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Impact of an updated observation error covariance matrix on the ozone analysis

In atmospheric chemistry retrievals and data assimilation systems, observation errors associated with satellite radiances are chosen empirically and generally treated as uncorrelated. In this work, we estimate interchannel error covariances for the Infrared Atmospheric Sounding Interferometer (IASI) and evaluate their impact on ozone assimilation with the chemical transport model MOCAGE.
The results show significant differences between using the estimated error covariance matrix with respect to the empirical diagonal matrix employed in previous studies. The validation of the analyses against independent data reports a significant improvement, especially in the tropical stratosphere. The computational cost has also been reduced when the estimated covariance is employed in the assimilation system.

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