

1st Suomi NPP EDR Product Provisional Readiness Review

Session 4: VIIRS Cloud Mask

NCEP User Feedback

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***Thanks to Hui-ya Chuang¹, Yali Mao², Binbin Zhou²,
Fanglin Yang, John Derber¹, & Geoff DiMego¹**

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VIIRS on NPP

- Currently no direct use within EMC; indirect use through VIIRS?
- Future plans to assimilate VIIRS radiances for:
 - Use of cloud information
 - Deriving near-surface sea temperature
- Unfortunately no one available to work on this within EMC

Indirect use through CLAVR-x

- Objective grid-to-grid (g2g) verification of cloud forecasts from EMC models:
 - N. American Mesoscale Model (NAM)
 - Global Forecast System (GFS)
- Accessed through an internal EMC web page from a MYSQL data base
 - Total cloud fractions from CLAVR-x & from the Air Force Weather Agency (AFWA)

Objective (g2g) Cloud Verification

NCEP Verification of Operational Models
MYSQL-based Verification System

Begin Period: Begin Day: Event Equalizer: On Off

End Period: End Day:

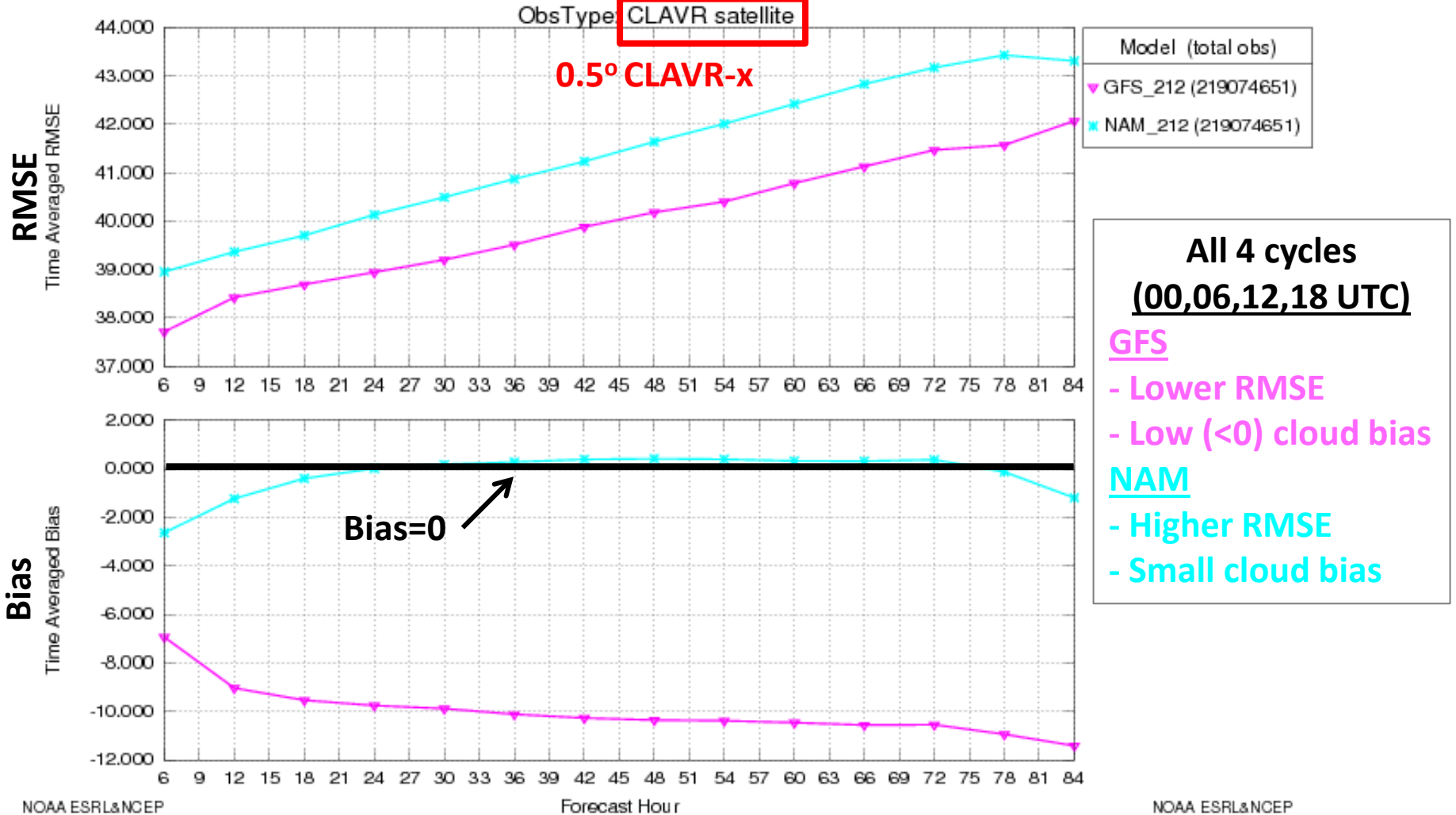
[Click here to see Model Grid definitions](#)
[Click here to see Regional Verification Domains](#)

| Models: | Verification Domain: | Parameter: | Level: |
|--|--|---|--|
| <input checked="" type="checkbox"/> GFS_212 <input type="checkbox"/> GFS_216 <input checked="" type="checkbox"/> NAM_212 <input type="checkbox"/> NAM_242 <input type="checkbox"/> NAM_212 <input type="checkbox"/> NAM_216 <input type="checkbox"/> RAP_252 <input type="checkbox"/> RAP_236 <input type="checkbox"/> RAP_242 <input type="checkbox"/> RAP13_130 <input type="checkbox"/> SRMEAN_212 <input type="checkbox"/> SRMEAN_216 <input type="checkbox"/> NARRE_130 <input type="checkbox"/> EASTNMM_255 <input type="checkbox"/> EASTARW_255 <input type="checkbox"/> WESTNMM_255 <input type="checkbox"/> WESTARW_255 <input type="checkbox"/> CONUSNEST_227 <input type="checkbox"/> AKNEST_198 <input type="checkbox"/> DGEX_185 <input type="checkbox"/> GFSE_211 <input type="checkbox"/> SMARTCONUS_197 <input type="checkbox"/> SMARTAK_198 | <input type="text" value="National"/> | <input type="text" value="Total Cloud"/> | <input type="text" value="SFC"/> |
| <input type="checkbox"/> Plot differences Go to ensemble verification | Model Runtime: <input type="text" value="ALL"/> | Statistic 1: <input type="text" value="RMSE"/> | Observation Type: <input type="text" value="CLAVR satellite"/> |
| | Forecast Hour: <input type="text" value="ALL"/> | Statistic 2: <input type="text" value="Bias"/> | <input type="button" value="Submit"/> |

(Binbin Zhou,
Perry Shafran)

Average Statistics for 2012 (Total Cloud Fractions, %)

Total Cloud, Runtime: ALL, Forecast Hour: ALL, 01 JAN - 31 DEC 2012, Natl

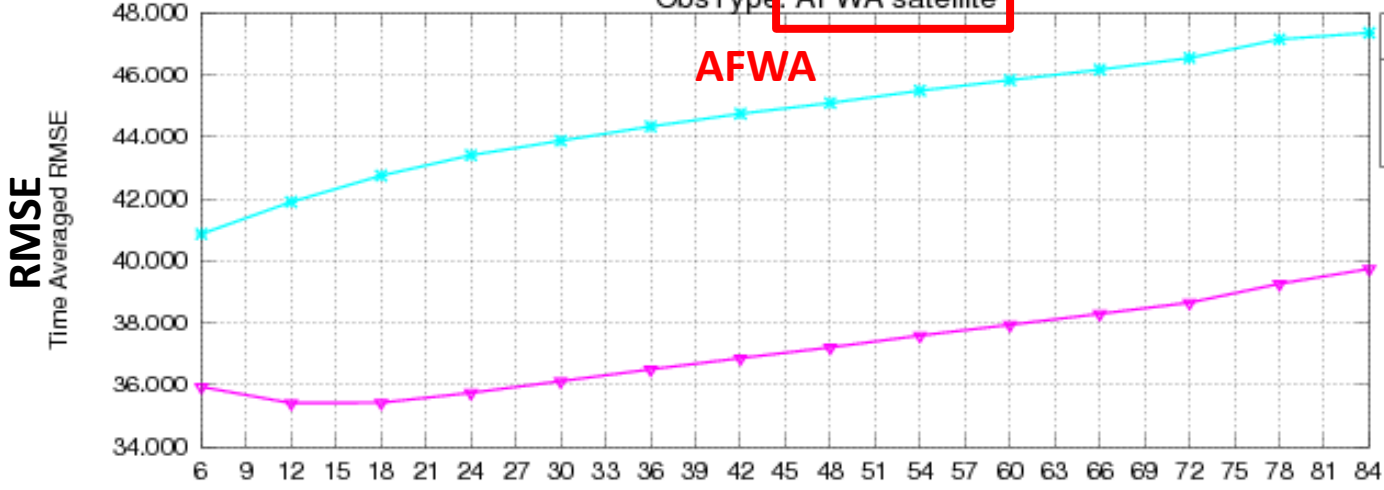


Average Statistics for 2012

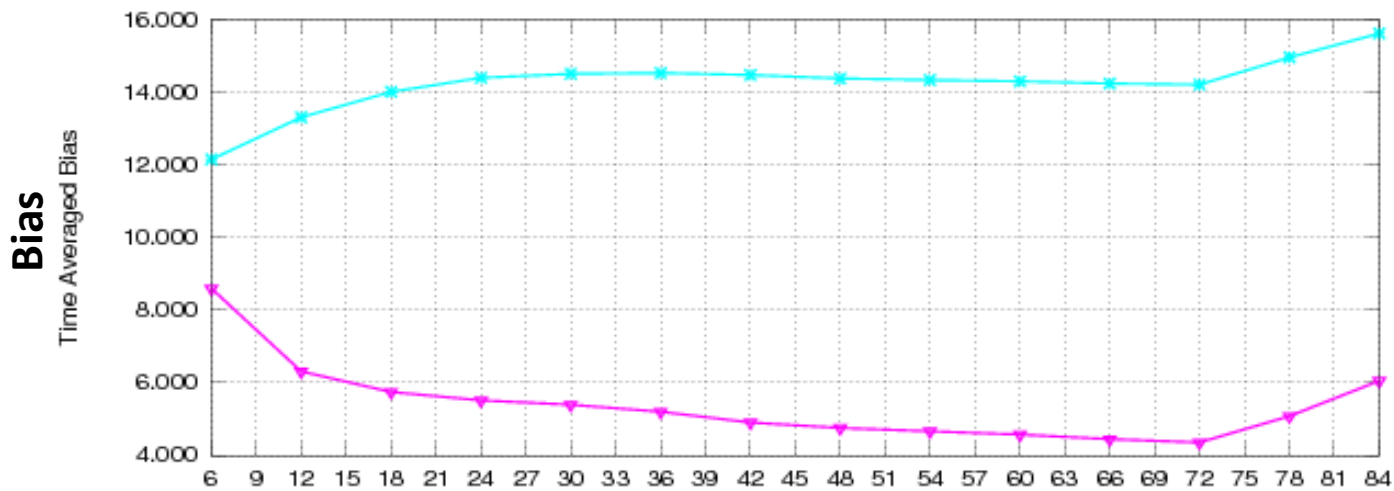
(Total Cloud Fractions, %)

Total Cloud, Runtime: ALL, Forecast Hour: ALL, 01 JAN - 31 DEC 2012, Natl

ObsType: **AFWA satellite**



| Model (total obs) | |
|-------------------|---------------------|
| ▼ | GFS_212 (338664106) |
| ★ | NAM_212 (338664106) |



All 4 cycles
(00,06,12,18 UTC)

GFS

- Lower RMSE
- Slight high bias in total cloudiness

NAM

- Higher RMSE
- Large, high bias in total cloudiness

Summary of g2g Cloud Verification

- Large differences between CLAVR-x & AFWA
- NAM more consistent with CLAVR-x
- GFS more consistent with AFWA
- More cloudiness in CLAVR-x (& NAM) than in AFWA (& GFS)

Future Plans (1 of 4)

- Data assimilation (John Derber)
 - Need funding to hire someone
- Expand objective g2g verification?
- Daily & monthly global maps (Fanglin Yang)
 - Regular lat-lon grid
 - Standard isobaric layers
 - 6-h mean fields
 - Preferably in **GRIB format**

Future Plans (2 of 4)

- Global Current Icing Potential, GCIP (Hui-ya Chuang, Yali Mao, Binbin Zhou)
 - Global analysis of probability & severity of icing
 - Used in *validating* World Area Forecast System (WAFS) icing forecasts from GFS & UKMO
 - Combines data from satellites, radars, lightning obs, METAR, & pilot reports (NCAR algorithm)

Future Plans (3 of 4)

- Requests in support of GCIP
 - 0.25° lat-lon grid, preferably in GRIB
 - 3-h intervals at high latitudes poleward of 70° N & S
 - A merged geostationary product up to 70° N & S will be provided later this year (K. Pryor, STAR/SMCD)
 - For icing probability:
 - Cloud coverage (fractions) & cloud-top temperatures
 - For icing severity:
 - Normalized albedos from visible channel
 - T_b diffs between ‘shortwave IR’ ch 2 (~3.9 μm) & ‘window’ ch 4 (~10.7 μm)

Future Plans (4 of 4)

- Regional & global validation?
 - Evaluate strengths & weaknesses between treatment of clouds between regional & global modeling systems?
 - Tie in with geostationary estimates?
 - Incoming surface insolation (useful for land surface)
 - Total cloud and/or aerosol optical depths
 - A joint effort between NESDIS & NCEP?