

Assimilating visible satellite reflectances at ECMWF

Visible reflectances contain a wealth of high-resolution information on clouds, but are not currently assimilated.

Goal

Develop a cloud monitoring system as a first step towards assimilating visible reflectances at ECMWF.

The first guess departures and analysis departures will be used to test the performance of the model before and after the assimilation of non-visible data.

For example, we can test the benefit of all-sky vs clear-sky microwave assimilation in terms of the resulting cloud field.

Data

We are using Ocean and Land Colour Instrument (OLCI) 1.2 km resolution data at 665 nm. This instrument is aboard both Sentinel 3A and 3B.



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Forward operator

We are using the Method for Fast Satellite Image Synthesis (MFASIS) as DISORT is too slow for operational use.

MFASIS is based on a reflectance look-up table computed with DISORT. The atmosphere is described by only a few parameters, obtained from ECMWFs Integrated Forecasting System (IFS).

Future work

Month-long simulations will be performed. Departures (the differences between the observations and the model) will be recorded.

These departures contain information regarding the performance of the model with respect to the observations, and can reveal potential biases in the observations themselves.

Benchmarking experiments will also be run, comparing the results of both MFASIS and DISORT against the observations.

