

# Preparation to the assimilation of the IASI data in the ALADIN LAM model at the Norwegian Meteorological Institute



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## Objectives

Assimilation of IASI data at the Met.no (Norwegian Meteorological Institute) is being carried out in the frame of the Norwegian IPY-THORPEX project.

The main goal of the **IPY-THORPEX project** at Met.no is to significantly improve forecasting skill of extreme weather events in the Arctic by assimilation of new satellite data and by adopting improved process parameterizations using a high resolution ensemble.

## Introduction

New instruments on operational meteorological satellites provide improved information on the Arctic atmosphere.

Good results have been obtained by assimilation of satellite microwave temperature profile data from AMSU-A (Advanced Microwave Sounding Unit) over polar areas. In periods with dominant mid troposphere winds from the sea ice areas towards south, added AMSU-A observations over sea ice have shown positive impact on forecast over Barents Sea, Norwegian Sea and the Scandinavian peninsula.

IASI data have finer horizontal and vertical resolutions compared to the AMSU data. We would like to get benefit from the IASI data to improve the high-resolution ALADIN 3D-VAR assimilation system.

Our study concerns instruments onboard polar orbiting platforms that have excellent Arctic coverage. We will utilize IPY campaign data with extended radiosonde observations for co-location with satellite data to develop **an advanced Arctic high-resolution atmospheric data assimilation system**.

This poster describes the components of the ALADIN/Norway 3D-VAR assimilation system and its monitoring tool for a better processing of the IASI data.

## The ALADIN/Norway

The domains:

large domain (yellow) :

- dx = dy = 20 km
- 60 vertical levels

small domain (red):

- dx = dy = 11 km
- 60 vertical levels

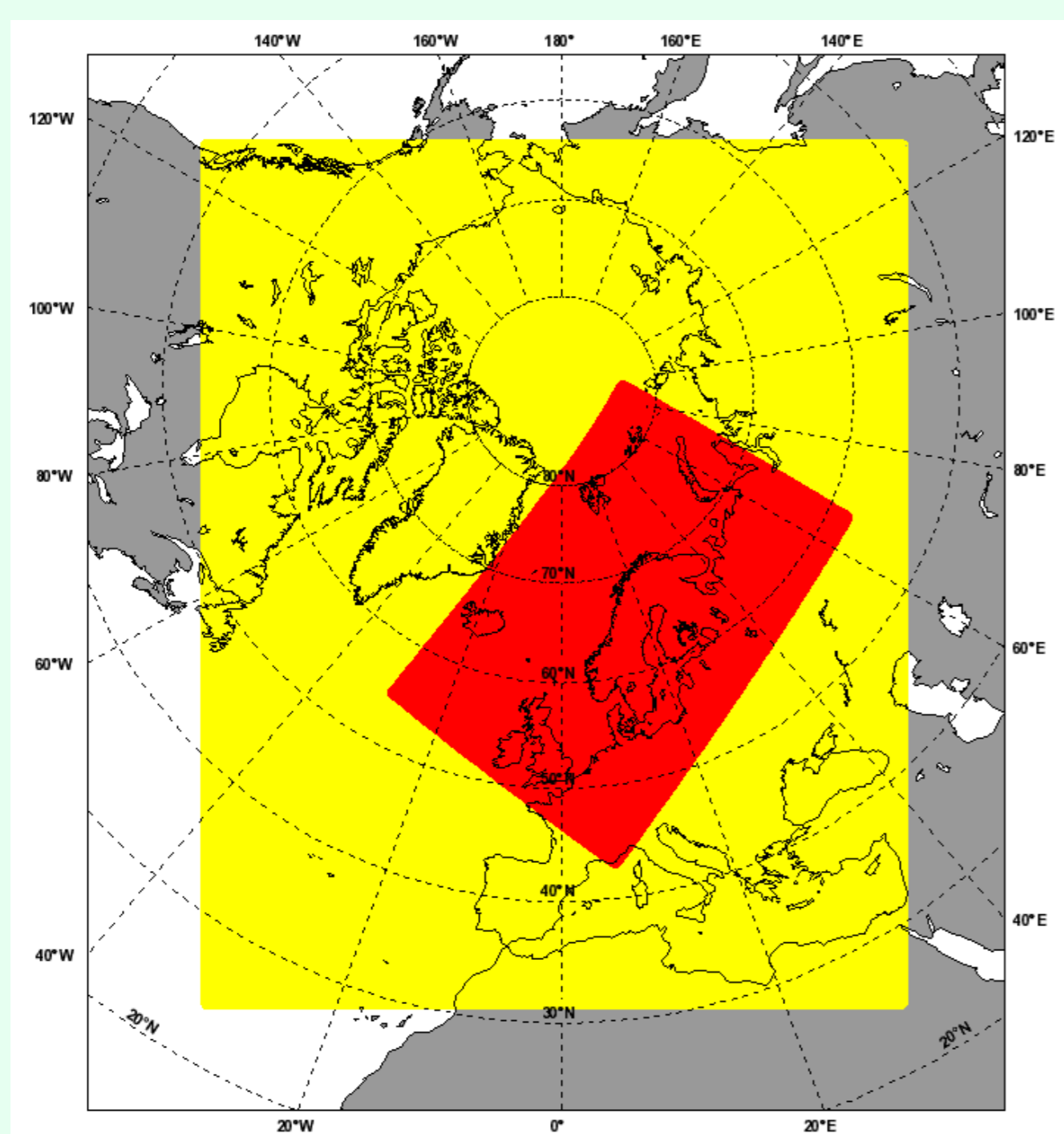


Figure 1: The chosen domains to run the ALADIN/Norway model

## Acknowledgements

Help from colleagues of GMAP (Météo France, Toulouse) during the implementation of the ALADIN model is highly acknowledged. Andrew Collard (ECMWF) provided software, which helped a lot in the pre-processing of the IASI data. This work is supported by the IPY-THORPEX, contract 175992/S30.

## Assimilation system – 3D-VAR

The CY32 of IFS/ARPEGE/ALADIN/HARMONIE is used.

### → Implemented observations

#### - Conventional data

- SYNOP
- BUOY
- DRIBU
- aircraft (Fig.2)
- radiosonde
- PILOT
- Wind-profilers
- AMV

#### - Satellite data

- L1C radiances from NOAA-15/16/17/18 and METOP
- AMSU-A ready (Figs.3-4)
- AMSU-B ready
- MHS ready

### → Under implementation

- L1C IASI:  
*the pre-processing part is ready*

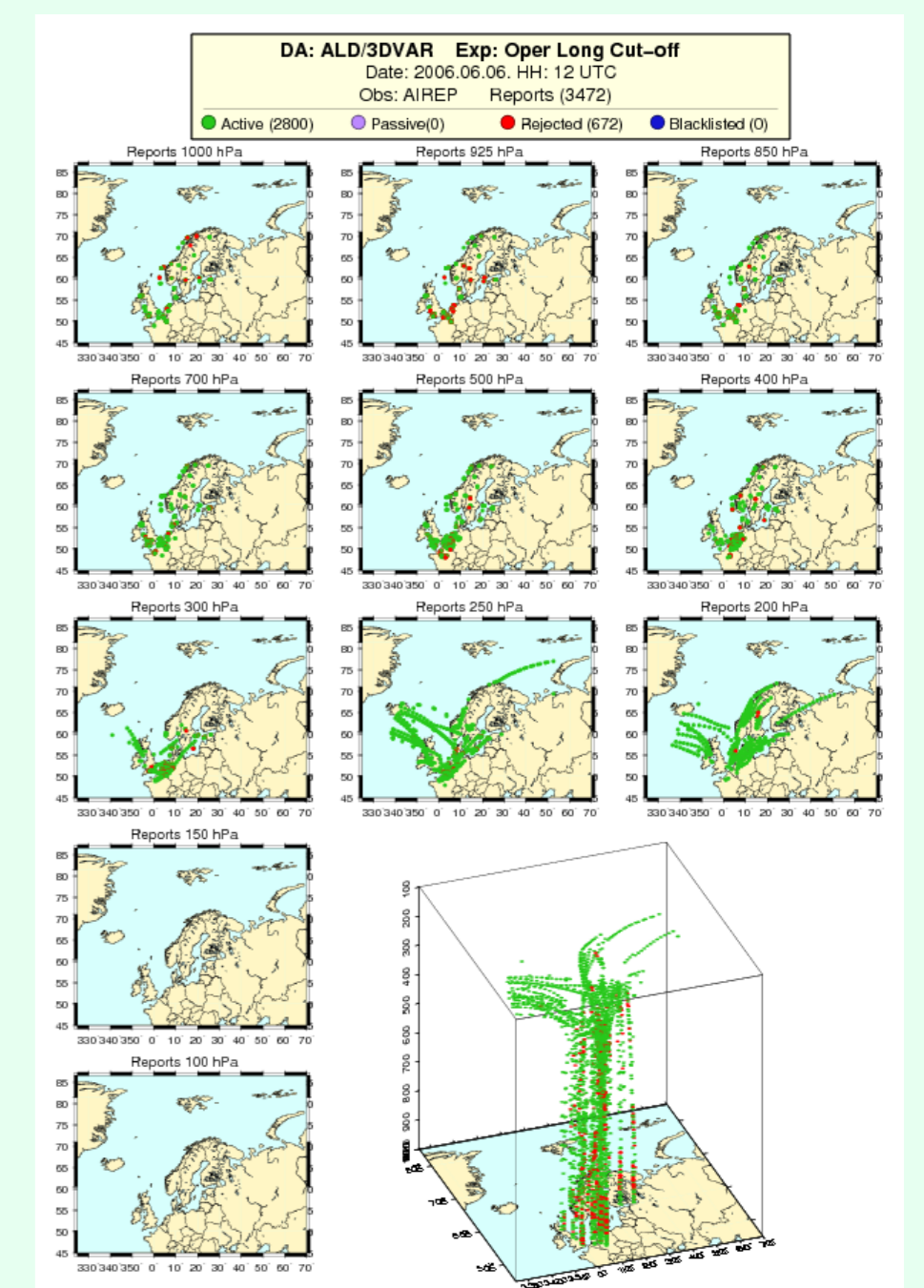


Figure 2: Usage of aircraft data

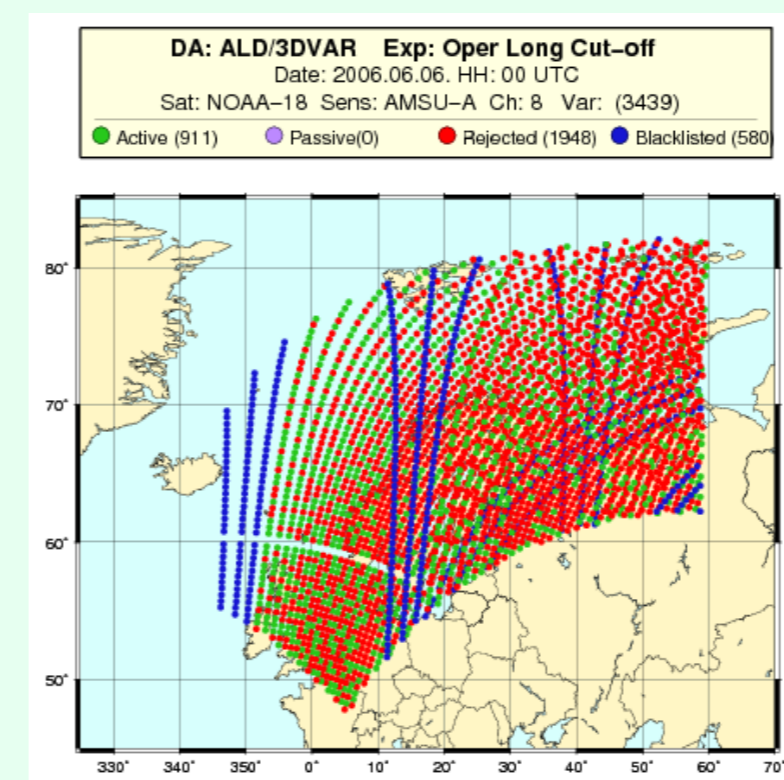


Figure 3: Usage of AMSU-A data

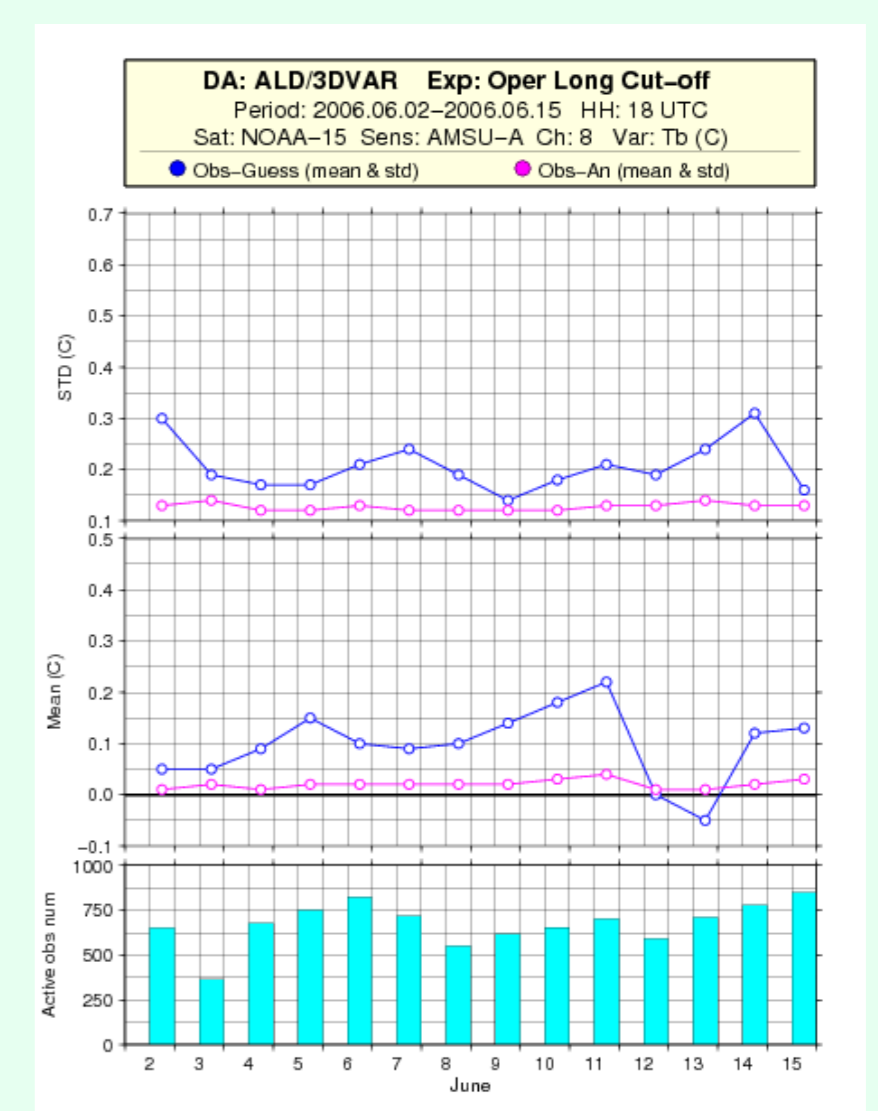


Figure 4: Statistics of O-G and O-A for AMSU-A

### → Background error statistics

- Estimated using NMC method

### → Monitoring system

- A web-based system is implemented locally to monitor all changes and developments

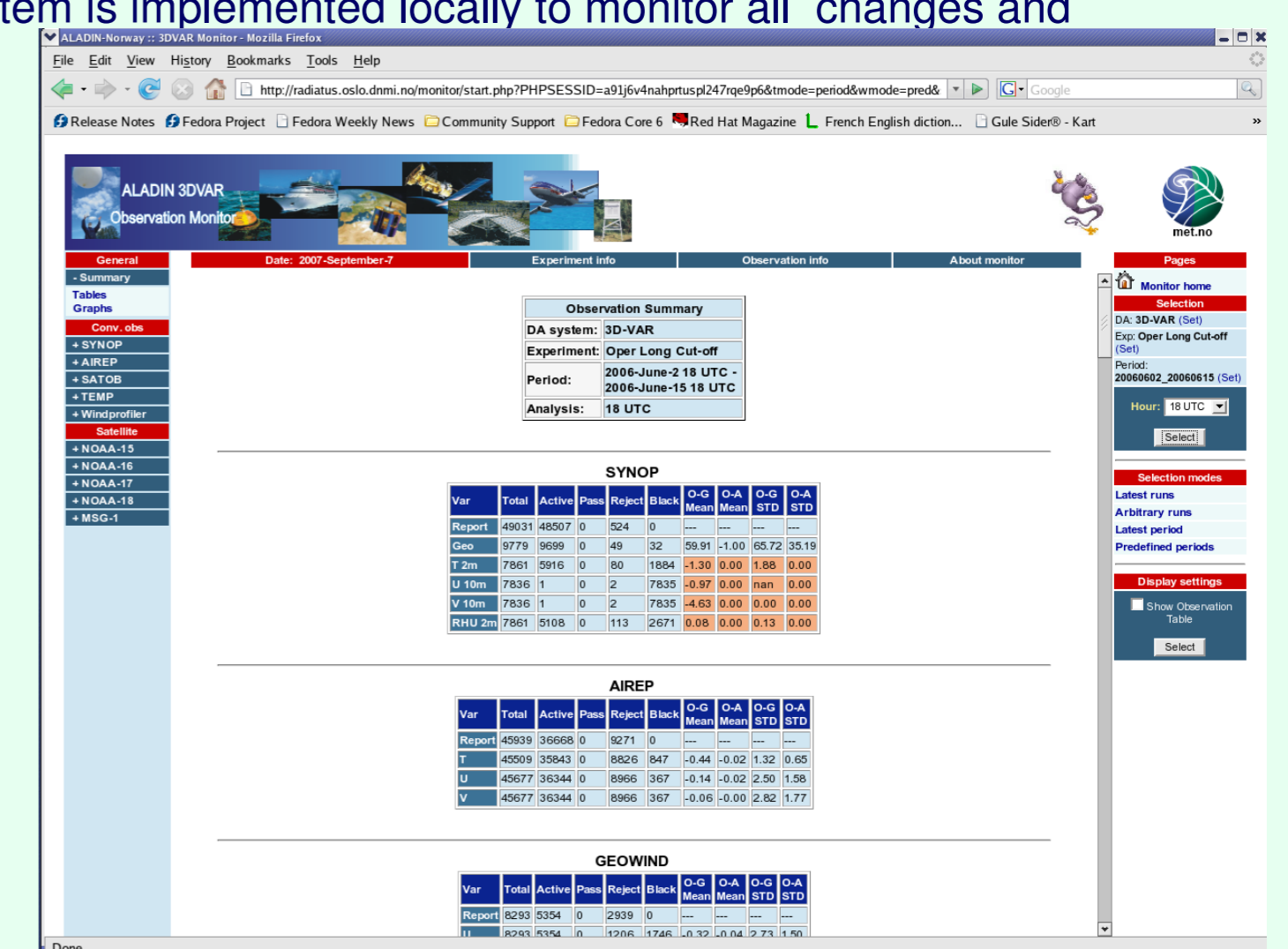


Figure 5: The monitoring system

## Our short-term plans on the use of IASI data

- To use more and more pixels from "IASI quartet"
- To try both variational and Harris and Kelly's methods for bias correction