

Estimating the Optimal Number of GNSS Radio Occultation Measurements for Numerical Weather Prediction

Florian Harnisch and Sean Healy

ECMWF

florian.harnisch@ecmwf.int

GNSS radio occultation (GNSS-RO) measurements will play an important part in the future global observing system (GOS). However, for the composition of the future GOS, it is not clear how many GNSS-RO measurements are required before the forecast impact becomes saturated. One of the recommendations of the 1st IROWG workshop was to perform Observing System Simulation Experiments (OSSEs) to determine the optimal number of observations for different applications.

We are going to present first results of an ESA funded Galileo science study OSSE that use an ensemble of data assimilations (EDA) approach to investigate the impact of up to 64000 simulated GNSS-RO bending angle profiles per day. The ECMWF EDA system, which consists of ten independent 4D-Var data assimilation members, is able to provide information about the uncertainty in the 4D-Var analyses and the short-range forecasts. The uncertainty of the experiments with different number of simulated GNSS-RO measurements are compared against each other to investigate (1) how the impact of the GNSS-RO measurements scales with the observations number and (2) if there is an apparent saturation limit in the observation impact.