# Comparison of initialization methods for a climate assimilation run

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**Brief Abstract:**

Insertion of analysis data into general circulation models generally leads to the generation of unphysical high-frequency waves due to the imbalance between the various data fields. Over the short time period of the GCM runs before the next assimilation time, these spurious waves can lead to errors in the forecast data.

To avoid these problems, many models employ a digital filter (Lynch and Huang, 1992) on the analysis data to eliminate these spurious high-frequency oscillations, but this also removes some of the "real" high-frequency oscillations from the model. Better is an incremental digital filter which acts only on the analysis increments. Recently, Polavarapu et al. (2004) showed that by choosing suitable coefficients, the method of incremental analysis updates could be made equivalent to the incremental digital filter for a linear model.

This talk investigates the effects that the digital filter, the incremental digital filter, and the incremental analysis updates initialization methods have on data inserted in the Canadian Middle Atmosphere Model (CMAM), a full three-dimensional general circulation model, with a lid around 96 km. Although high-frequency oscillations affect the stratosphere in only a minor way, their role is expected to be larger in the mesosphere. Using the CMAM allows us to compare the effects that the different methods have at such high altitudes, as well as other regions of the atmosphere. The results will highlight the advantages and disadvantages of each of the methods.