Validation and intercomparison of SCIAMACHY IUP V 2.5 and ESA V 5.02 limb ozone profiles

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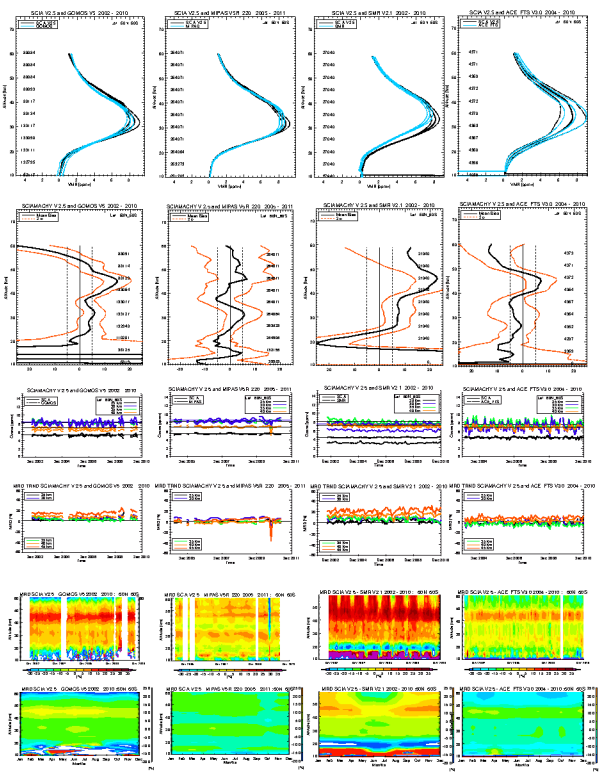
Abstract

The results of SCIAMACHY IUP V 2.5 limb ozone validation task as part of ESA's climate change initiative (CCI) project and SCIAMACHY limb ozone validation (SCILOV) of ESA V5.02 with concurrent sensors are presented. The common sensors used for comparison in this poster are GOMOS, MIPAS, ACE-FTS, and SMR. Mean relative difference are calculated and depicted as bias (See Fig. 1) and shown for pairwise comparison for IUP V 2.5 (left picture panels) and ESA V 5.02 (right picture panels).

IUP V 2.5

ESA V 5.02



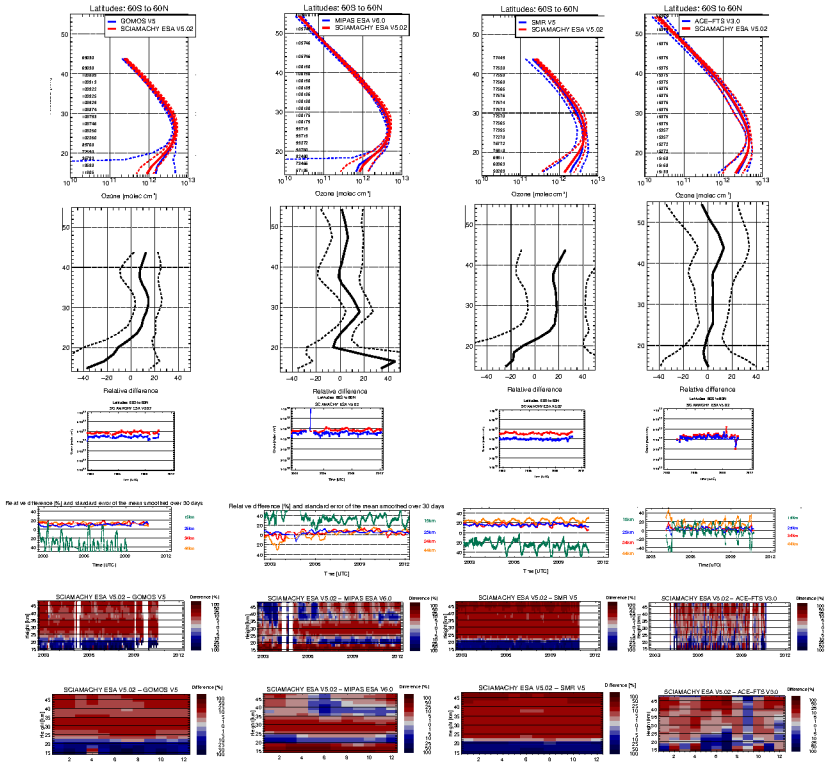
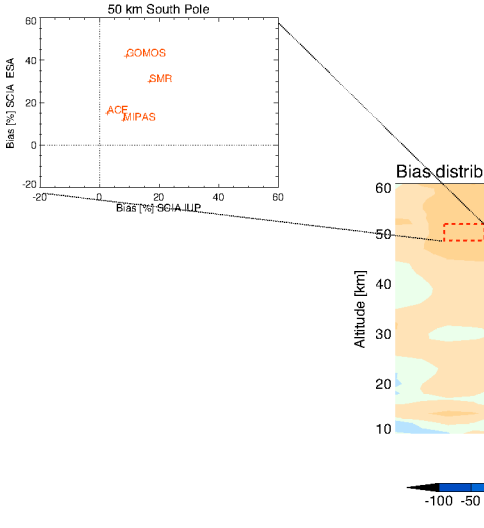
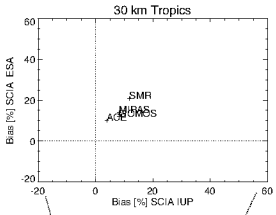
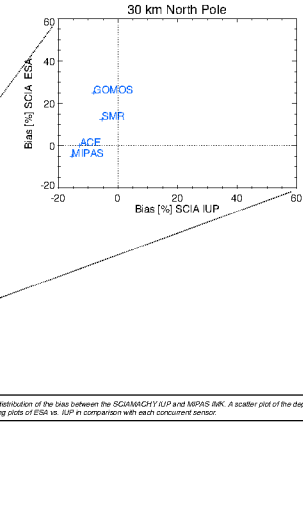


Fig. 1: SCIAMACHY IUP V 2.5 (left) and ESA V 5.02 (right) limb ozone comparison with concurrent sensors. Top panel: Collocated mean ozone profiles. Second panel: Total mean bias calculated from all mean relative difference profiles (MRD). Third panel: Ozone time series for given altitudes. Fourth panel: MRD time series for given altitudes. Fifth panel: Contour plot of MRD. Last panel: Seasonal cycle of the MRDs.







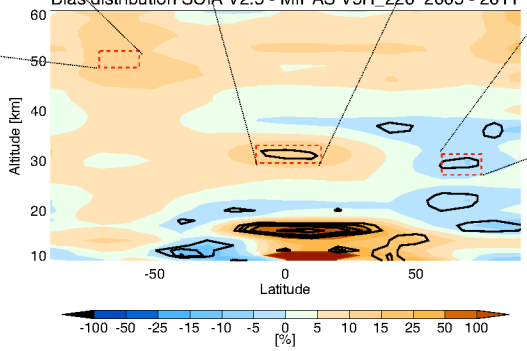


Fig. 2: Latitudinal distribution of the bias between the SCIAMACHY IUP and MIPAS IMK. A scatter plot of the depicted areas are shown in the corresponding plots of ESA vs. IUP in comparison with each concurrent sensor.

Conclusion

Pairwise inter comparison of IUP V 2.5 and ESA V 5.02 limb ozone profiles have been performed with 4 instruments. Overall similar features can be observed between the two independent retrievals with ESA biased systematically higher in comparison to IUP. The issues observed in three regions (Fig. 2), show clearly that the agreement between IUP and ESA is the best in the tropics at 30 km. In the northern polar latitudes at 30 km the IUP shows oscillation features and is generally negatively biased toward all of the concurrent instruments in comparison to ESA which is only negatively biased toward MIPAS. In the southern polar latitudes at 50 km the agreement is good for MIPAS but ESA is relatively higher biased toward GOMOS, ACE, and SMR.

Acknowledgement

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