

Monitoring & assimilation of IASI data in Météo-France NWP system

Vincent GUIDARD
Nadia FOURRIÉ & Thomas PANGAUD

Météo-France/CNRM – CNRS/GAME

Overview

- 1. Data Processing
- 2. Pre-operational Monitoring
- 3. First Assimilation Experiment
- Conclusions



1. Data Processing (1/2)

- Level 1C radiances are received via EumetCast in Toulouse (whole BUFR including 8461 channels)
- Only a subset of 314 channels is retained in the Operational Observational DataBase
 - 300 channels according to [Collard \(2007\)](#)
 - 14 additional channels
- A pre-thinning is performed:
 - 1 FOV AMSU-A / 2
 - 1 scanline / 2
- Only one detector / 4 is used (detector #1)



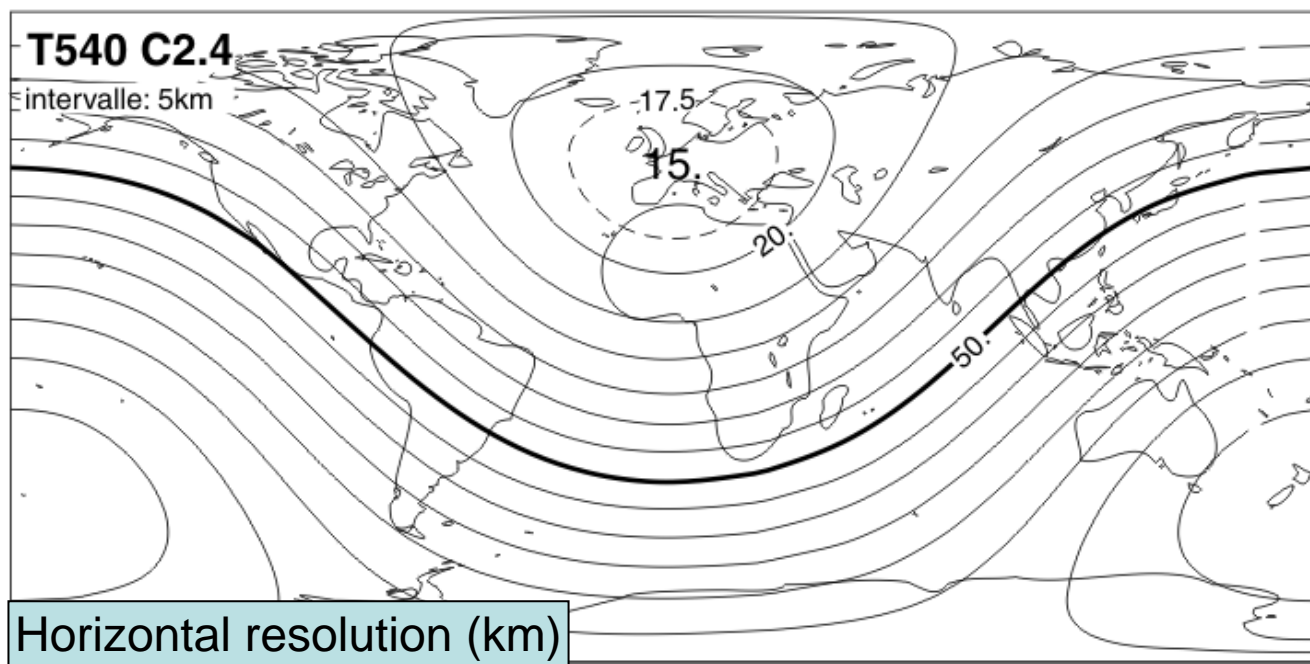
1. Data Processing (2/2)

- Radiances are bias corrected:
Variational Bias Correction (VarBC) from ECMWF
predictors are: powers of scan angle, thicknesses, ...
[Dee \(2004\)](#), [Auligné et al \(2007\)](#)
- Cloud detection is based on a channel ranking method
from ECMWF
[McNally & Watts \(2003\)](#)
- First-guess check



2. Pre-operational monitoring

- The whole subset of 314 IASI channels is monitored
- All radiance data are bias corrected using VarBC (AMSU-A, AMSU-B/MHS, HIRS, SSMI, AIRS)
- Assimilation of ASCAT data, GPS Radio-Occultation data
- Higher resolution than the current operational system
- Expected to switch to operations at the beginning of 2008



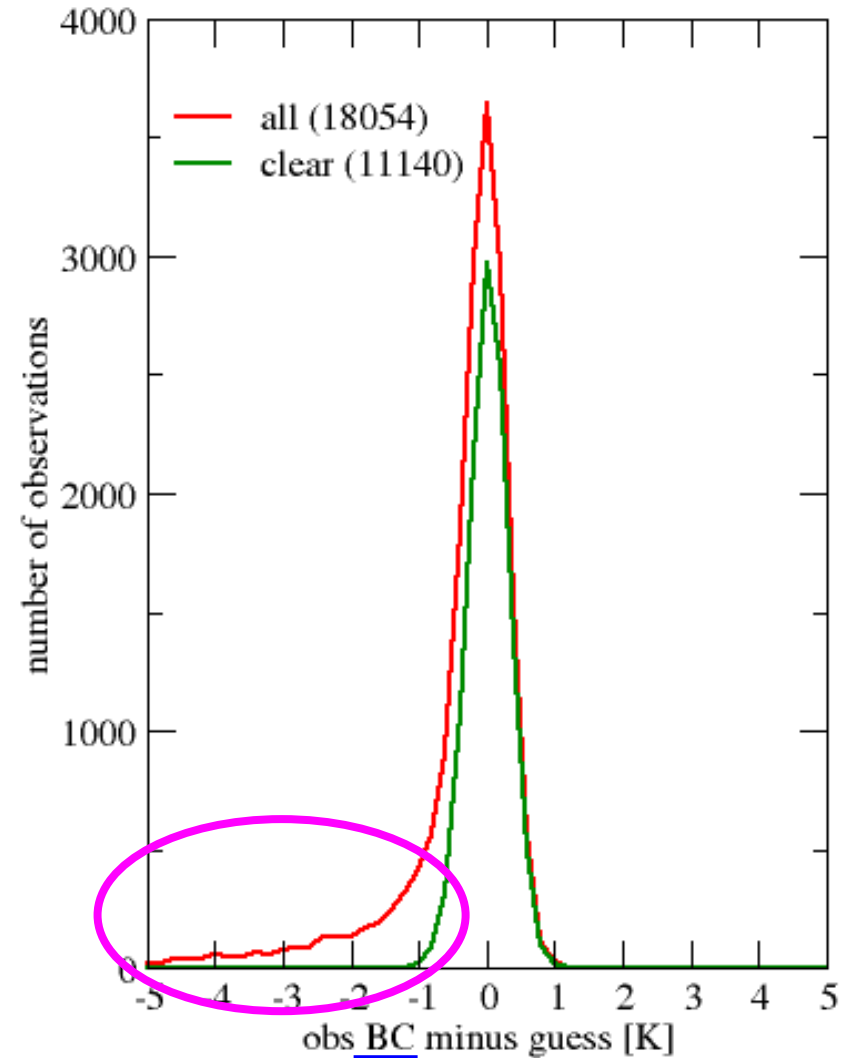
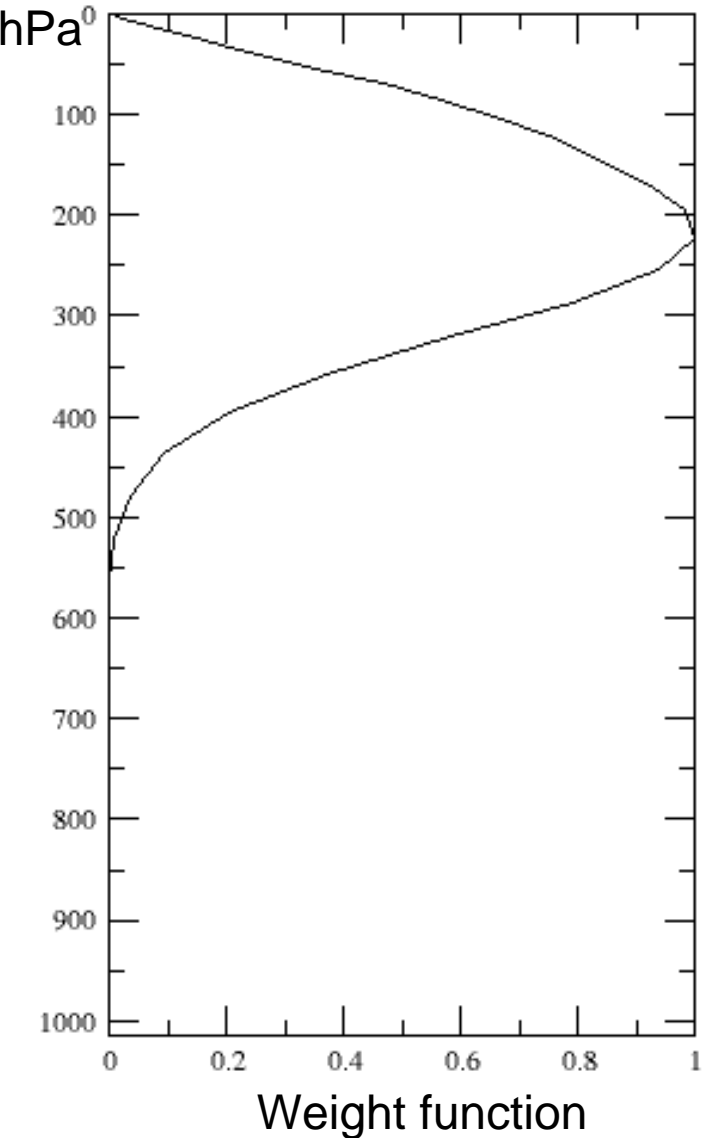
3. First assimilation experiment

- Assimilation of 41 channels peaking between 200 hPa and 600 hPa in CO₂ temperature LW band
- Only over Sea
- Prescribed sigma_o: 1 K
- Geographical thinning:
average distance between 2 obs. is 250 km



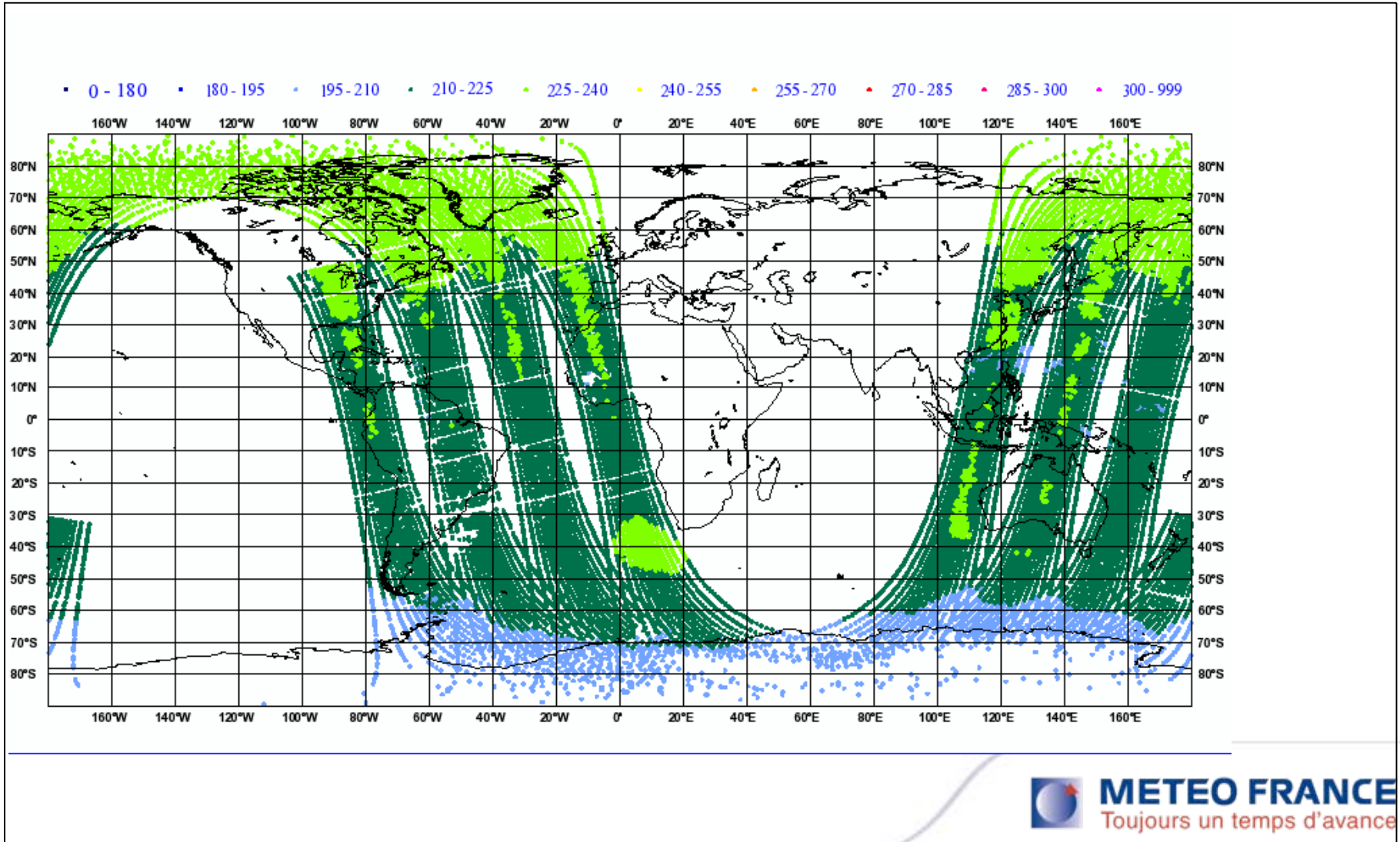
3.1 Channel #0219 – 699.50 cm⁻¹

#0219 -- 699.50 cm-1



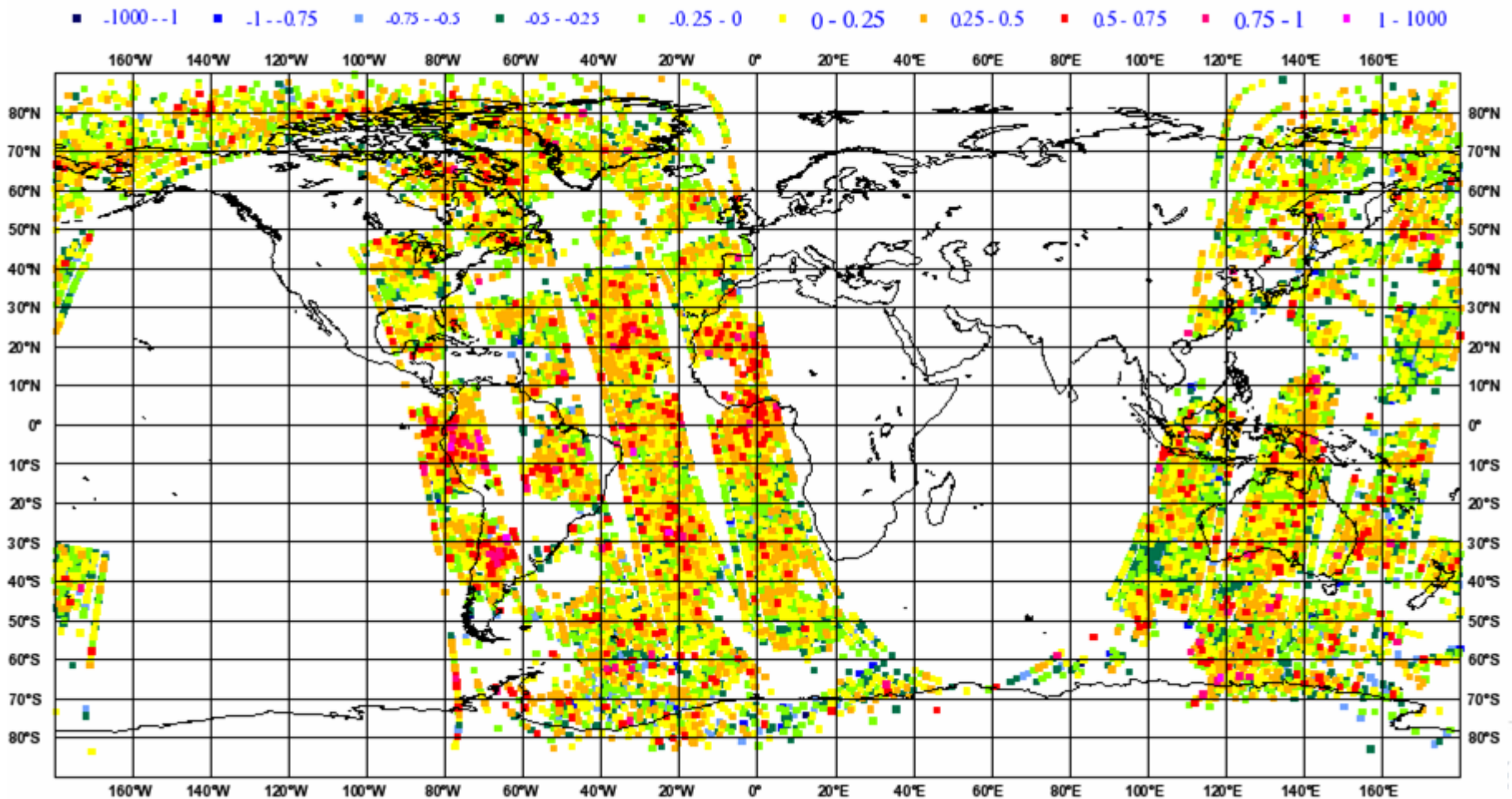
3.1 Channel #0219 – 699.50 cm⁻¹

Observation values all data



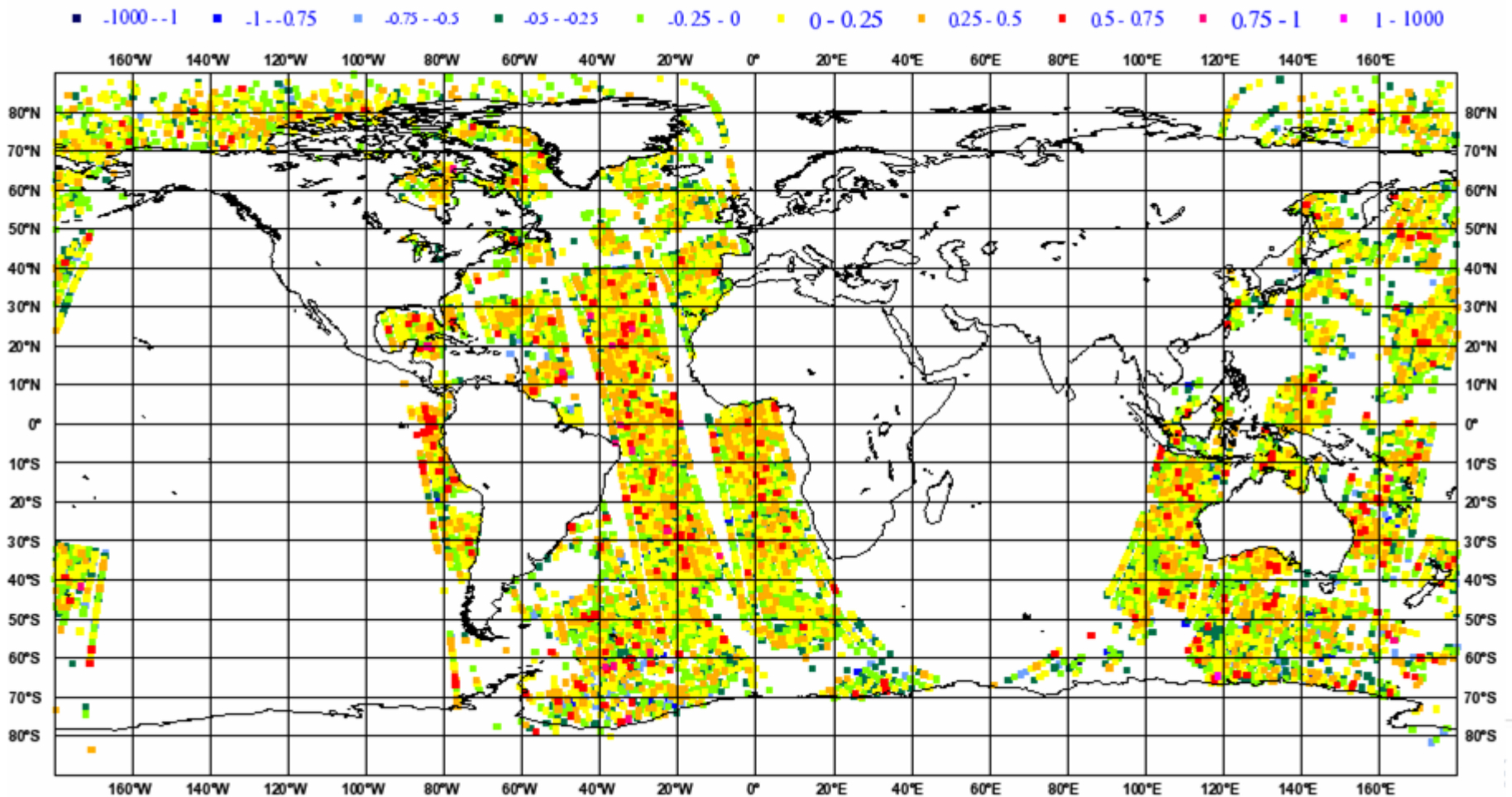
3.1 Channel #0219 – 699.50 cm⁻¹

Bias corrected obs. minus first-guess
clear data

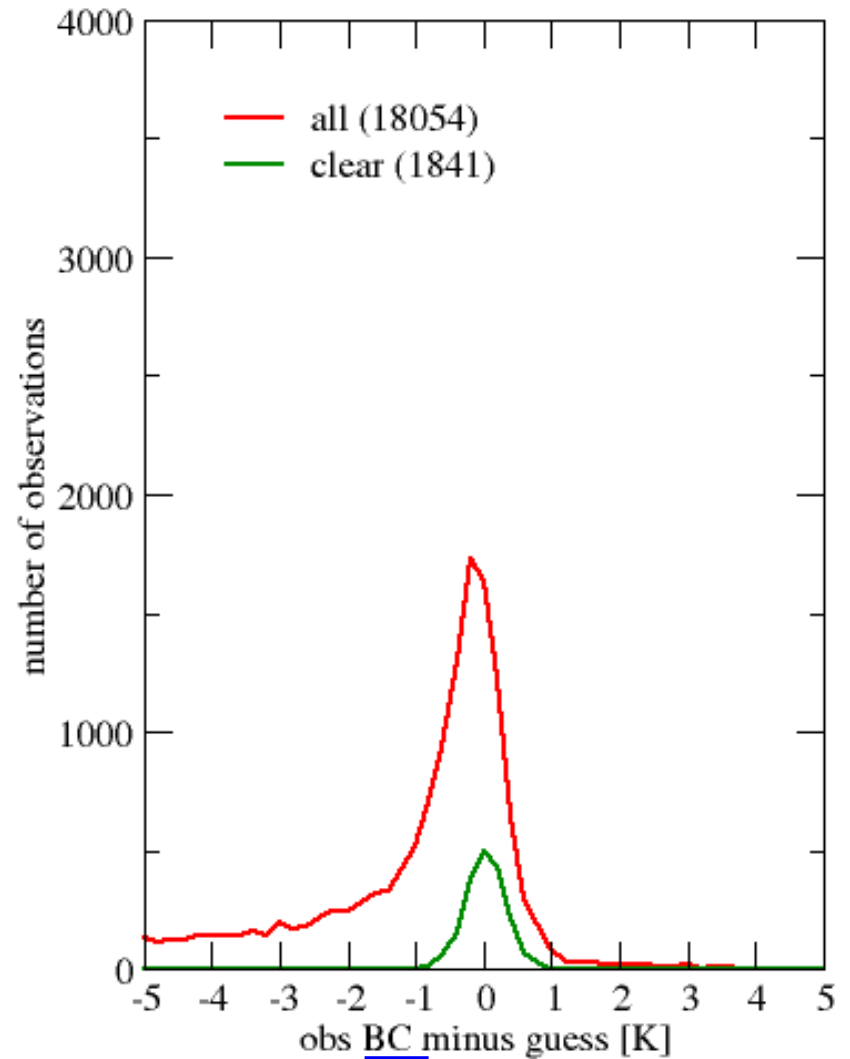
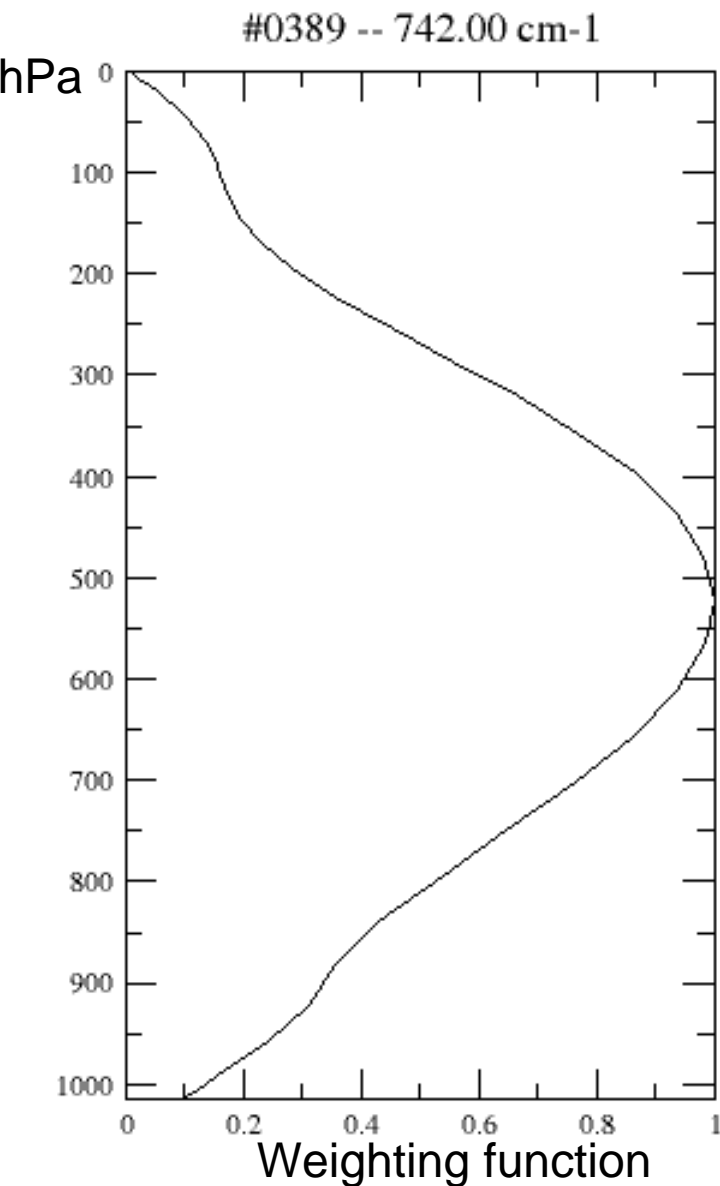


3.1 Channel #0219 – 699.50 cm⁻¹

Bias corrected obs. minus analysis
used data

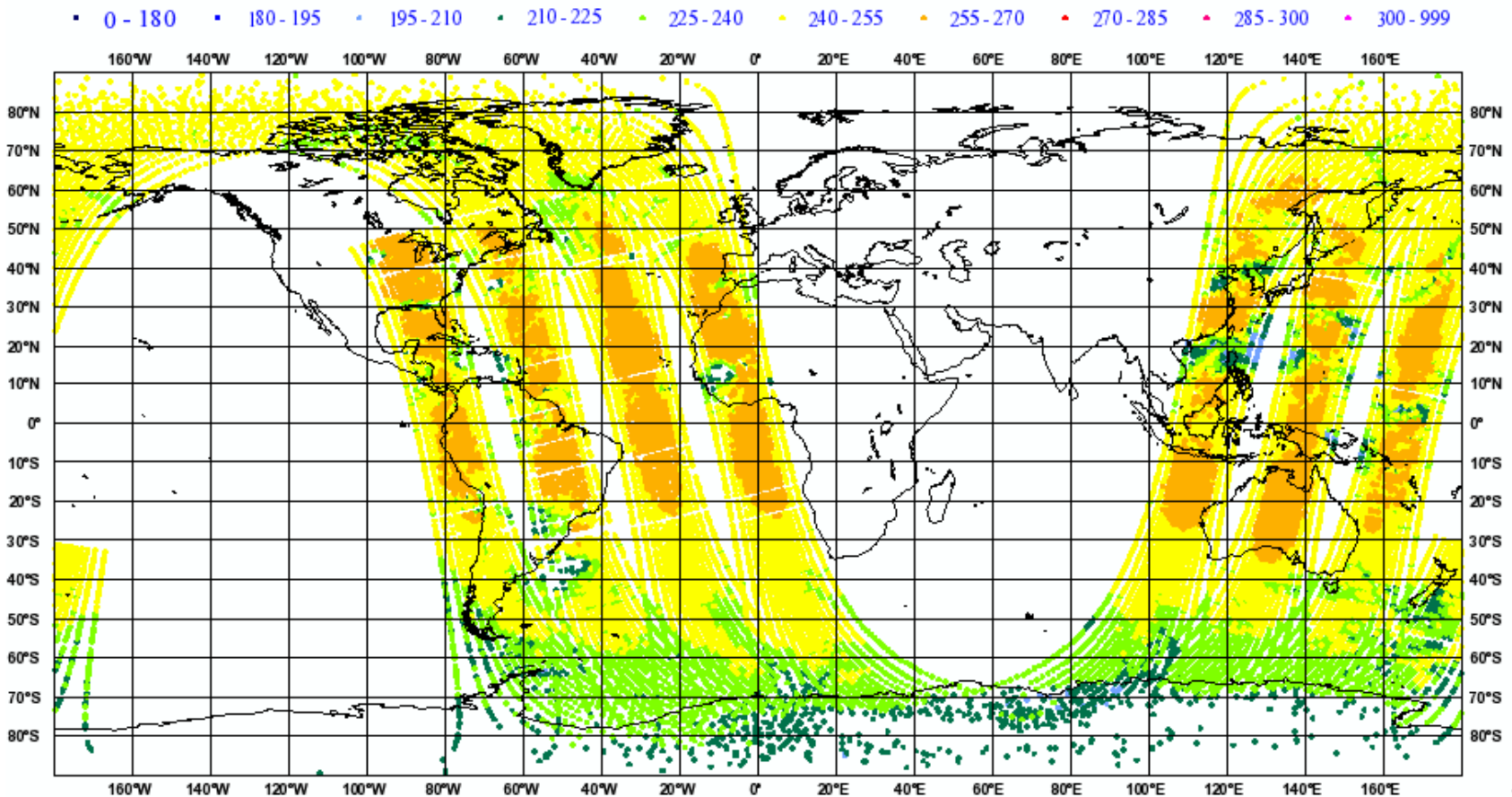


3.2 Channel #0389 – 742.00 cm⁻¹



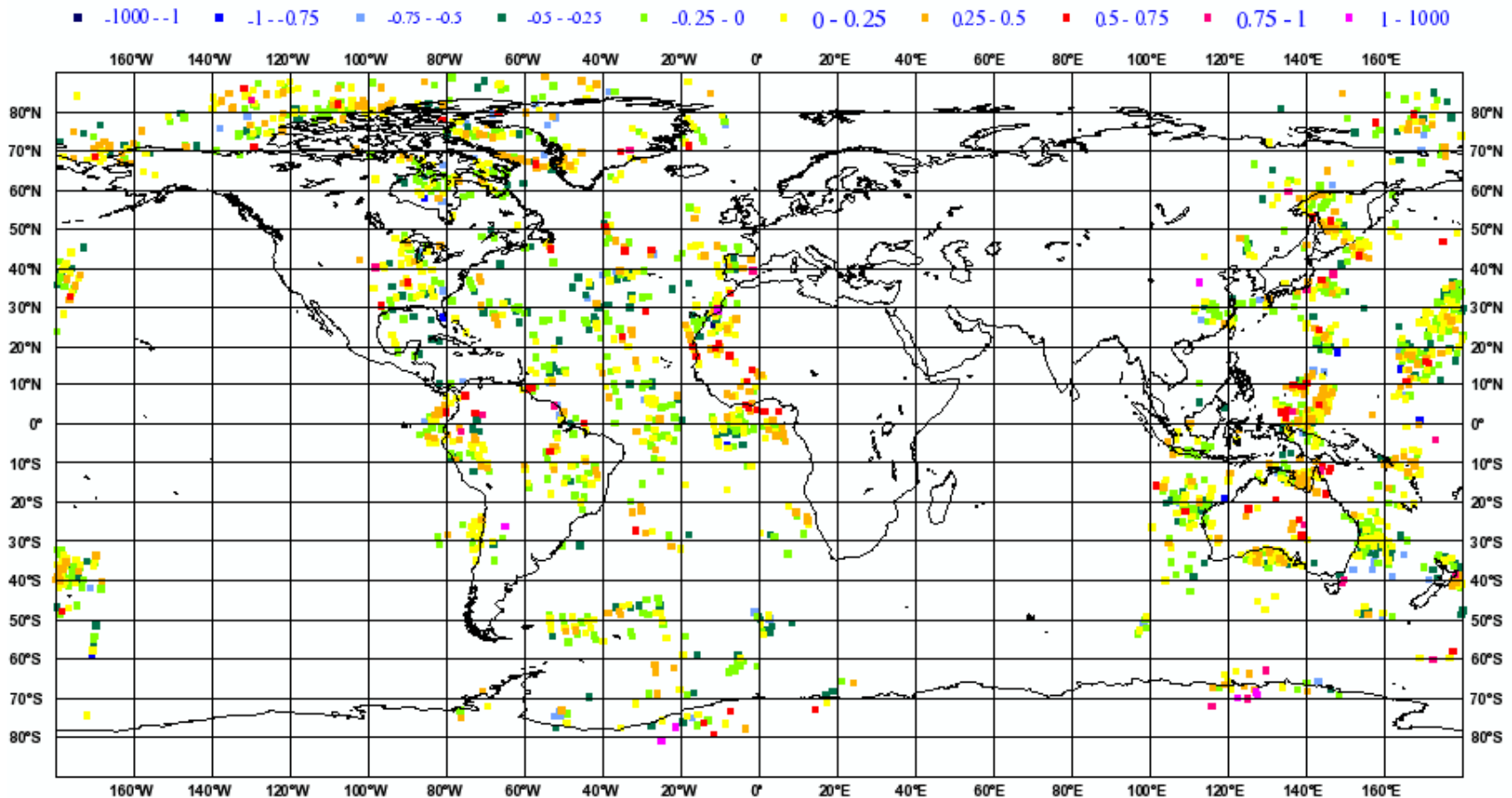
3.2 Channel #0389 – 742.00 cm⁻¹

Observation values all data



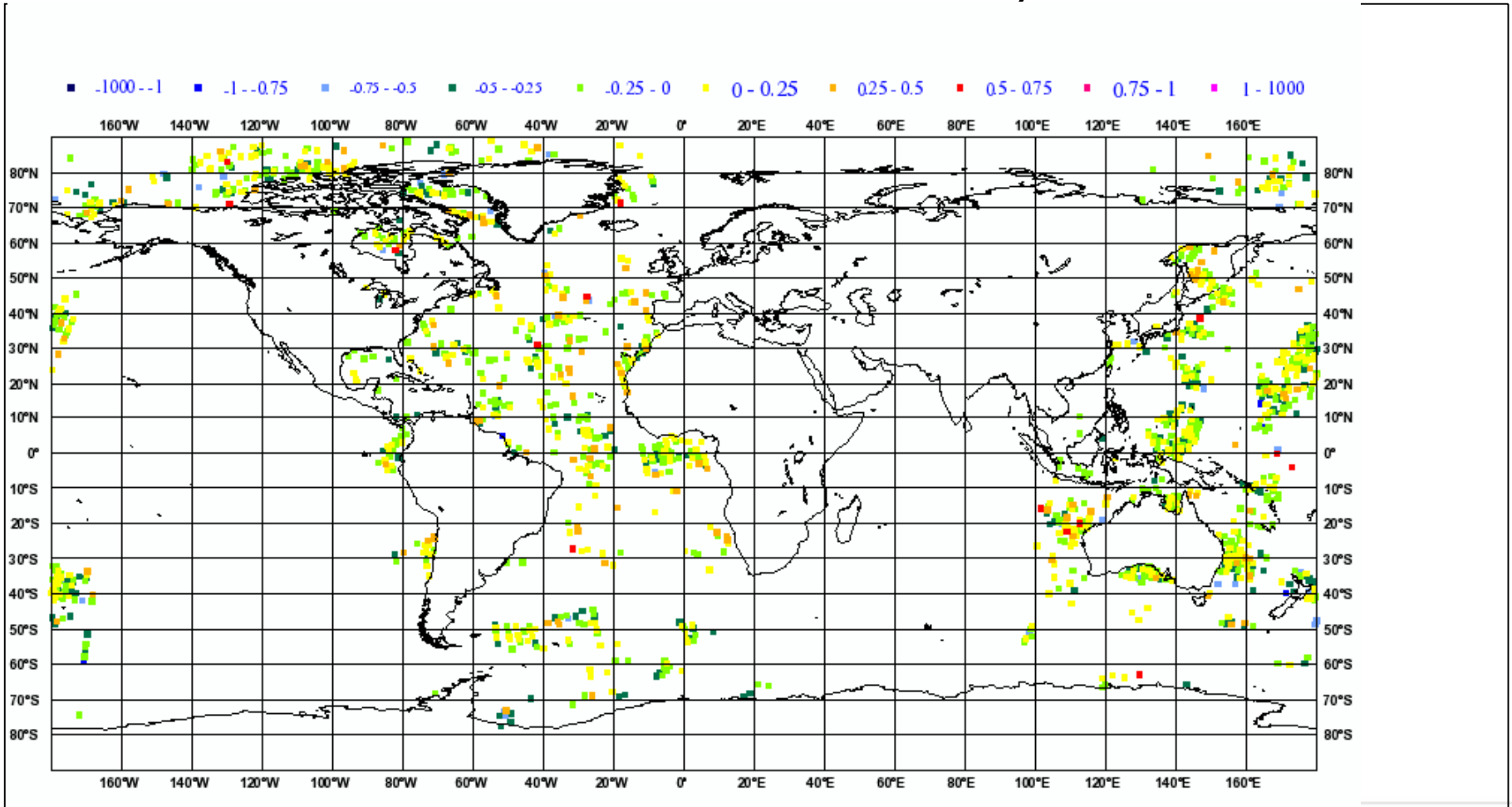
3.2 Channel #0389 – 742.00 cm⁻¹

Bias corrected obs. minus first-guess clear data



3.2 Channel #0389 – 742.00 cm⁻¹

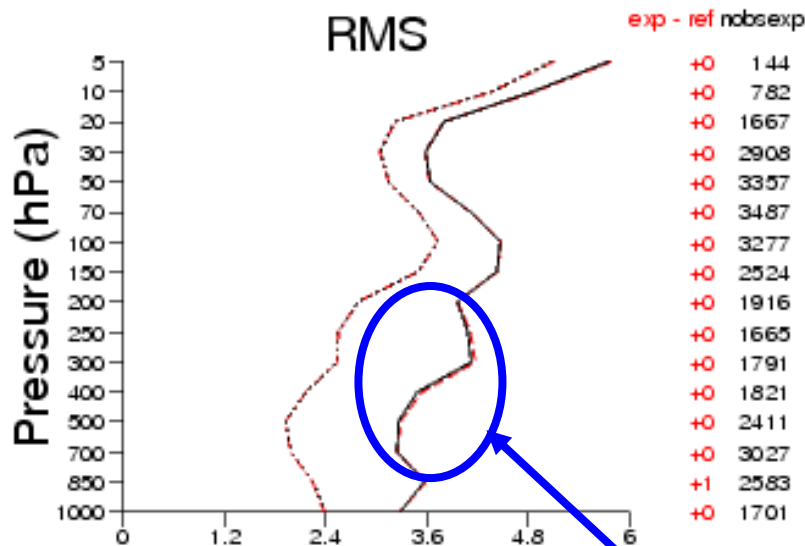
Bias corrected obs. minus analysis used data



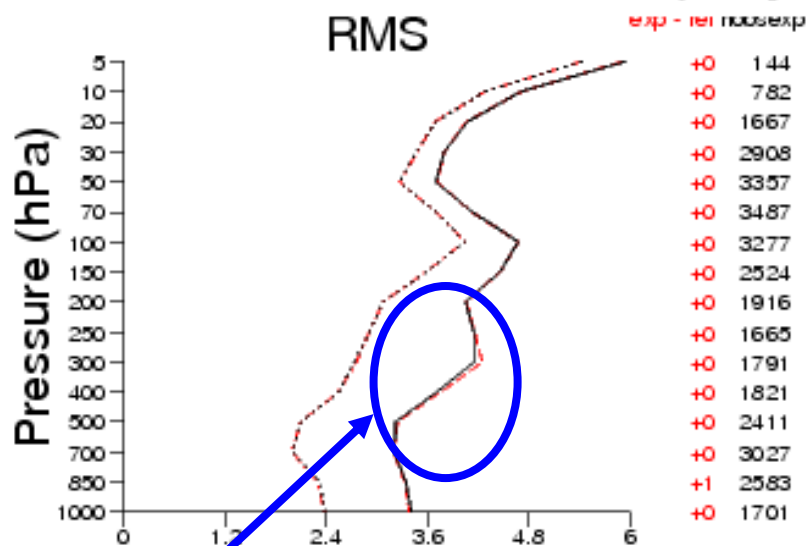
3.3 First Objective Evaluation

Fit of first-guesses to radiosonde winds
 August 2007: 08 @ 06 UTC → 16 @ 00 UTC

TEMP-Uwind S.Hemis
 used U



TEMP-Vwind S.Hemis
 used V



--- background departure o-b(ref)
 — background departure o-b
 - - - analysis departure o-a(ref)
 . . . analysis departure o-a

Very slight impact



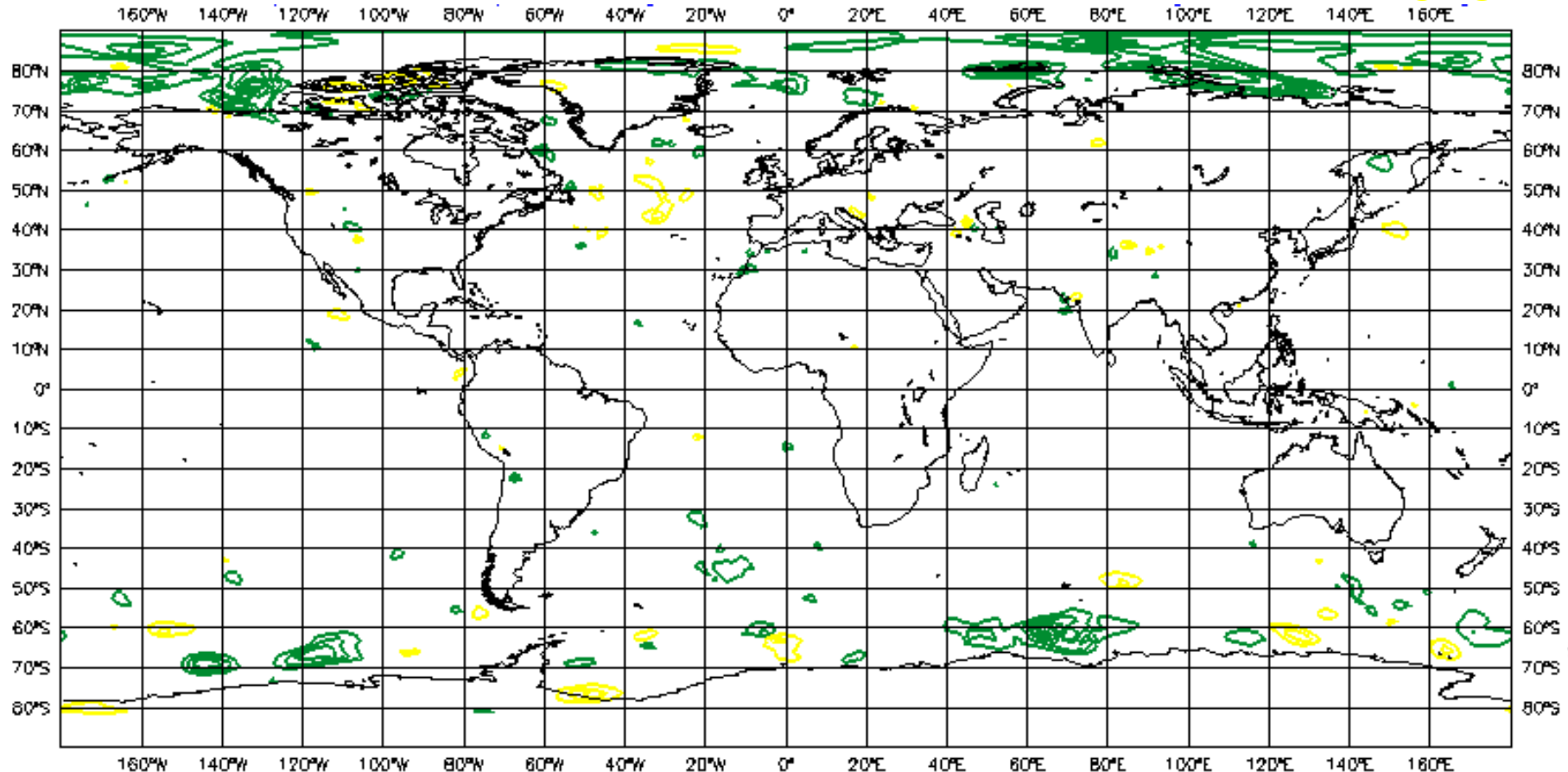
3.3 First Objective Evaluation

Consistency with ECMWF analyses for geopotential height
August 2007: average from 10 @ 00 UTC to 16 @ 00UTC

RMS (ref. ana. w/r ECMWF ana.) – RMS (exp. ana. w/r ECMWF ana.)

850 hPa

BETTER
WORSE



Conclusions

- Pre-operational monitoring of 314 IASI channels
→ Operational monitoring at the beginning of 2008
- First experiments to assimilate 41 channels are going on
→ Encouraging first results
- Extension to channels peaking between 100 hPa and the low troposphere
- Towards an operational assimilation of IASI radiances (second quarter 2008 ?)
- Work on improving assimilation of AIRS & IASI over Antarctica → Concordiasi (see Florence Rabier's poster !)