL WI WITH CDFNT DLL-PWE-GLD LN AND WRMFNT DLL-ECK LN. ...DARRAH...

ND SCT100. OCNL BKN080 TOP FL180. ISOLD -SHRA. OTLK...VFR. .

SD WRN 1/3...SCT060 SCT120 TOP FL180. TIL 06-08Z OCNL CIG BKN050. WDLY SCT -SHRA/-TSRA. TS TOPS FL400. OTLK...VFR.

CNTRL 1/3...SCT080. OCNL BKN060. WDLY SCT -SHRA ISOLD -TSRA. TS TOPS FL400. OTLK...VFR.

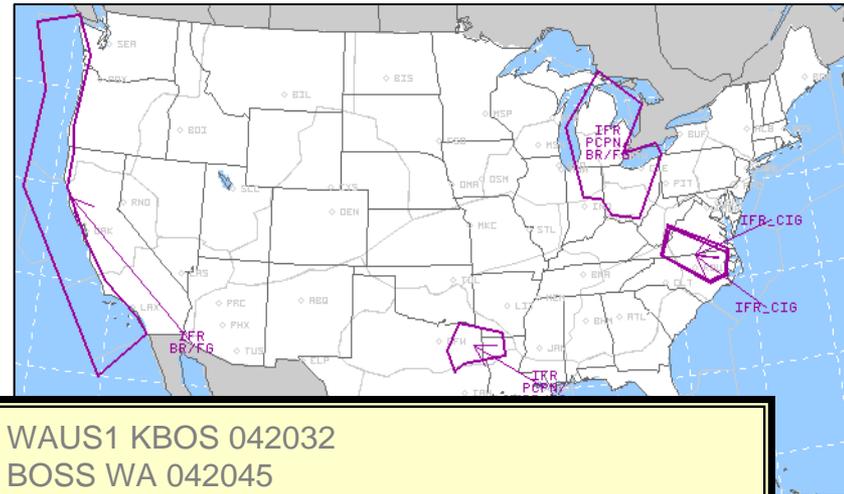
ERN 1/3...SCT100. BY 05-07Z OCNL BKN080 TOP 160. OTLK...VFR SHRA. .

NE PNHNDL...AGL SCT050. TIL 04-06Z ISOLD -SHRA/-TSRA. TS TOPS FL400. OTLK...VFR.

CNTRL AND E...AGL SCT040 BKN080 TOPS LYRD FL180. OCNL CIG OVC030. WDLY SCT -SHRA/-TSRA. TS TOPS FL450. TS POSS SEV. CNTRL BY 06-08Z SCT030 OCNL CIG BKN020. CONDS SPRDG ACRS RMNDR BY 11-13Z. OTLK...VFR. .

# AIRMETs

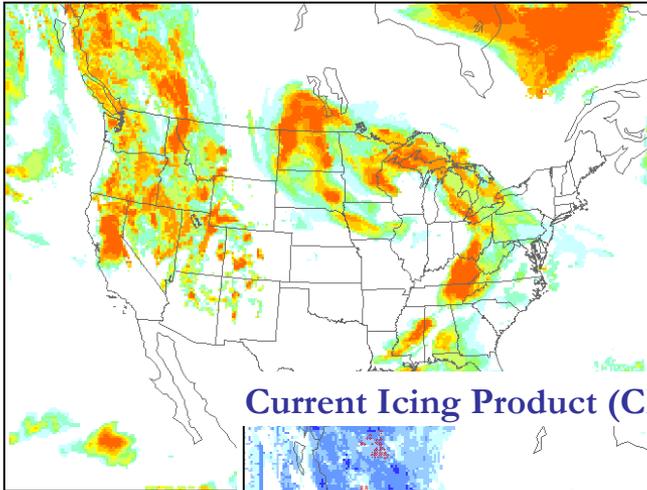
- ➔ **Staffing:**  
Same forecasters as SIGMETs/FA
- ➔ **Non-thunderstorm weather not meeting SIGMET criteria**
  - ➔ Moderate Icing,
  - ➔ Moderate Turbulence,
  - ➔ Widespread Areas of IFR i.e. Low Ceilings and Visibility
  - ➔ Mountain Obscurations
  - ➔ Strong Surface Wind
- ➔ **Area of responsibility:**  
**CONUS** and coastal waters
- ➔ **26280** routine issues annually



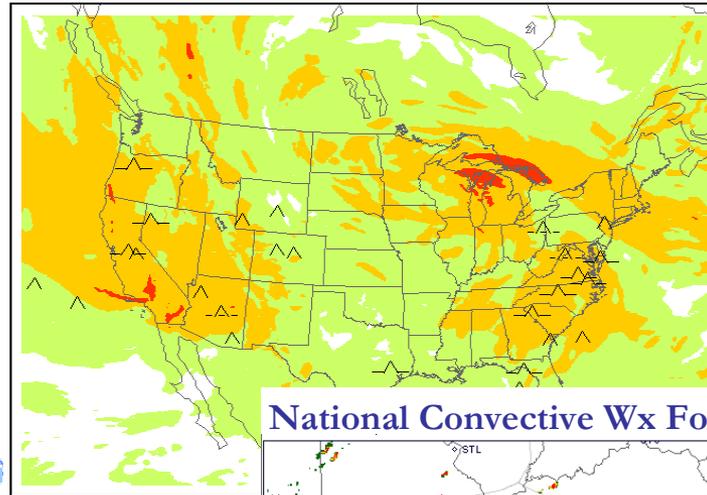
WAUS1 KBOS 042032  
BOSS WA 042045  
AIRMET SIERRA UPDT 6 FOR IFR AND MTN  
OBSCN VALID UNTIL 050300  
AIRMET MTN OBSCN...ME NH VT NY PA MA MD  
WV VA  
FROM 70NW PQI TO MLT TO CON TO HAR TO  
30NW GSO TO HNV TO HNN TO JHW TO SYR  
TO MSS TO YSC TO 70NW PQI  
MTNS OCNL OBSC IN CLDS/PCPN/BR. CONDS  
CONTG BYD 03Z THRU 09Z.

# Automated Products

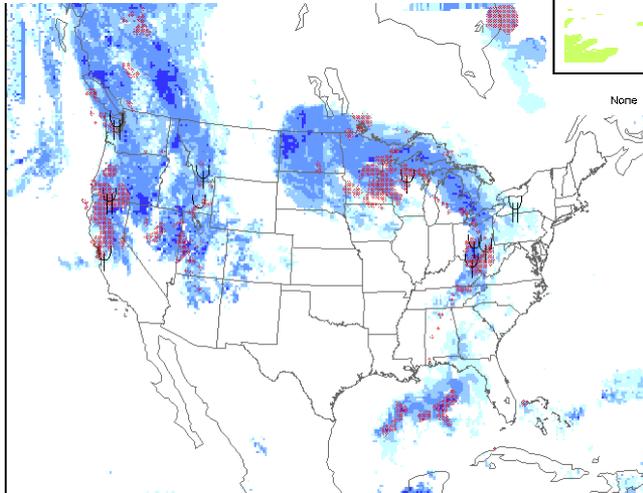
## Forecast Icing Potential (FIP)



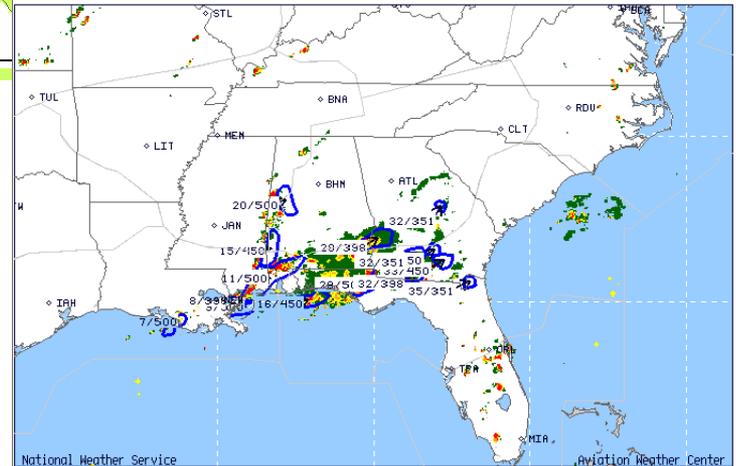
## Graphical Turbulence Guidance (GTG)



## Current Icing Product (CIP)



## National Convective Wx Forecast (NCWF)



# ADDS Web Site

- Aviation Digital Data Service (ADDS)
- Developed by NCAR (AWRP funding)
- Operational 2003
- Averaging 10 million hits per day, 100 GB per day
- <http://adds.aviationweather.gov>

# Graphical AIRMET

## G-AIRMET

- G-AIRMET contains information related to the occurrence or expected occurrence of en-route weather phenomenon, which may affect safety of aircraft
- Issued at 03:00, 09:00, 15:00, and 21:00 UTC
  - Updates (e.g., amendments) issued as necessary
- G-AIRMET provided in Binary Universal Format Record (BUFR) format via NWSTG
  - Digital format intended for integration into customer and partners' systems
- Basic display interface on [AviationWeather.gov](http://AviationWeather.gov)

# G-AIRMET Elements

Some overlap with WFO and CWSU products

Element	G-AIRMET
Turbulence (non-convective)	Moderate Turbulence Surface to 45,000 feet
Sustained Surface Winds	$\geq 30$ knots
Low Level Wind Shear (non-convective)	Wind shear (+/- 10 knots) below 2000 feet AGL
Surface Visibility	$\leq 3$ miles (IFR)
Cause of Surface Visibility restriction	Precipitation (PCPN), Mist (BR), Fog (FG), Haze (HZ), Smoke (FU), Blowing Snow (BLSN)
Low Ceilings	Ceiling $\leq 1000$ feet (IFR)

# G-AIRMET Elements (Cont.)



Element	G-AIRMET
Icing (non-convective)	Moderate Airframe Icing Surface to 45,000 feet
Freezing Level	Location of the freezing level at the Surface, 4,000, 8,000, 12,000, and 16,000 feet
Multiple Freezing Levels	Area and vertical range
Mountain Obscuration	Area
Cause of Mountain Obscuration	Clouds (CLDS), Precipitation (PCPN), Mist (BR), Fog (FG), Haze (HZ), Smoke (FU)
SIGMETs	<i>Included in depiction but not provided as part of the G-AIRMET/GFA BUFR message</i>

# G-AIRMET

- ➔ Intended to be displayed as a graphic
  - ➔ Not a text message converted to a graphic
  - ➔ Data intended to be integrated into display systems
  - ➔ Not a “picture”
- ➔ Identification of weather hazard
  - ➔ Use Lat/Lon instead of VORs
  - ➔ Uses many more points to describe with more precision
- ➔ Quality of information
  - ➔ More precision in time and space
  - ➔ More information than text can carry
  - ➔ Tiny communication costs

# AIRMET and G-AIRMET

→ The text AIRMET is a product of the G-AIRMET

→ AIRMET and G-AIRMET are fully consistent

→ The AIRMET contains less precision

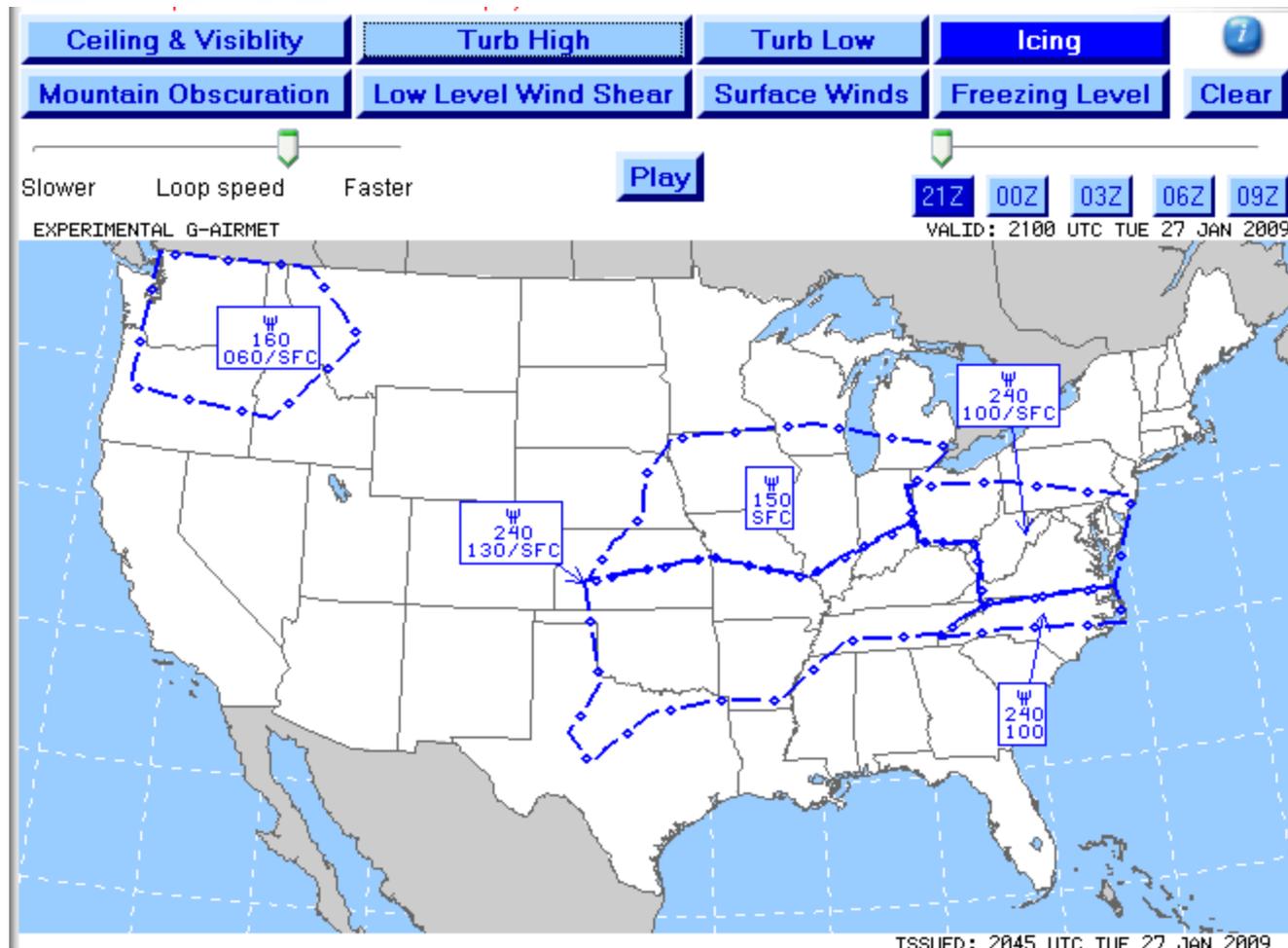
→ Advisory for a period of up to 6 hours

→ a time “smear”

→ The text AIRMET is limited by number of characters

→ Uses VORs to describe extent of hazard over a period of time.

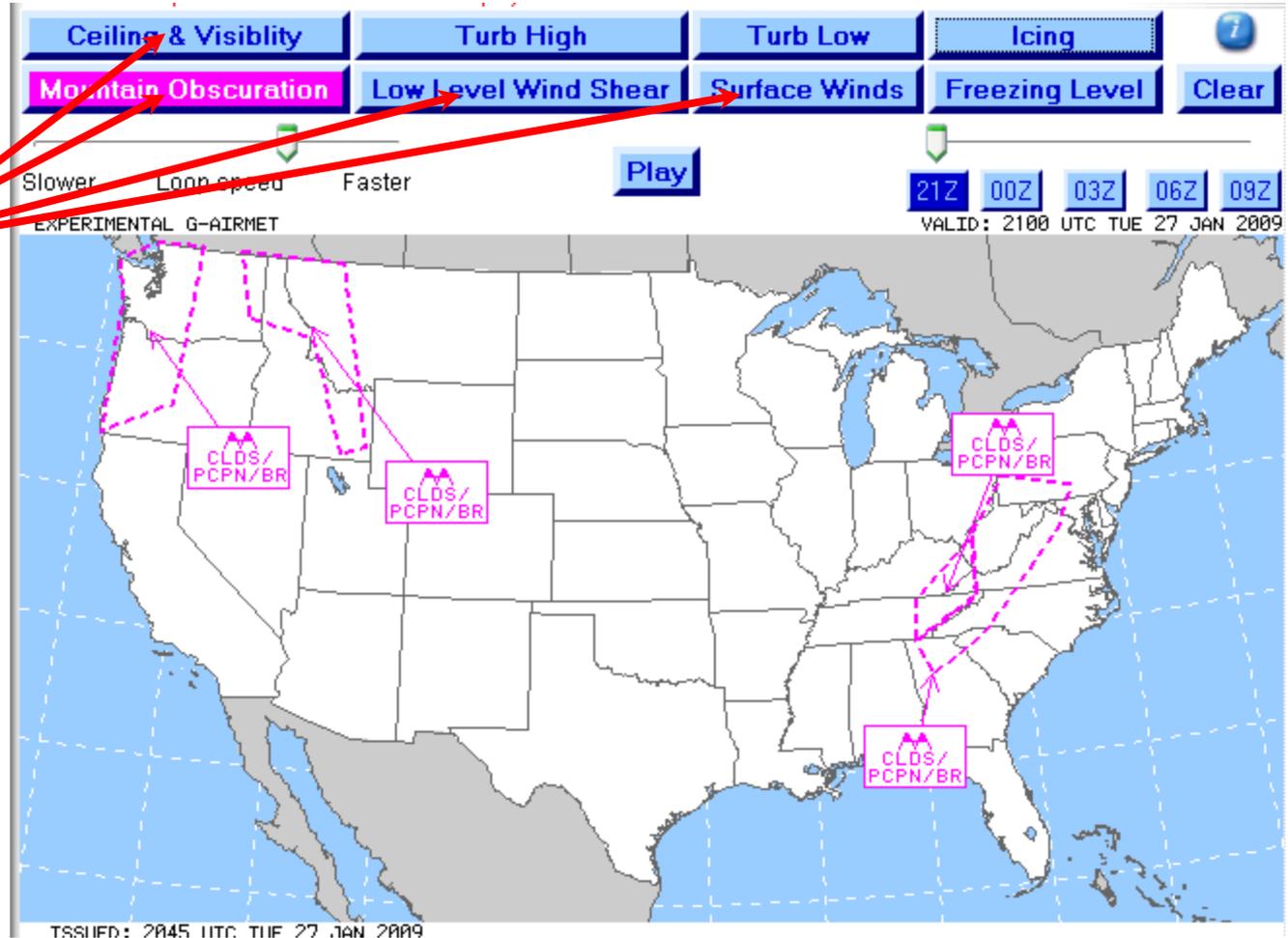
# G-AIRMET



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# G-AIRMET



Note: WFO and CWSU collaboration opportunities



# Collaboration

## AWC-WFO-CWSU

- All three have unique and overlapping Aviation Weather responsibility
- WFO 5 mile radius
  - Approach/Departure
  - Flight Planning
- AWC
  - Approach/Departure for all that is not a 5 mile circle
  - Flight Planning
- CWSU
  - TRACON – crucial
    - “bridge” between TAF and En-Route forecast

# Collaboration Opportunities

- ➔ FAA continually states “weather information consistency is favored over accuracy”
- ➔ WFO NDFD grids
  - ➔ Use for FA production
    - ➔ Winds
    - ➔ Wind gusts
    - ➔ Cloud cover
    - ➔ Weather
  - ➔ Use for TAF production
- ➔ National Ceiling and Visibility
  - ➔ Use as first guess or guidance for a GFE/NDFD grid population?

# Area Forecast

FAUS43 KKCI  
261045 FA3W  
CHIC FA 261045  
SYNOPSIS AND VFR CLDS/WX SYNOPSIS VALID UNTIL 270500  
CLDS/WX VALID UNTIL 262300...OTLK VALID 262300-270500  
ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY .  
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN. TS IMPLY  
SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS. NON MSL  
HGTS DENOTED BY AGL OR CIG.  
.SYNOPSIS...UPR LVL DISTURBANCE NRN KS-NRN IN FCST 05Z SRN  
GRTLKS RGN. HIGH PRES THRUT SFC FCST LTL CHANGE THRU PD.  
. ND SKC OR SCT CI. OTLK...VFR. .  
.SD..  
N 1/3...BKN120 LYRD FL250. OTLK...VFR.  
S 2/3...BKN040-045 TOP FL250. VIS 3-5SM -SN BR. BECMG 1719  
SCT050 BKN100-120. ERN PTNS OCNL VIS 3-5SM -SN BR.  
OTLK...VFR THRUT.  
.NE..  
W HLF...OVC040-045 TOP 150 BKN CI. VIS 3-5SM -SN BR.  
OTLK...MVFR CIG SN.  
E HLF...SCT-BKN035 OVC050-070 TOP 150 BKN CI. OCNL VIS 3-5SM  
-SN BR. OTLK...MVFR CIG SN. .  
KS..  
E HLF...BKN030 OVC050 TOP 160. BKN CI. 15Z OVC025. OCNL VIS  
3-5SM -FZDZ/-SN BR. OTLK...MVFR CIG SN.  
NW...OVC040-050 TOP 150. SCT-BKN CI. VIS 3-5SM -SN BR.  
OTLK...IFR CIG SN.  
SW...SCT040. BECMG 1213 OVC040 TOP 150. AFT 17Z OCNL VIS  
3-5SM - SN BR. OTLK...MVFR CIG SN BR.  
.MN..  
N HLF...SKC OCNL SCT CI. OTLK...VFR.  
S HLF...SCT-BKN CI. BECMG 1516 SCT-BKN120 LYRD FL250.  
OTLK...VFR. .  
.IA..  
W 1/3...SCT-BKN035 OVC060 LYRD FL250. VIS 3-5SM -SN BR. AFT  
17Z OVC020-025. OTLK...MVFR CIG.

→ 3860 Characters

→ Basic formatting takes 60%

→ Can't mention "IFR"

→ Difficult to brief with

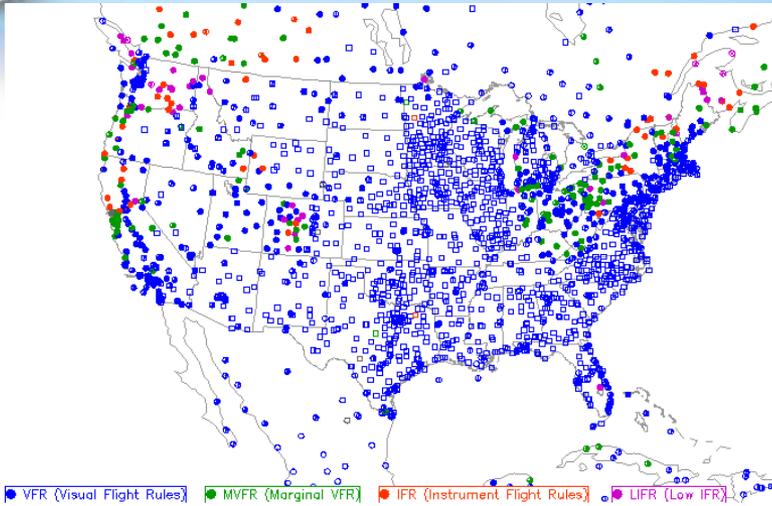
→ Going to a "Graphical  
FA"

→ NextGen Component

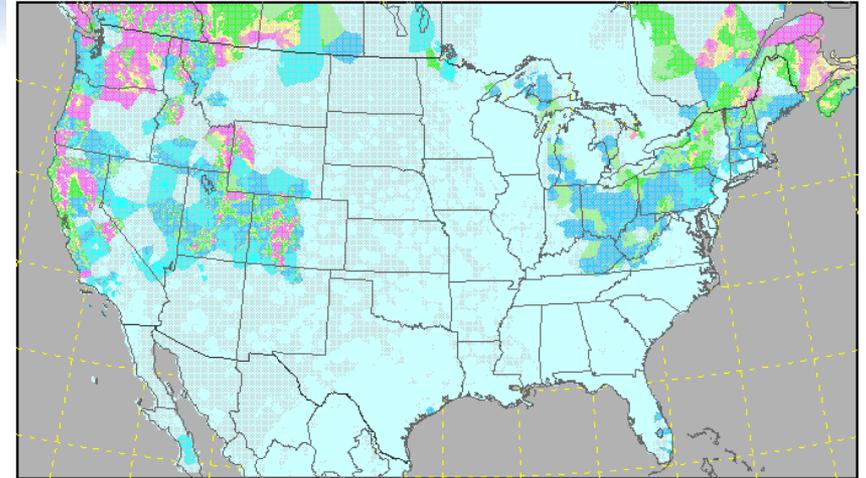
→ Consistent with other NWS  
forecasts

→ Utilize NDFD

# Collaboration: NCV

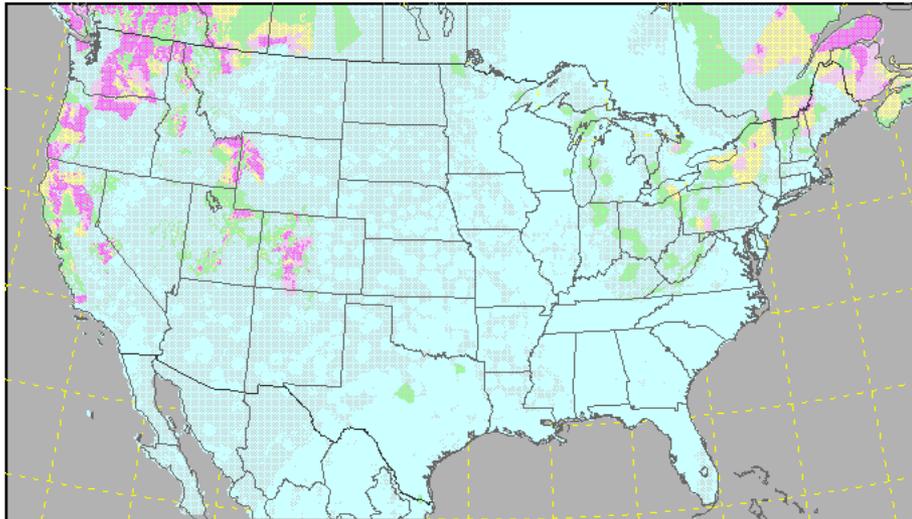


**Ceiling (feet AGL)** NCV-Analysis valid 1900 UTC Mon 23 Feb 2009

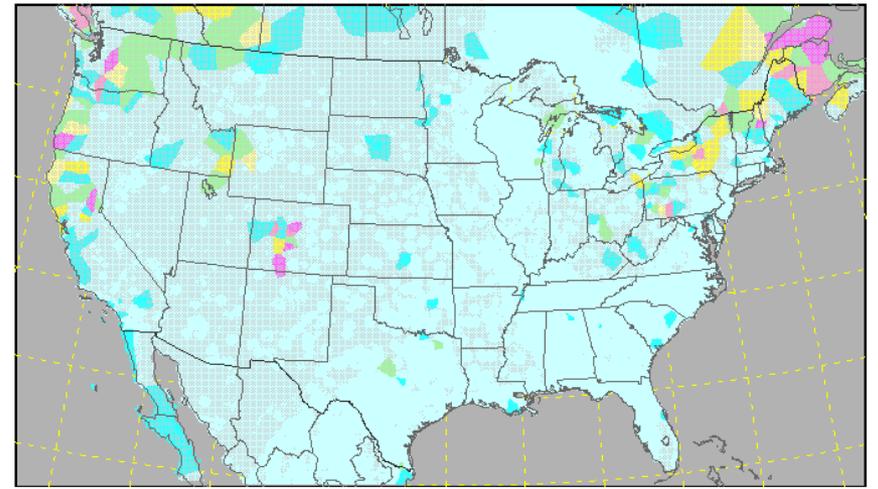


**Flight category**

NCV-Analysis valid 1900 UTC Mon 23 Feb 2009



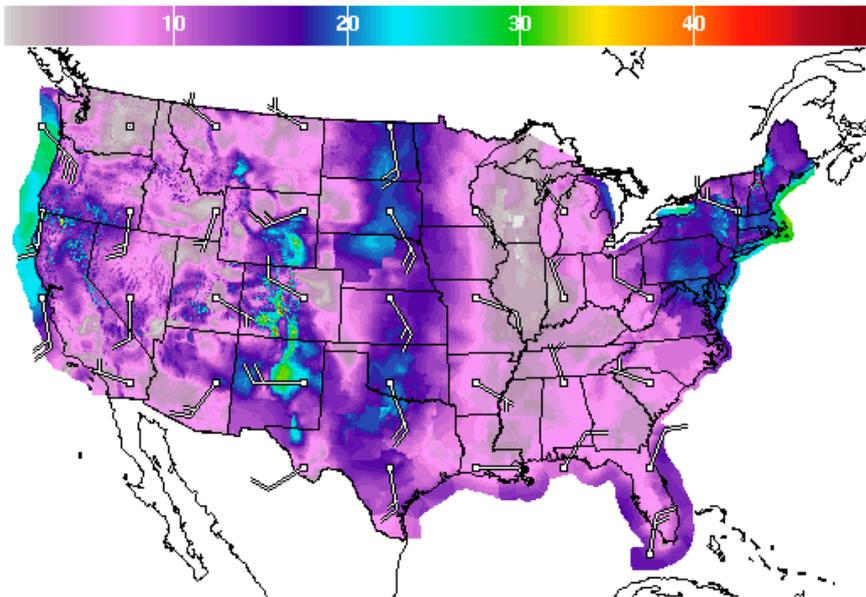
**Visibility (statute miles)** NCV-Analysis valid 1900 UTC Mon 23 Feb 2009



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# NDFD Collaboration

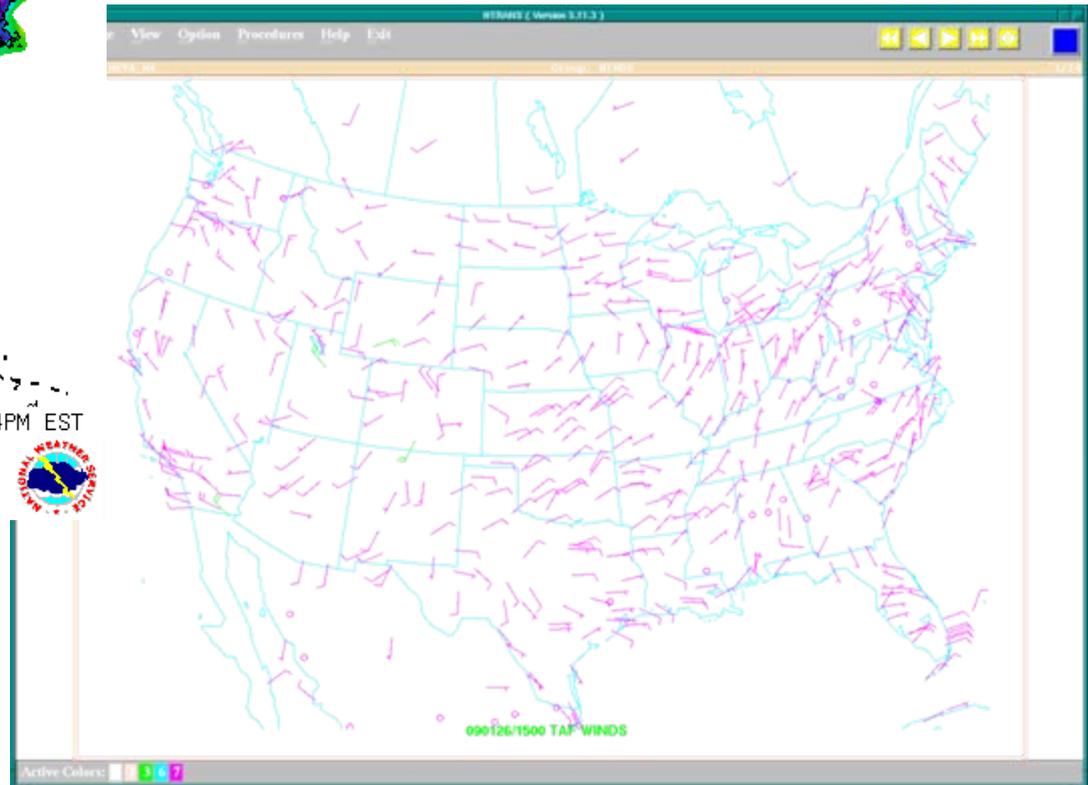


WindSpd(Kts) & WindDir For Mon Feb 23 2009 4PM EST  
(Mon Feb 23 2009 21Z)

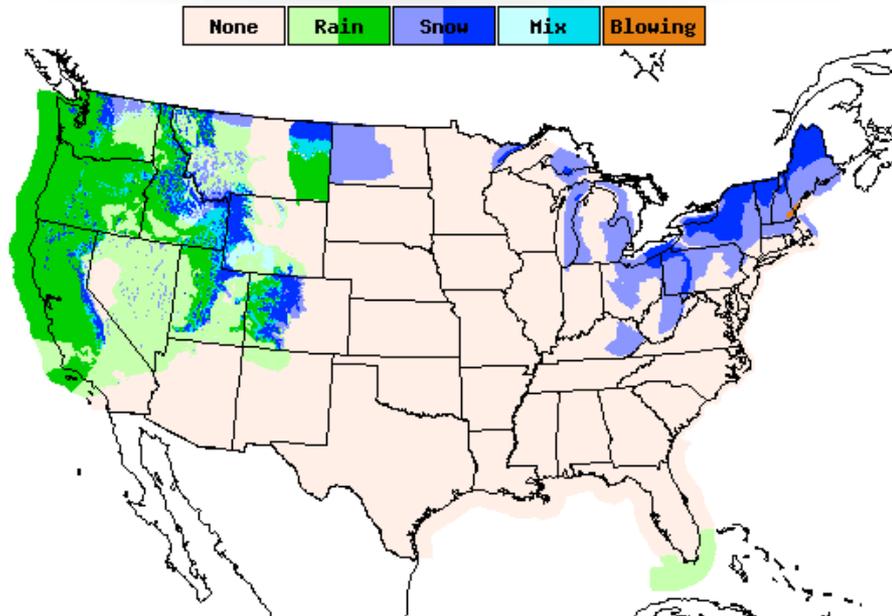
**National Digital Forecast Database**  
18z issuance Graphic created-Feb 23 1:22PM EST

5km resolution

20-40km resolution on NAWIPS Display

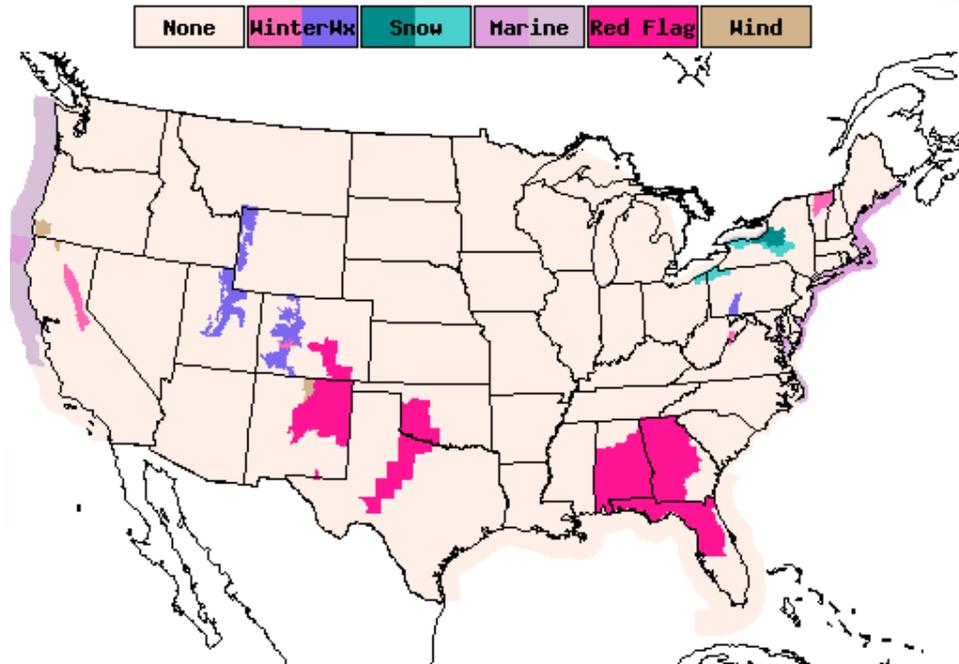


# NDFD Collaboration



Predominant Weather For Mon Feb 23 2009 4PM EST  
(Mon Feb 23 2009 21Z)

**National Digital Forecast Database**  
18z issuance    Graphic created-Feb 23 1:20PM EST



Hazards For Mon Feb 23 2009 4PM EST  
(Mon Feb 23 2009 21Z)

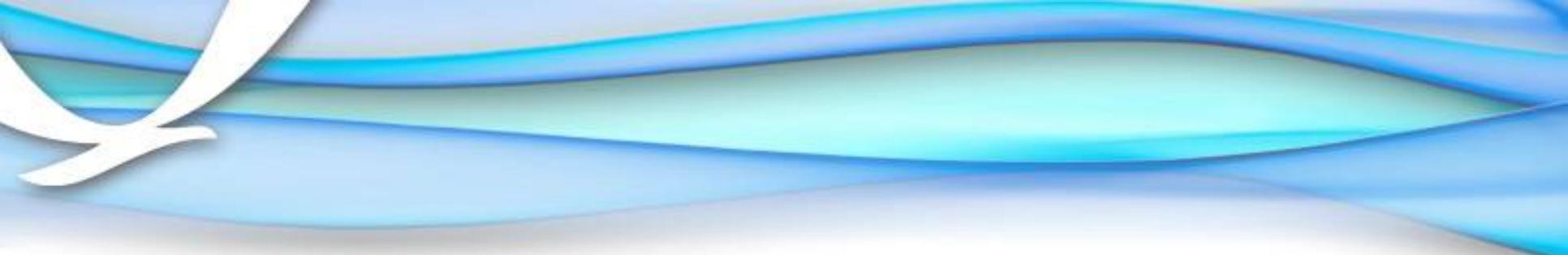
**National Digital Forecast Database**  
18z issuance    Graphic created-Feb 23 1:23PM EST



Hourly or 3-hourly availability needed to utilize  
coordination/consistency with AWC

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# **International OPERATIONS**

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# Questions?

→ Thank you!

→ Contact Information:

[Marc.Singer@noaa.gov](mailto:Marc.Singer@noaa.gov)