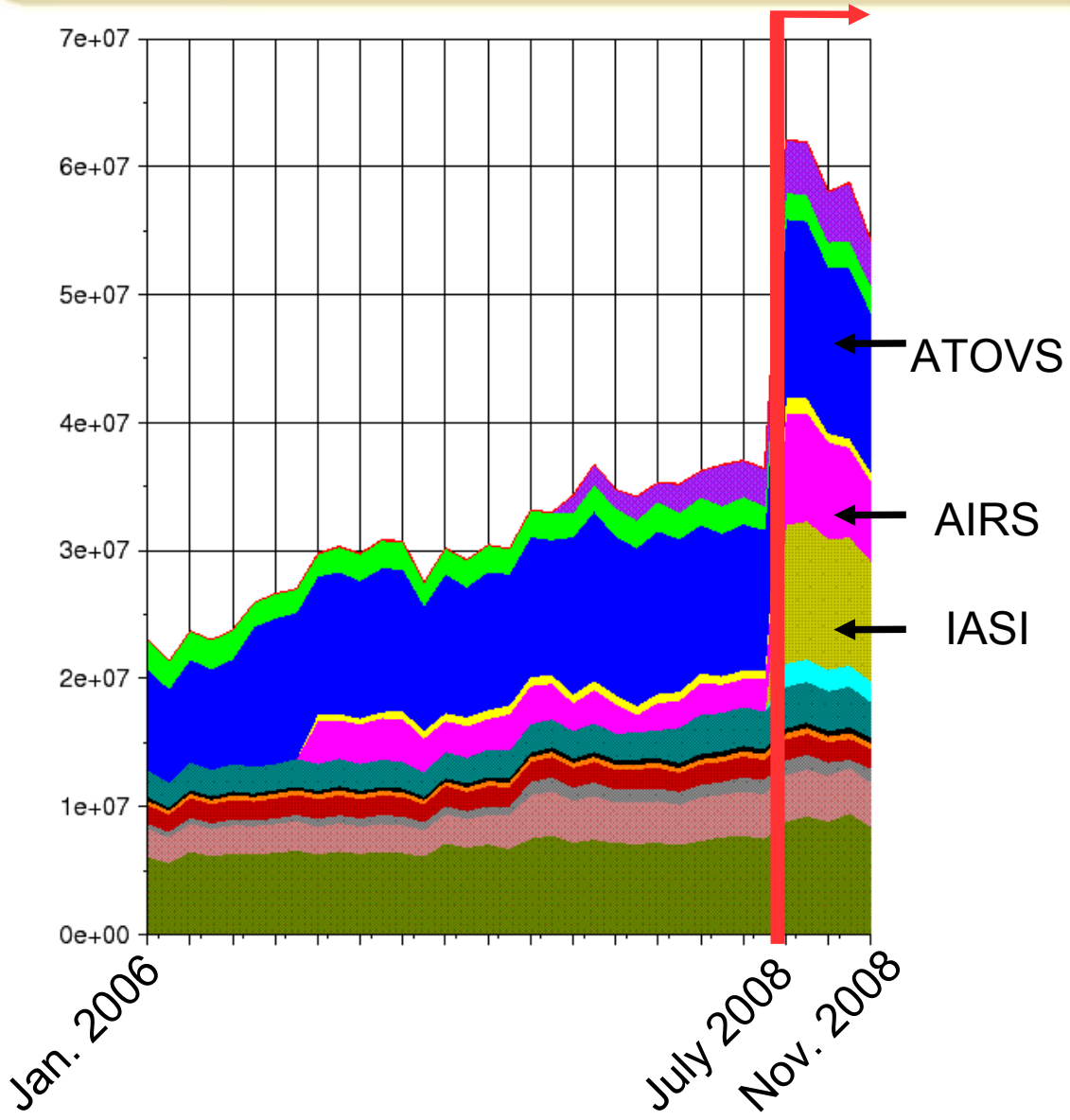
Status of AIRS and IASI assimilation at Météo-France

Overview

- 1. In operations: AIRS & IASI assimilated similarly
- 2. In pre-operational mode:
  - Extension of IASI usage over land and sea-ice
  - Assimilation of cloud-affected AIRS radiances

1. In Operations: evolution of obs. monthly usage



Current operational version:

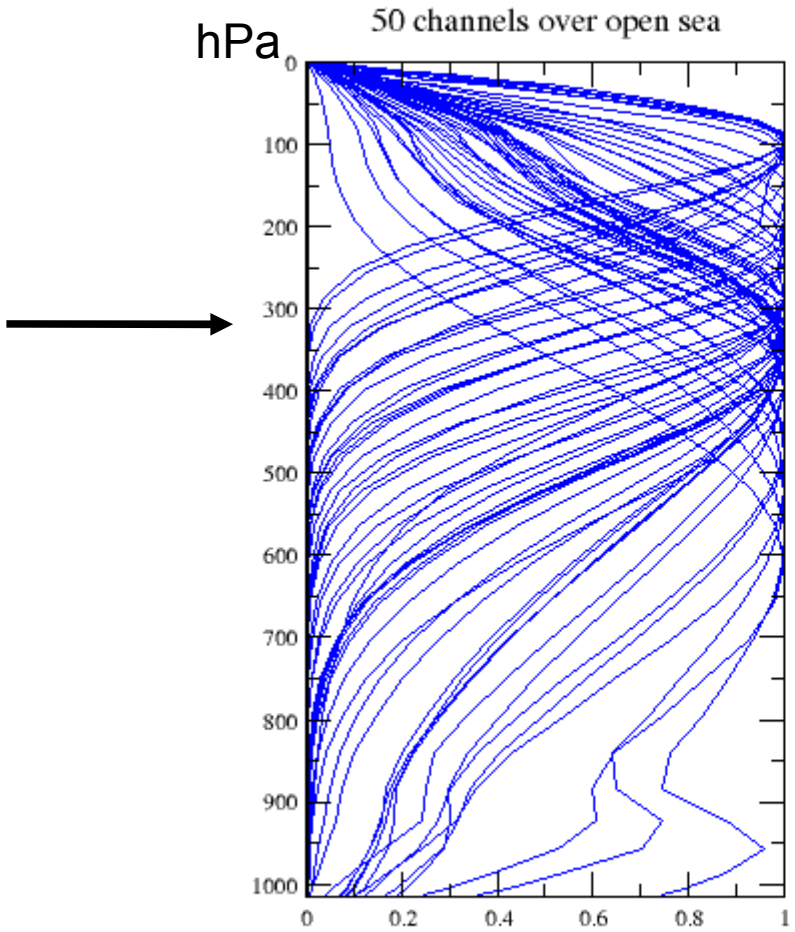
from 1st July 2008

first assimilation of IASI in operations at Météo-France

more AIRS data assimilated

1. In Operations: which information from AIRS & IASI ?

- In the operational configuration:
  - **50 IASI** channels **over open sea**, peaking between 100 and 650 hPa only for temperature information
  - **54 AIRS** channels **over open sea**, peaking between 100 and 620 hPa only for temperature information



Weighting function

1. In Operations: processing of AIRS & IASI

- Radiances are bias corrected:
  Variational Bias Correction (VarBC)
  from ECMWF
  predictors are: powers of scan angle, thicknesses, …
  Dee (2004), Auligné et al (2007)

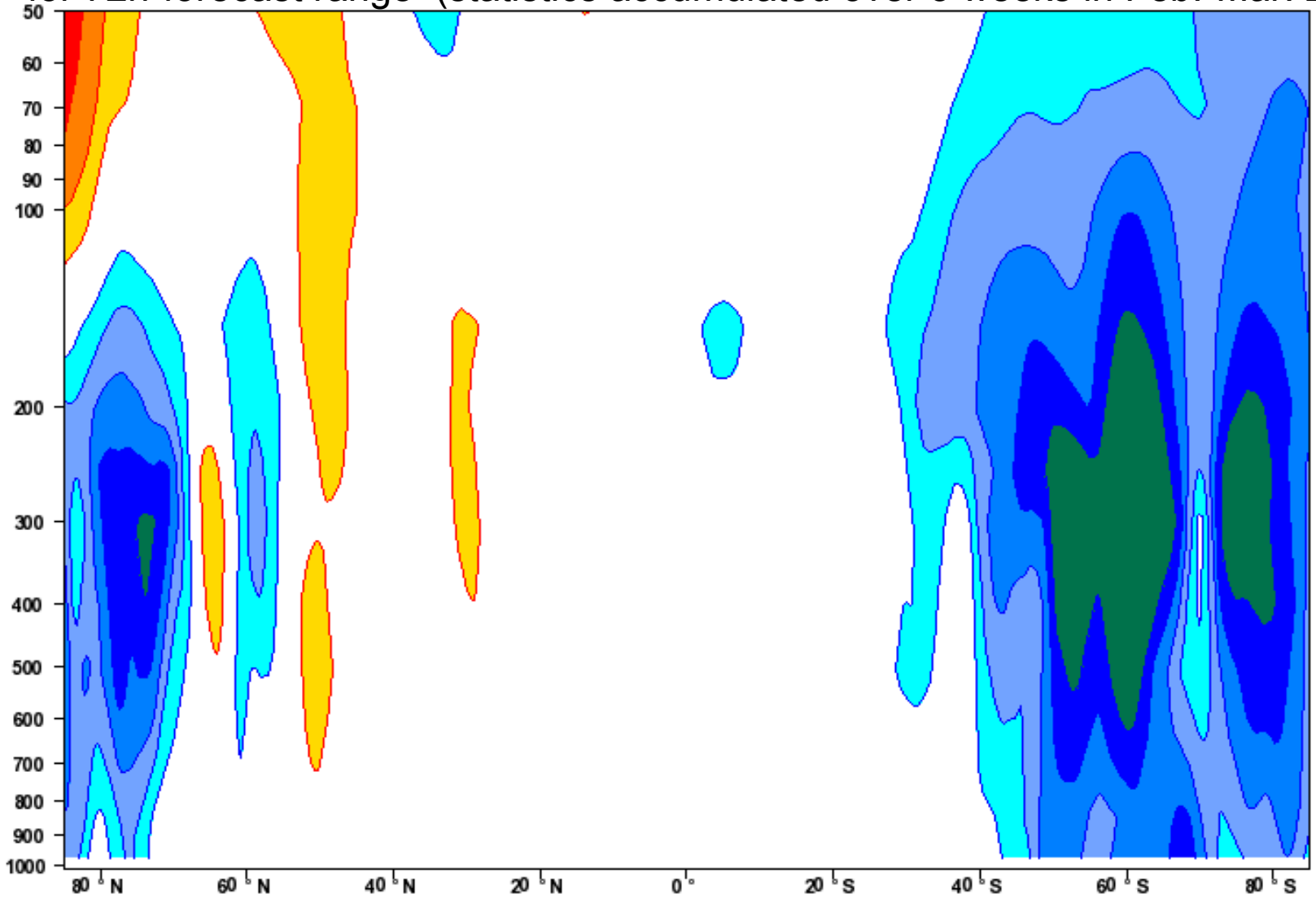
- Cloud detection is based on a channel ranking method from ECMWF for AIRS and IASI
  McNally & Watts (2003)

- First-guess check

- Geographical thinning for AIRS and IASI:
  average distance between 2 obs. is 250 km

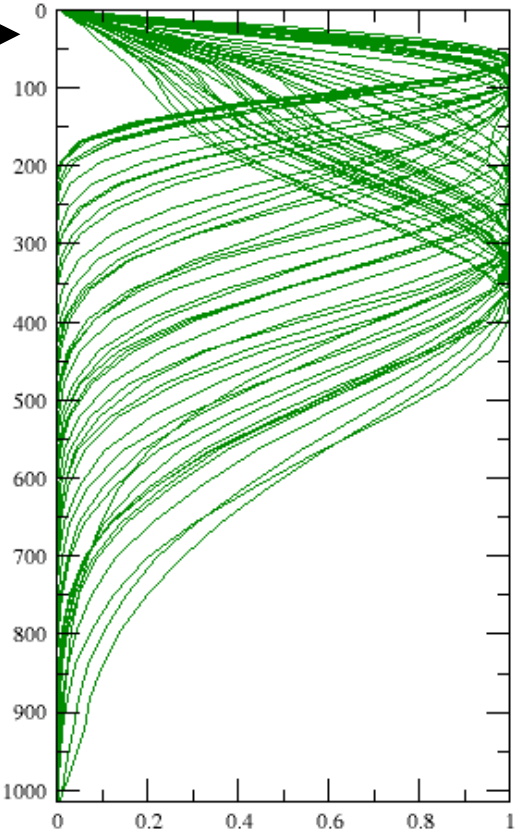
1. In Operations: assessing IASI impact

- Reduction of RMSE for geopotential height with respect to ECMWF analysis for 72h-forecast range (statistics accumulated over 3 weeks in Feb.-Mar. 2008)

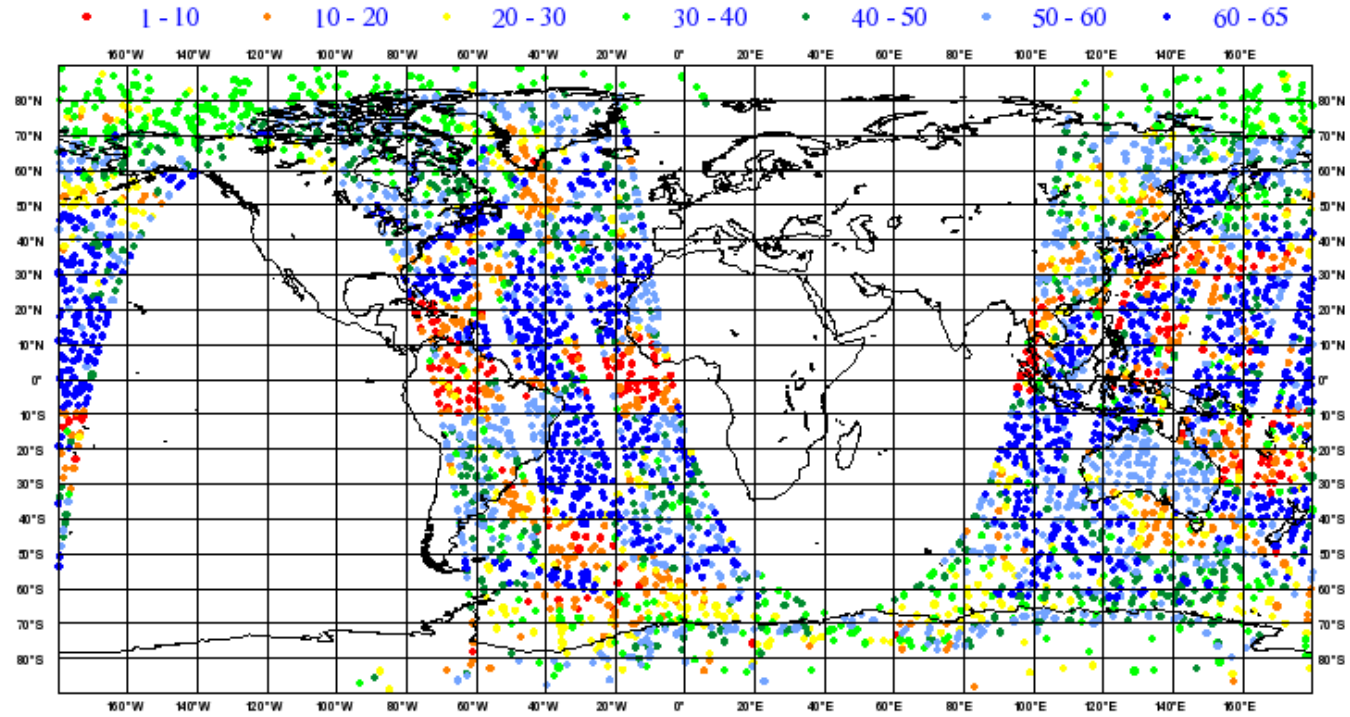


2.a IASI in pre-operational mode

- **64** channels over open sea, peaking between 50 and 650 hPa
  subset of **50** channels over land
  subset of **32** channels over sea-ice

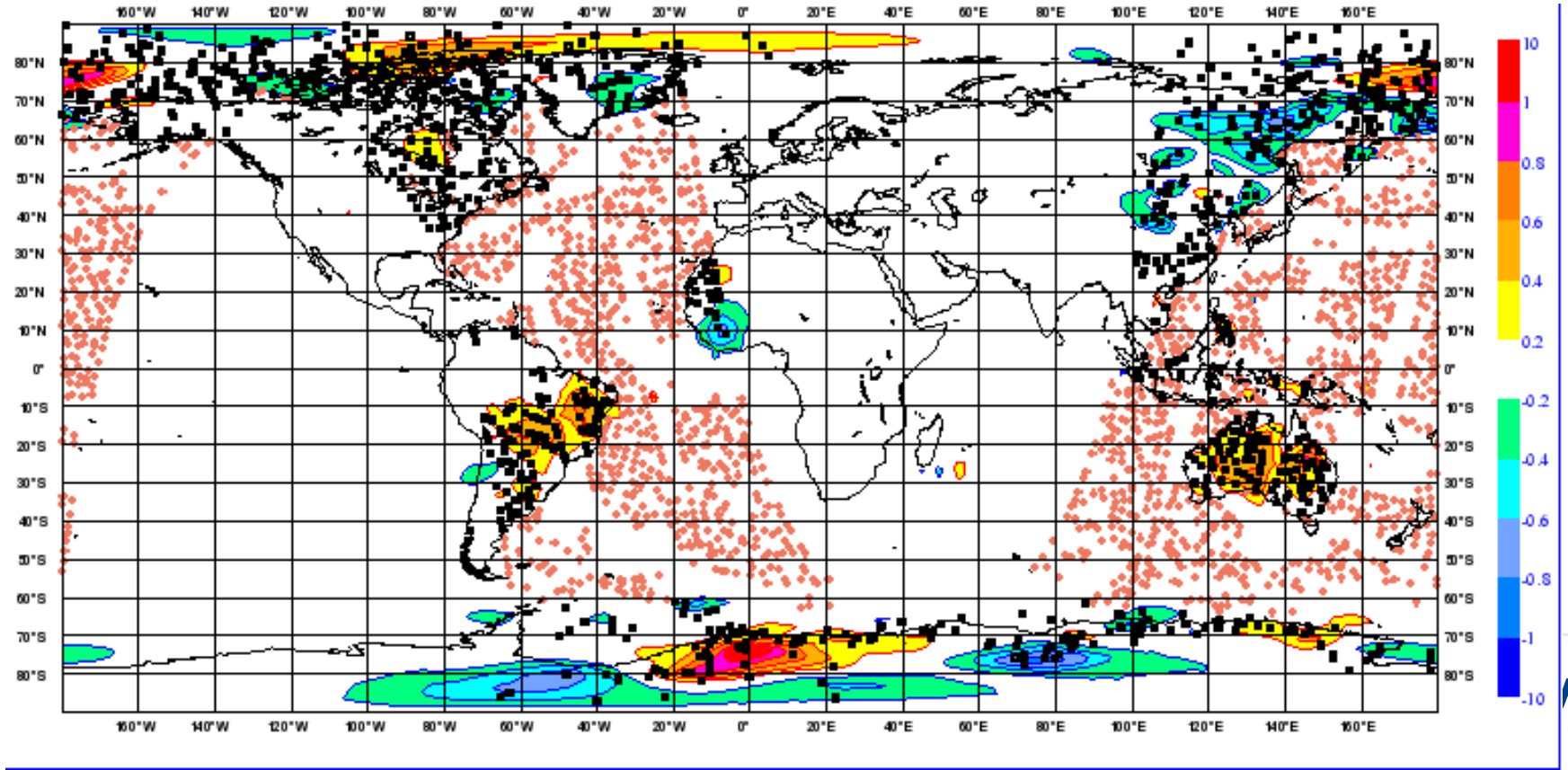


- # of channels assimilted per observation point
  1st October 2008 @ 00UTC



2.a IASI in pre-operational mode

- Difference between Op. And Pre-Op. Analyses for Temperature at 400 hPa
- Assimilated channel 0275
  - In both Op. And Pre-Op. (+)
  - Only in Pre-Op. (■)

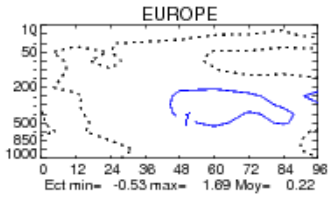


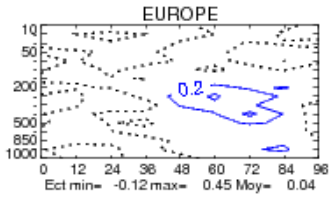
2.a IASI

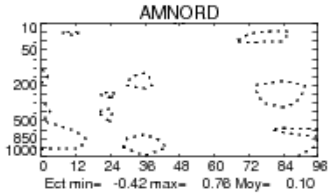
- Impact of <u>additional</u> IASI data
  in Pre-Op. Suite
  on RMSE
  with respect to radiosonde data

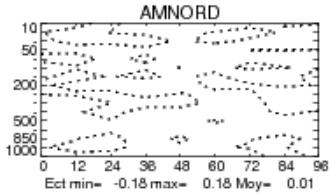
  for geopotential height (left)
  &
  for wind (right)

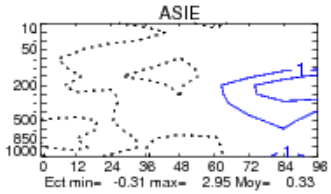
BLUE = reduction of RMSE
RED = increase of RMSE

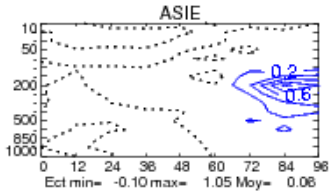


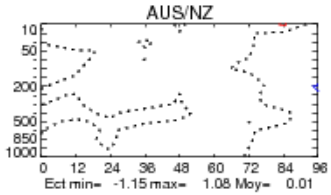


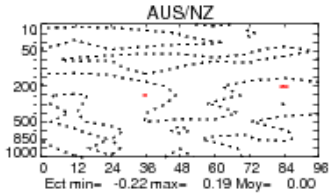


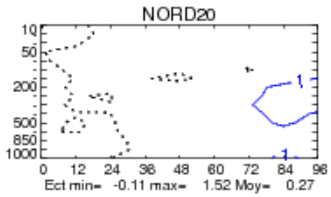


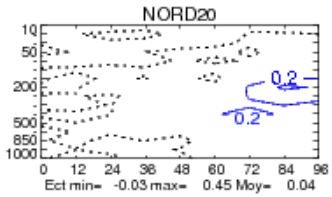


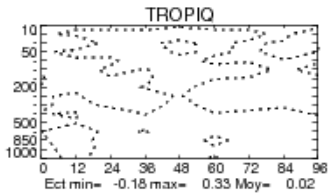


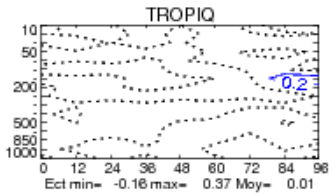


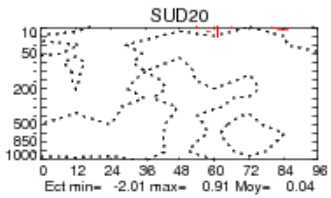


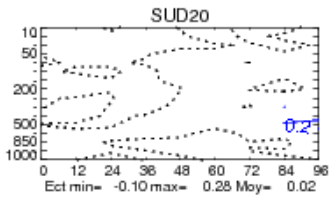










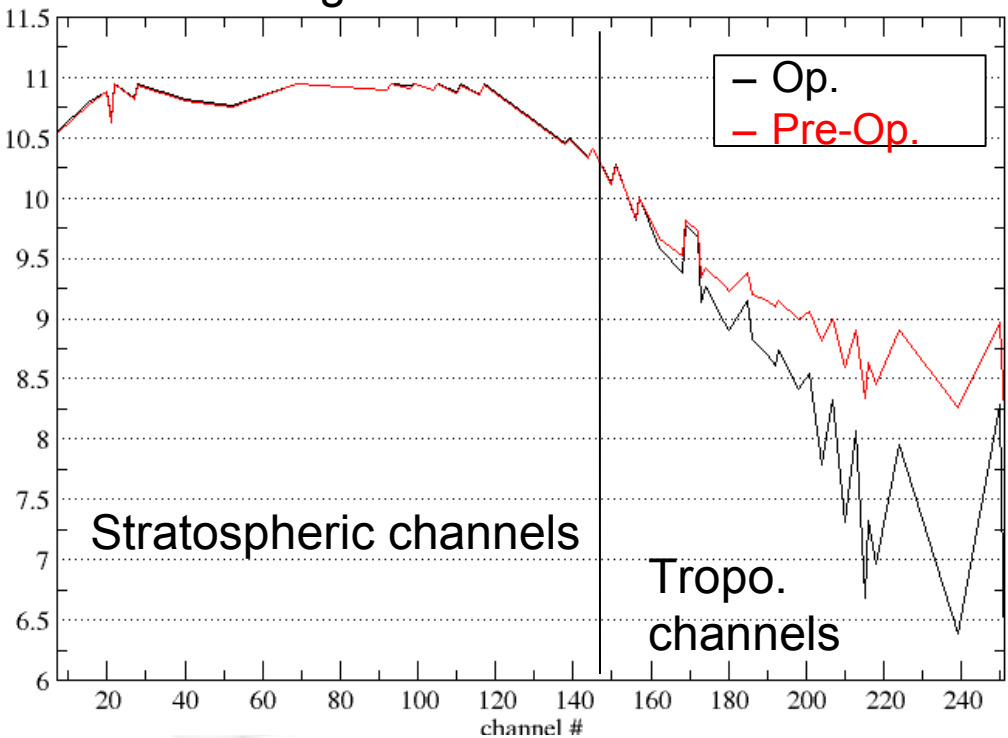


2.b AIRS in pre-operational mode

- Infrared measurement is affected by the presence of cloud
- In Operations, cloud-affected channels are identified thanks to the McNally & Watts algorithm and then rejected from the assimilation
- In Pre-Op., a cloud-top pressure is retrieved from AIRS observations in a sounded profile (CO2-slicing method)

which is provided to the radiative transfer model when computing difference between observations and simulation from atmospheric model

Impact:
- clear & cloud-affected channels are better simulated
- some cloud-affected channels thus can be assimilated



2.b AIRS

- Impact of <u>additional</u> AIRS data
  in Pre-Op. Suite
  on RMSE
  for geopotential height

  with respect to radiosonde data (left)
  &
  with respect to ECMWF analysis (right)

BLUE = reduction of RMSE
RED = increase of RMSE