

Cloud analysis (qCONDOR)

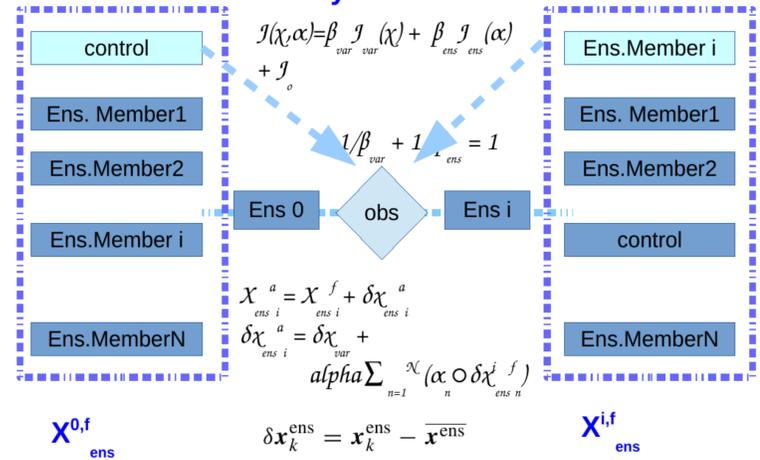
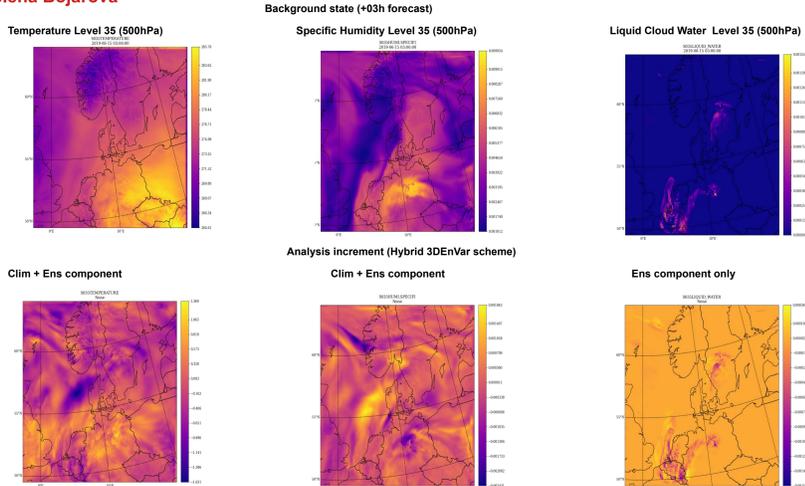
Jelena Bojarova

quasi-Continuous Data Assimilation for Nowcasting and Very Short range Forecasting



Ensemble of Data Assimilation runs without perturbing observations

N+1 Hybrid EnVAR runs



Lambertian Vs Specular reflection Assimilation of clear-sky Microwave:

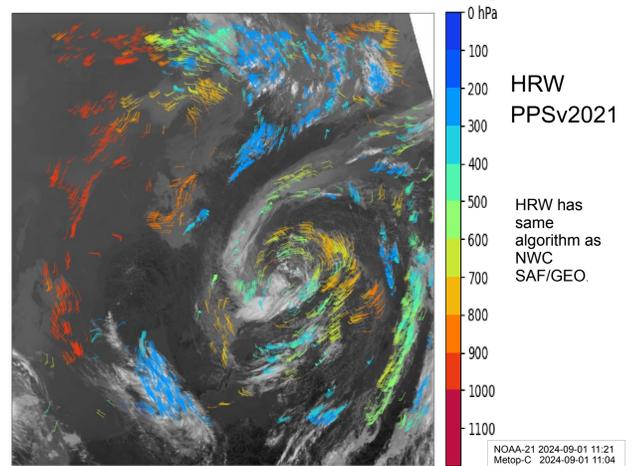
Swapan Mallick and Magnus Lindskog

We are investigating the potential for increased use of surface-sensitive microwave radiances and the incorporation of Lambertian reflection, along with Specular reflection, in radiative transfer modeling over snow and sea-ice surfaces. A 3D-VAR assimilation was applied with a 3-hour assimilation cycle using AMSU (A and B) clear-sky radiances. All simulations were conducted using Harmonie CY46 and simulations valid for the forecast on February 19, 2021.



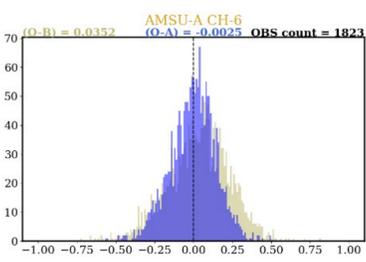
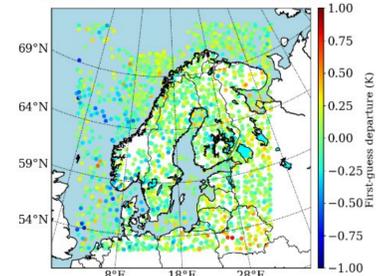
Atmospheric motion vectors

Nina Håkansson et al



- The AMV colours here represent winds at different heights.
- One product requires two scenes, over same area but time separated (max 1h)
 - Allowed to combine different instruments
- AVHRR, VIIRS, MODIS, MERIS-2, SLSTR, (later also METimage)
- Winds available for assimilation in NWP models

AMSUA CH-6 count = 1823 on 20210219



Histogram of first-guess departure (O-B) and analysis increment (O-A) of channel 6 (54.4 GHz) for all assimilation cycle on 19 February 2021.

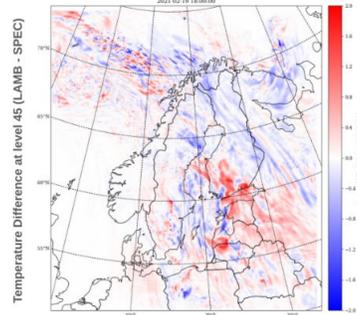


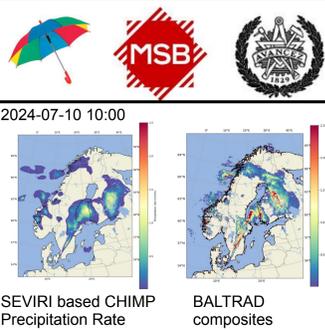
Figure 1. Spatial distribution of First guess departure (observed - simulated, brightness temperature in K).

Precipitation Product at High Latitudes

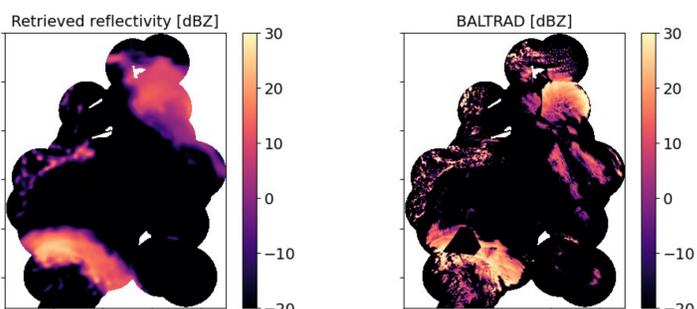
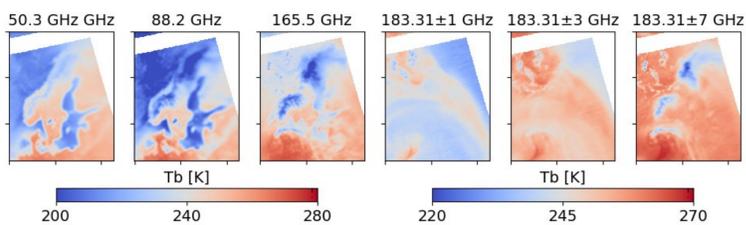
(National "paraply" (umbrella) project in collaboration with Chalmers University of Technology and Swedish Civil Contingencies Agency)

Adam Dybroe et al

- PMW data provides information on atmospheric temperature, humidity, and cloud hydrometeors
- Trained to estimate
 - ground-based precipitation radar data
 - from PMW data
- CHIMP model provides probability of precipitation rates.
- Satellite and radar measurements have different types of problems



Example with ATMS data, the retrieval (probability of precipitation rate), and corresponding BALTRAD composite. (The retrieval is masked to match the composite pattern)

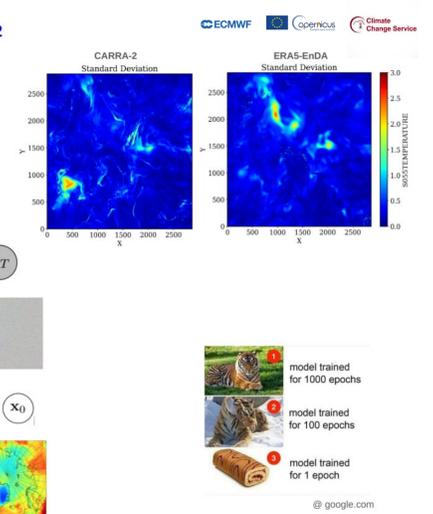
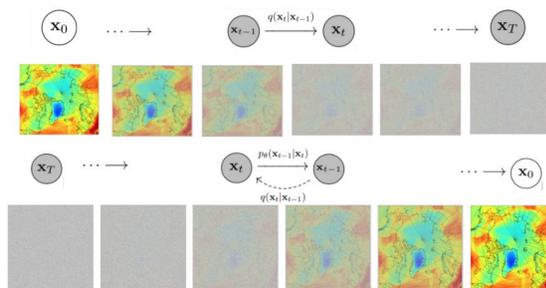


CHIMP
The CHALMERS/CSU Integrated Multi-Satellite Retrieval Platform

Uncertainty Estimation in Ensembles Across the CARRA-2 Domain: An Approach Leveraging Deep Learning:

Swapan Mallick

A Diffusion Model is trained by finding the reverse Markov transitions that maximize the likelihood of the training data. Denoising Diffusion Probabilistic Models (DDPM) generate high-quality data by progressively adding noise to a dataset and then learning to reverse this process.



The ENSRKF and the EKF scheme are compared on their performance in the off-line HARMONIE-Arome SODA environment. Only screen level SYNOP temperature and humidity are assimilated. The ENSRKF results in a more realistic growth of the perturbations of soil variables and land surface fluxes reaching deeper soil layers with improvement in forecast of near surface variables. The results are shown over Södankylä site (open grass patch) on 29 July 2023 00 UTC (zoomed plot to the right) for EKF (red curve), ENSRKF (blue curve), profile observations (green curve).

Development ensemble based data assimilation for soil moisture

Abhishek Lodh

