A COMPARISON OF MEASUREMENTS OF $O_2(^1\Delta)$ AND NO AIRGLOW WITH CALCULATIONS FROM GM3. J. C. McConnell[1], J. W. Kaminski[1], A. Akingunola[1], M. Labbas[2], F. Daerden[3], and S. Hirst[1], [1] Centre for Earth and Space Science, York University, Toronto, Canada (jcmcc@yorku.ca), [2]Ecole Normale Superieure de Cachan, France, [3]Belgian Institute for Space Aeronomy BIRA-IASB, Brussels, Belgium, [4].

Abstract: GM3 is a multiscale global Mars general circulation model with a vertical domain from the surface to about 160 km [1,2]. It has a water cycle that includes covered ice cap and regolith as well as bulk ice clouds. A simple water, CO_2, Ox, HOx, NOx chemistry scheme has first added by Moudden and McConnell [3] and H_2O_2 chemistry has been investigated by Moudden [4]. We present here a more recent version of the chemistry and focus on airglow as a means of evaluating the chemistry and dynamics of the model. In this case we focus on the $O_2(^1\Delta)$ airglow and its sources, photolysis of O_3 and O self recombination together with its sinks of emission and quenching. We find large values of $O_2(^1\Delta)$ from O recombination in the polar night with the descent of O rich air from the thermosphere. For NO we note that there is thermospheric production from the ioniszation of N_2 and subsequent reactions. As in Moudden and McConnell [3] we have used a N and $N(^2D)$ source function based on the work of Jane Fox to calculate NO densities and also NO emission based on recombination. We have compared the GM3 results with the SPICAM observations based on the NO airglow measurements of Bertaux et al [5,6] and related publications and for ozone and $O_2(^1\Delta)$ the comparisons are based on the work of Federova et al. [7], Pierrier et al. [8] and Bertaix et al. [9].

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