Tackling Stratospheric Humidity Assimilation

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Brief Abstract:

This talk will summarise the work currently being undertaken at the Met Office to improve the assimilation of humidity data in the stratosphere. There are numerous reasons for the scheme's current poor performance, including a lack of humidity observations in the stratosphere, unreliable error covariance statistics and an unsuitable control variable. This work has been motivated by the availability of MIPAS humidity data from ENVISAT.

To address the unrealistic model error covariance statistics, we have developed scaling tools to reduce the vertical error correlations and variances. We have also investigated the impact of the form of the humidity control variable. Dee and Da Silva (2003) found that when using relative humidity as the control variable, large spurious specific humidity increments would result from temperature increments. Holm et al. (2004) found that by normalising by an appropriate model error standard deviation, the error statistics became more Gaussian and the assimilation of humidity observations improved. We are currently formulating a control variable which combines these ideas. The impacts of these modifications on the assimilation of ENVISAT data will be presented and discussed.