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## ***Interactive comment on “Technical Note: Adjoint formulation of the TOMCAT atmospheric transport scheme in the Eulerian backtracking framework (RETRO-TOM)” by P. E. Haines et al.***

### **Anonymous Referee #1**

Received and published: 12 March 2014

The technical note describes RETRO-TOM, the adjoint to the transport component of TOMCAT. The model aims to get the benefits of both the finite difference of adjoint and the adjoint of finite difference formulations. Prather’s second-order moments scheme is used for advection. Validation of the model is achieved using three test cases. Further issues, such as density inconsistency and the use of flux limiters are also evaluated. The manuscript describes the background to adjoint models and the Eulerian backtracking well. The description of the model, including a brief recap of transport in TOMCAT, is good. The number of test cases is good, as they validate the model without being overbearing.

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The manuscript is well written, and the work is presented in a clear and concise manner. The appendices are long, but I think that they are required to complete the paper. The figures are clear. There are no obvious spelling or grammatical errors.

Comments:

- 1) Can you clarify which flux limiter is used in the testing (Section 4.5)?
- 2) For the resolution study you only increase the horizontal resolution. Would also increasing the vertical resolution produce the same results?

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 1481, 2014.

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