Use of satellite data in ALADIN/HARMONIE-Norway
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Introduction
Understanding the relative impact of the observations is of primary importance for data assimilation. In order to assess this impact optimal control operational systems. In this paper we present the use of observations in the ALADIN/HARMONIE-Norway data assimilation and forecasting system. The impact of the use of assimilation techniques and the impact of different observation types are assessed. The system takes advantage of surface analysis by the use of RH and T measurements at 2 meters and wind measurements at 10 m from synoptic stations. The domain (showed on the right) covers an area from 5 to 13 Air-mass and scan bias correction 80 Km horizontal resolution.

<table>
<thead>
<tr>
<th>Type</th>
<th>Parameter (Channel)</th>
<th>Bias correction</th>
<th>Thinning</th>
</tr>
</thead>
<tbody>
<tr>
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<td>No</td>
</tr>
<tr>
<td>V</td>
<td>A, B</td>
<td>Yes</td>
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</tr>
<tr>
<td>Z</td>
<td>A, B</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>U</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>


Table 1: Use of Observations in the ALADIN/HARMONIE-Norway Data Assimilation

The authors acknowledge that offshore errors derived through ensemble analysis could contribute to the optimal estimation of observations.


Acknowledgements
The authors would like to thank the Meteor-France/GMAP staff for their help, in particular Bernard Chapnik for his suggestions in the computations of DFS and Loik Berre for his observations.


Experimental observations

The impact of different observation types on forecasts have been studied separately each observation group, assessing the assimilation and verifying the RMSD (Temporal and spatial_NO).


Table 2: Impact of Different Observation Types on Analysis and Forecasts


Conclusions
The use of variational bias correction techniques to correct the bias of all radiances emphasizes the information content of all the observations since they are better assimilated. This is true not only for satellite data but also for conventional data. Variational bias correction technique to correct the bias of all radiances emphasizes the impact of different observation types.


Figure 1. Absolute and relative degrees of freedom of different observation types

Figure 2. Absolute percentage variation of NRMSE of different observation types
Introduction

Understanding the relative impact of the observations is a fundamental premise for the assimilation activity, in order to assess their optimal use in operational systems. In this paper, we present new results on the use of observations in ALADIN/HARMONIE-Norway, a regional mesoscale model and its associated data assimilation system. Our main objective is to study the sensitivity of forecasts to different observation types and the use of variational bias correction technique. In this context, we analyze the impact of observations on forecasts and the use of background error covariances. The results are presented in a separate poster (by R. Randriamampianina).

Sensitivity of forecasts to observations

The impact of observation on forecasts in ALADIN/HARMONIE-Norway has been studied using the analysis sensitivity of the model. The system takes advantage of surface analysis by the use of RH and T measurements at 2 meters and wind measurements at 10 m from synoptic stations. The domain (showed above) has a resolution of 11 Km for a 405x270 computational grid centred over Norway. The system is very promising, although more work for the assessment of their best use is required.

Assimilation of other remote-sensed observations types is very promising, although more work for the assessment of their best use is required. The system is very promising, although more work for the assessment of their best use is required.

Experimental observations

Superobservations derived from CloudSat data:

In this section we present recent results for a number of new observation types assimilated in our operational system. We present results for the assimilation of CloudSat superobservations, which are used to assess the impact of observations on forecasts. The results show that the weight given to the CloudSat observations is large. The system is very promising, although more work for the assessment of their best use is required.

GPS 2TDa data:

A feasibility study for the assimilation of GPS Ground Truth Data has been carried out through the estimation of a reduced number of suitable GPS stations. The study was carried out over a period of 2 months, and the results are presented in a separate poster (by R. Randriamampianina). The system is very promising, although more work for the assessment of their best use is required.

B covariances from downscaled ensemble analysis

In order to evaluate the performance of the ensemble analysis, we present new results on the use of background error covariances. The results show that the weight given to the CloudSat observations is large. The system is very promising, although more work for the assessment of their best use is required.

Acknowledgements

The authors would like to thank the ECMWF/ITSC/StratEAS staff for their kind help in particular. The authors would also like to thank the ECMWF/ITSC/StratEAS staff for their kind help in particular. The authors would also like to thank the ECMWF/ITSC/StratEAS staff for their kind help in particular. The authors would also like to thank the ECMWF/ITSC/StratEAS staff for their kind help.
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Introduction
Understanding the relative impact of the observations is of primary importance for data assimilation. In order to assess that optimal control is operational systems, in this paper we present the use of observations in the ALADIN/HARMONIE-Norway data assimilation and forecasting system. The impact of the use of assimilation techniques and the impact of the observations on the analysis and on the forecast system are shown. The effort has been done to make sure that the observations are properly represented in the analysis and that the assimilation is done in a way that the analysis and forecasts are of high quality.

Table 1. Use of Observations in the ALADIN/HARMONIE-Norway

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency/Channel</th>
<th>Bias RMSE RMSE</th>
<th>Temporal and Spatial</th>
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<td>AMSU-A</td>
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<td>No</td>
<td></td>
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</tbody>
</table>

The use of observations is key to provide a good analysis and forecast system. The results show that the analysis and forecasts are of high quality. The use of observations is key to provide a good analysis and forecast system. The results show that the analysis and forecasts are of high quality.

Sensitivity of forecasts to observations

The sensitivity of the forecasts is determined by the impact of different observations on the analysis and forecast system. The impact of different observations on the analysis and forecast system is determined by the impact of different observations on the analysis and forecast system. The impact of different observations on the analysis and forecast system is determined by the impact of different observations on the analysis and forecast system. The impact of different observations on the analysis and forecast system is determined by the impact of different observations on the analysis and forecast system.

Conclusions

The use of variational bias correction technique is very promising, although more work is needed to improve the best use of the observations. The use of variational bias correction technique is very promising, although more work is needed to improve the best use of the observations. The use of variational bias correction technique is very promising, although more work is needed to improve the best use of the observations. The use of variational bias correction technique is very promising, although more work is needed to improve the best use of the observations.

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