

Interactive comment on “Data assimilation of stratospheric constituents: a review” by W. A. Lahoz et al.

W. A. Lahoz et al.

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We thank Ref. 1 for his/her constructive comments. This is our response (numbers correspond to those used by the referee);

Specific comments:

1. We will clarify the issues concerning Bayesian estimation and data assimilation, and we will do so by following the approach suggested by the referee.
2. We will clarify the statement about the tangent linear hypothesis, taking account of the referee's comment.
3. We will clarify this statement, making reference to Gaussianity and the use of bias correction in many assimilation schemes.

4. We will clarify that we are discussing constituent assimilation with 3D-PSAS.
5. As the referee implies, the statement applies to the KF, but not to PSAS, as the latter is not formulated to provide analysis uncertainties. What we intended to say in the text is that the PSAS system at the GMAO includes a method to compute an approximation of the forecast covariance matrix. We will amend the text to reflect this.
6. We will clarify the statements about ozone monitoring at ECMWF and ozone forecasting at ECMWF to make sure they cannot be interpreted as contradictory.
7. We will clarify the statement about the model operator as suggested by the referee.
8. We will remove the contradictory nature of the second and third sentences in this paragraph.
9. We will take into account the referee comment concerning the relationship between the EnKF and the EKF.
10. We will clarify our statement about the approach taken by BIRA-IASB concerning background errors.
11. As the referee points out, in the case of linear systems, the analyses from 4D-Var and the KF are similar at the end of the assimilation period. However, when the system is nonlinear, as is generally the case for the atmosphere, the sentence in the text is correct. This will be clarified in the text.

Technical comments:

12. We will provide references to POAM-III, SEVIRI and IASI in Table 1.
13. We will mention nudging in the text.
14. We will add the Zupanski paper to the list of references.
15. We will correct the Lyster et al. reference. We will also add the references indicated by the referee (Courtier 1997; Louvel 2001), and update the general list of references.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 9561, 2007.

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