# Potential for Ensemble Assimilation of Stratospheric Ozone

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In the past decade, meteorological centers around the world have raised the lid of their numerical weather prediction models to include the stratosphere. However, comprehensive prognostic ozone fields are generally not included in these models even though ozone plays a strong role in the radiative budget of the stratosphere and influences the model forecasts. In addition, assimilating ozone observations can also have a strong impact on the temperature and wind fields analyses.

We will demonstrate the direct impact that the Ensemble Kalman Filter assimilation of ozone has on the wind analysis in the context of a perfect-model observation system simulation experiment (OSSE) [1]. The role of the multivariate background-error covariances and proper localization will be emphasized.

The assimilation process is also tested with times-lags between the analysis and the observations. Ozone data up to 48 hours posterior to the analysis time are being assimilated with an Ensemble Kalman Smoother. Again, promising results in terms of impact on the analysis errors of different model variables are obtained, at a computational cost similar to that of assimilating current observations [2]. This has implications for the improvement of current reanalysis systems and the production of ozone reanalyses.

**References**
**[1] T. Milewski and M. S. Bourqui. "Assimilation of Stratospheric Temperature and Ozone with an Ensemble Kalman Filter in a Chemistry-Climate Model,"** *Monthly Weather Review*, **vol. 139, pp. 3389-3404, November 2011. (Journal Article)**
**[2] T. Milewski and M. S. Bourqui. "Potential of an Ensemble Kalman Smoother for Stratospheric Chemical-Dynamical Data Assimilation,"** *Tellus A*, **vol. 65, no. 18541, February 2013. (Journal Article)**