

# Overview of Stratospheric Analyses Produced by BASCOE in the Framework of GSE-PROMOTE

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[www.bascoe.oma.be/promote](http://www.bascoe.oma.be/promote)

## Introduction

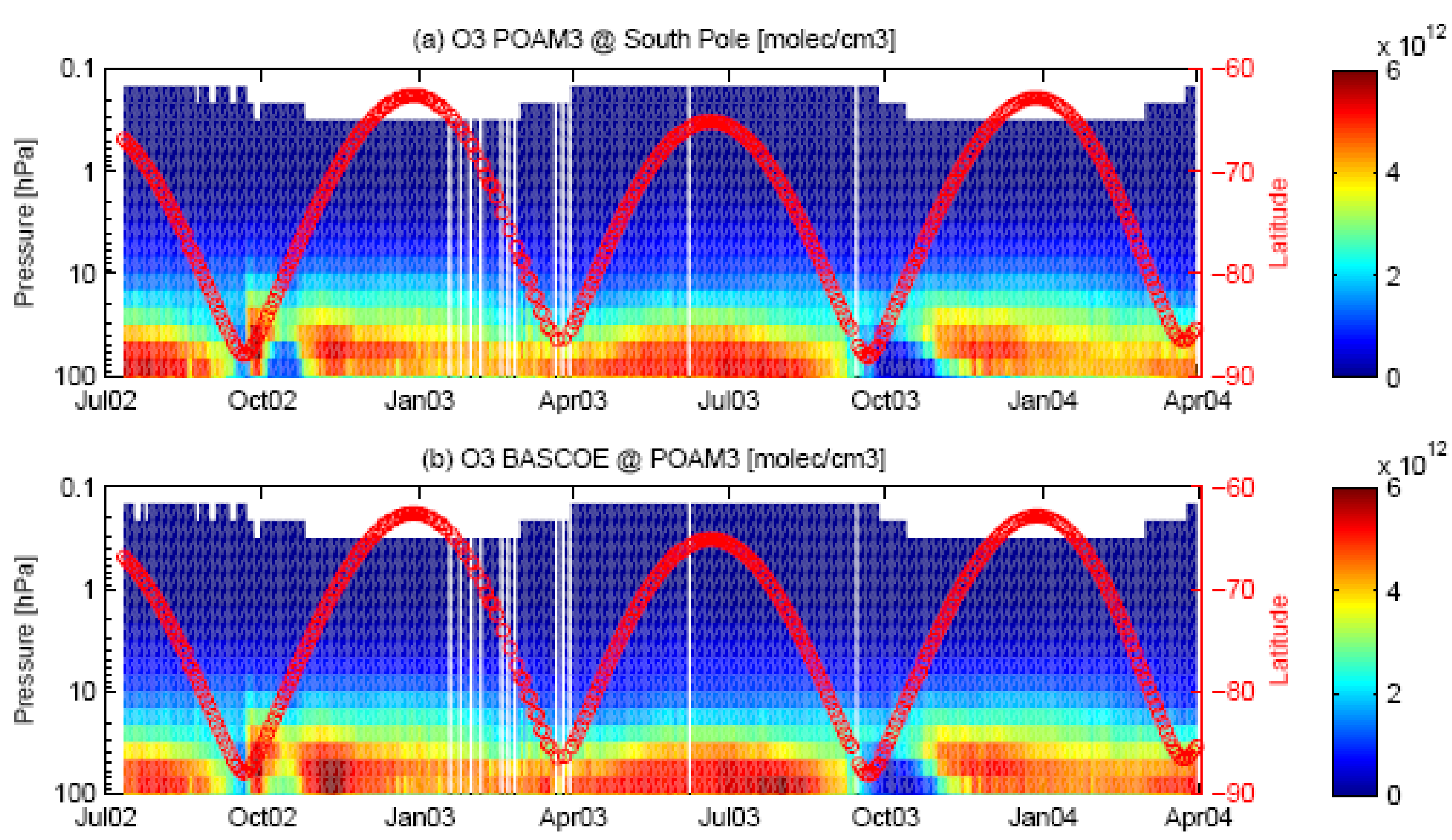
The Belgian Assimilation System of Chemical Observations\* (BASCOE) takes part in two services of the GMES Service Element PROMOTE: The Stratospheric Ozone Profile Record service and the Stratospheric Aerosols and Gas service. In the first service, BASCOE is intent to provide analyses of O<sub>3</sub> and Cly based on the assimilation of UARS/MLS and Envisat MIPAS data. In the second service, BASCOE will provide CH<sub>4</sub> and H<sub>2</sub>O based on the same datasets.

## System Overview

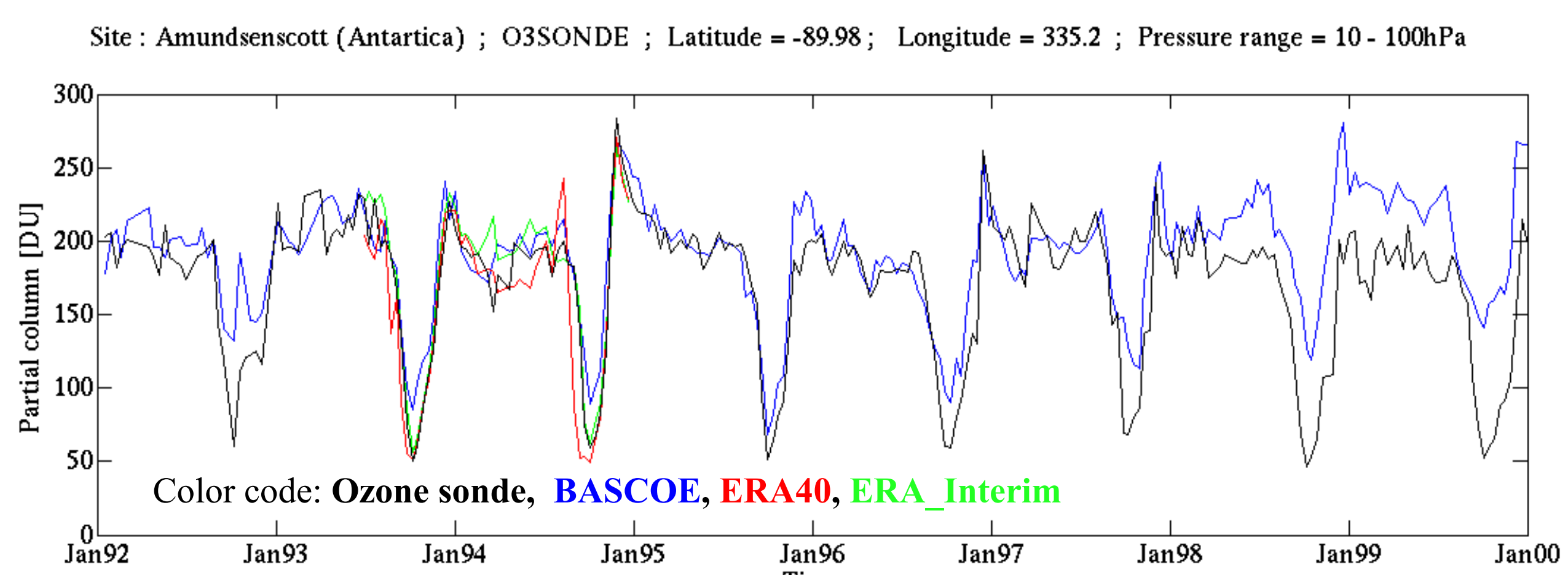
version	BASCOE v4.0	Future BASCOE version
Meteo	6h ECMWF OD or ERA40	6h ECMWF OD or ERA_Interim
Horiz. Res.	5°lon x 3.75°lat	3.75°lon x 2.5° lat and 2.5° lon x 2° lat
Vertic. Res	37 σ-pressure (surf-0.1 hPa)	37 σ-pressure (surf-0.1 hPa)
Chemistry	57 species, 200 reactions	57 species, 200 reactions
Het. Chem	NAT, ICE, sulfate aerosols	Improved NAT, ICE, sulfate aerosols
Advection	FFSL (Lin and Rood, 1996)	FFSL (Lin and Rood, 1996)
Background	Diagonal, 20% error on diag.	Hollingsworth and Lönnberg
error cov.		
DA method	4D-Var	4D-Var

## BASCOE PROMOTE Available Analyses

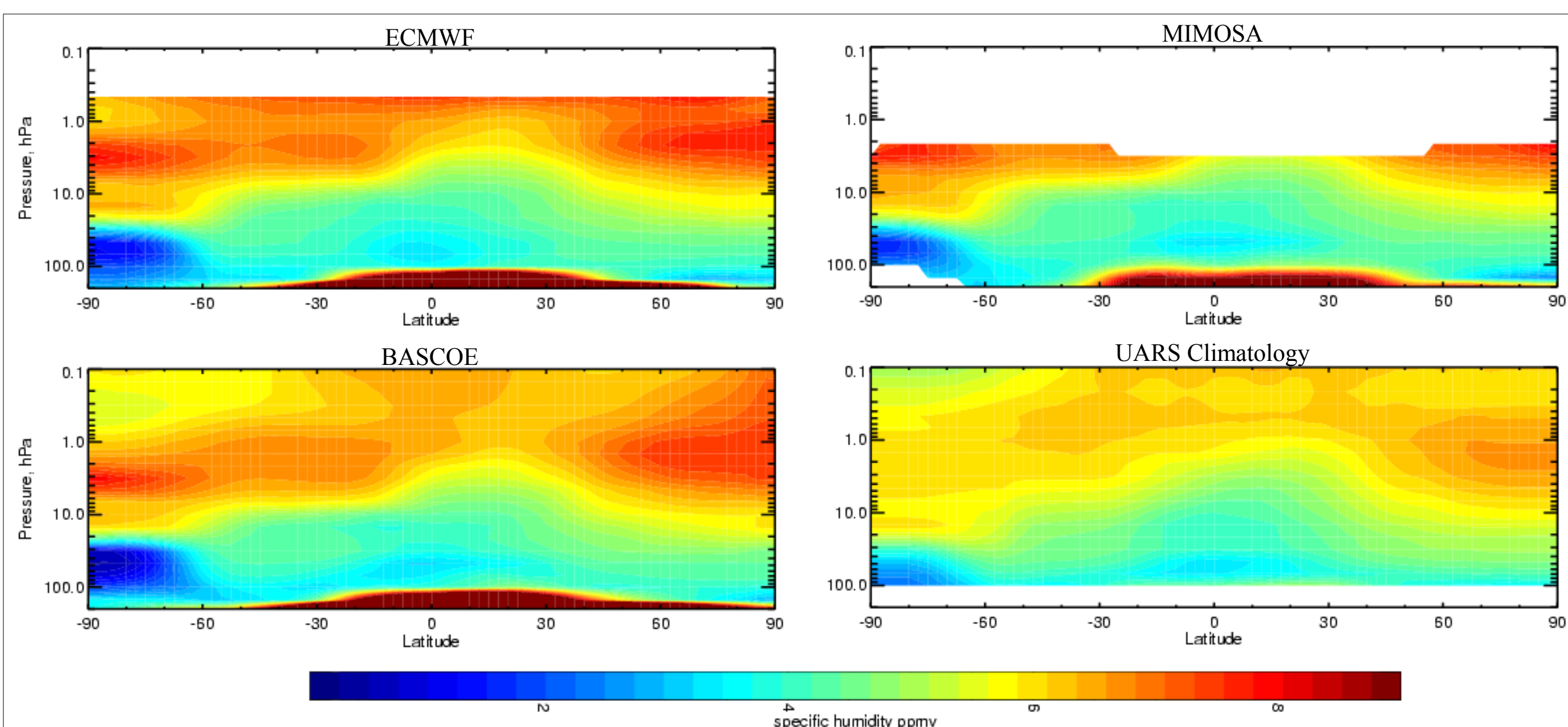
version	v4q09	v4q30
Instrument	UARS/MLS V05 (1992-1999)	MIPAS ESA v4.61-v4.62
Assim. Species	O <sub>3</sub> , HNO <sub>3</sub> , ClO & H <sub>2</sub> O	O <sub>3</sub> , HNO <sub>3</sub> , NO <sub>2</sub> , N <sub>2</sub> O, CH <sub>4</sub> & H <sub>2</sub> O
Meteo	ERA40 (in future ERA_Int.)	ECMWF Operational Data
Output species	O <sub>3</sub> (Cly, H <sub>2</sub> O available in 2009)	O <sub>3</sub> (H <sub>2</sub> O and CH <sub>4</sub> available for Sept 2003, complete data set available in 2009)
Data format	HDF4 (netCDF on request)	HDF4 (netCDF on request)



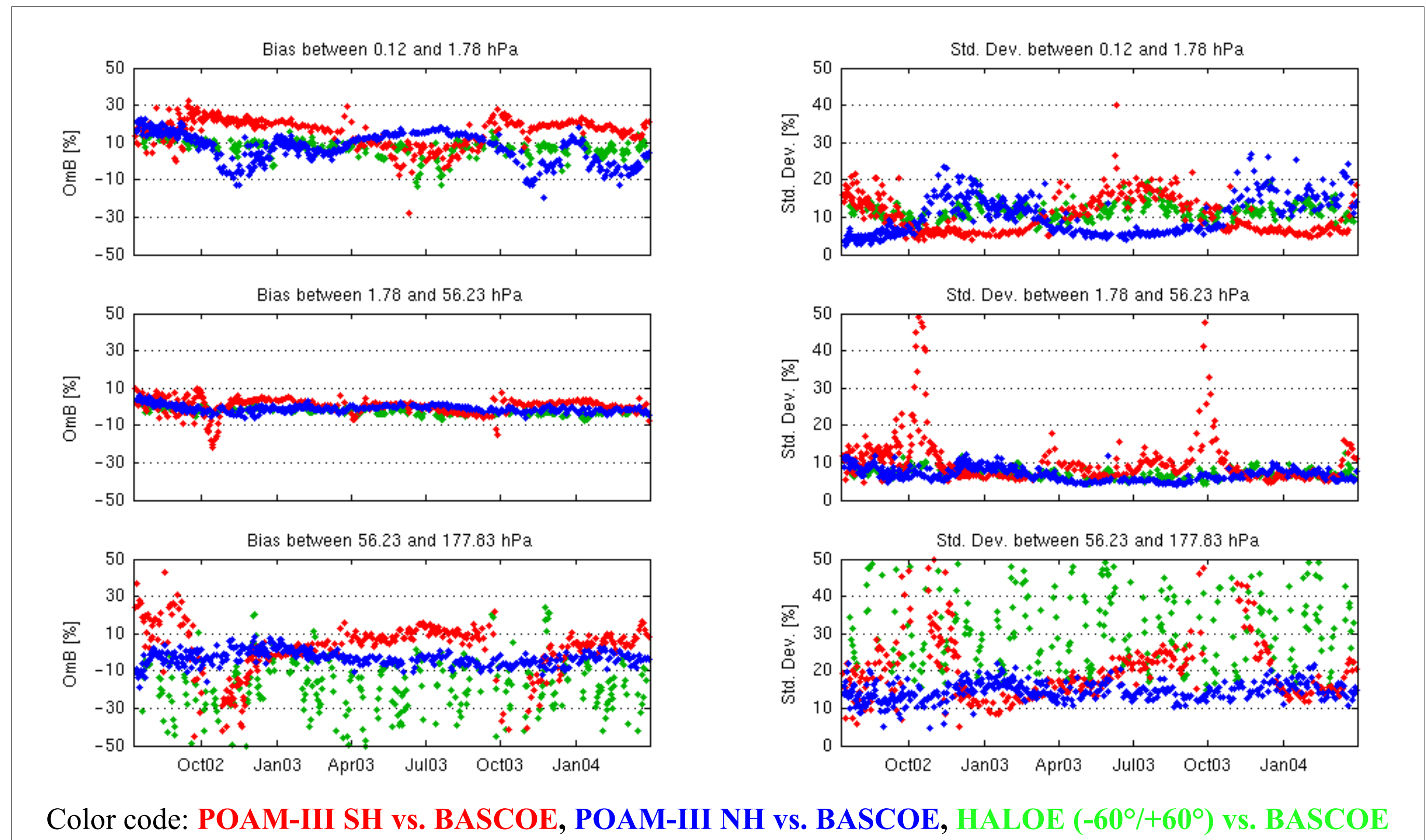
**Figure 1:** Time series of SH POAM-III ozone profiles (top) and the corresponding BASCOE/MIPAS analyses from July 2002 to March 2004. Red circles indicate the latitude of POAM-III observations.



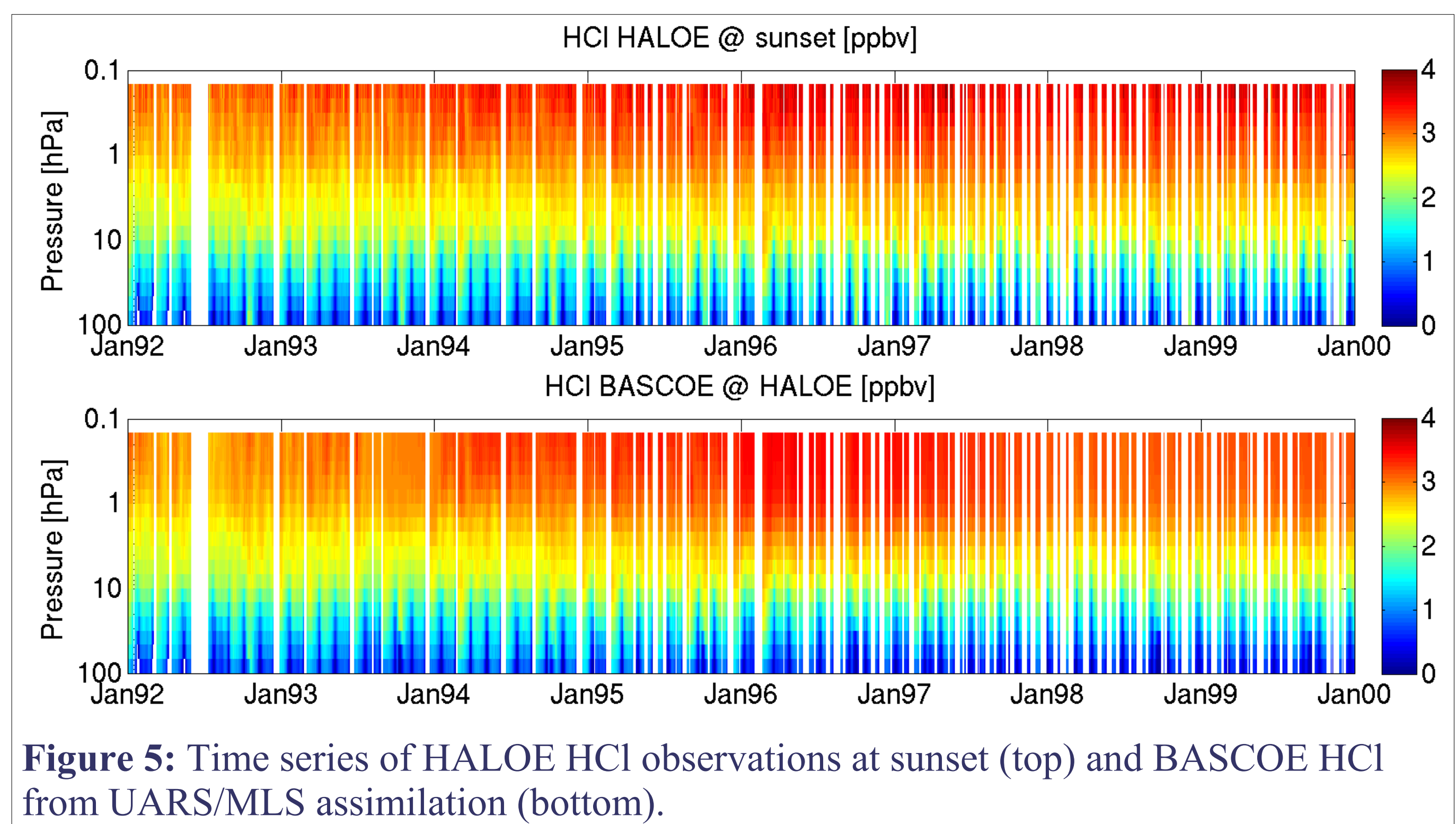
**Figure 2:** Time series of ozonesondes partial column between 10 and 100 hPa at South Pole station compared to (1) BASCOE/MLS analyses, (2) ECMWF ERA40 and (3) ECMWF ERA\_Interim.



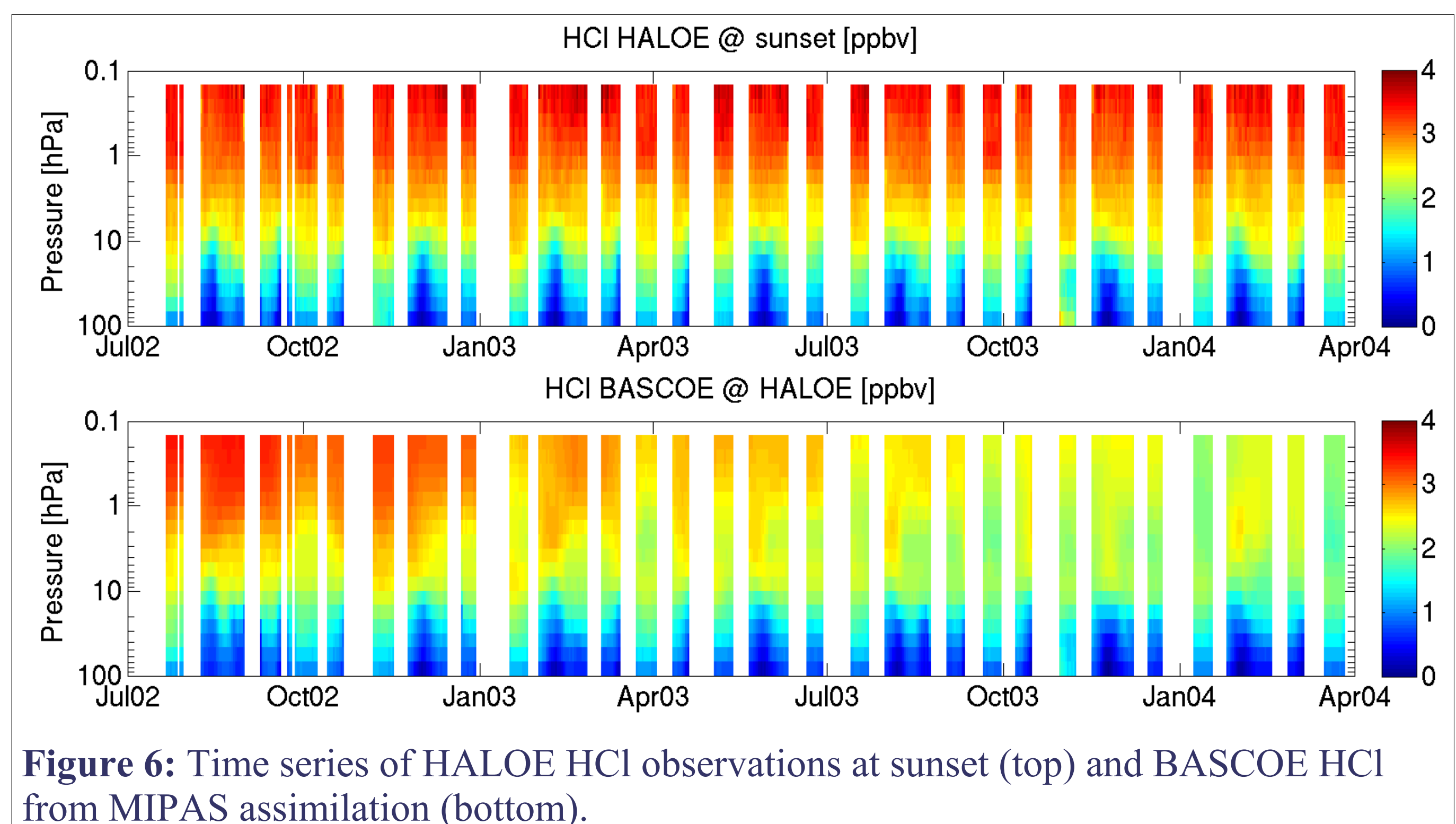
**Figure 3:** September 2003 zonal mean H<sub>2</sub>O from (a) ECMWF/MIPAS analyses, (b) BASCOE/MIPAS analyses, (c) MIMOSA/MIPAS analyses and (d) UARS climatology. © Thornton et al., ACPD, 2008.



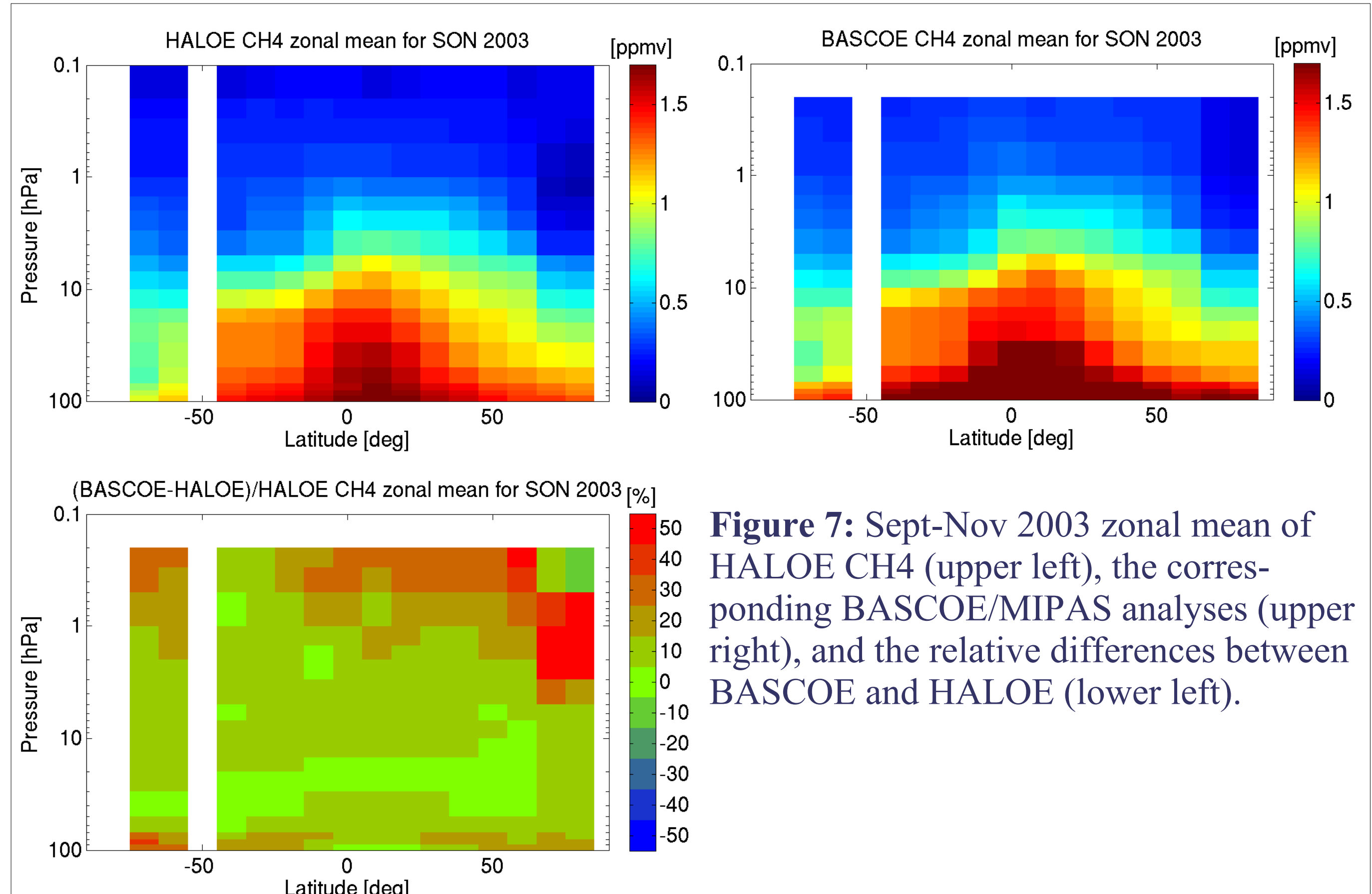
**Figure 4:** Time series of the mean differences (Obs-BASCOE)/Obs (in percent, left column) and the corresponding standard deviations between July 2002 and March 2004. Red: difference between POAM-III SH and BASCOE; blue: difference between POAM-III NH and BASCOE; green: differences between HALOE (-60°/+60°) and BASCOE.



**Figure 5:** Time series of HALOE HCl observations at sunset (top) and BASCOE HCl from UARS/MLS assimilation (bottom).



**Figure 6:** Time series of HALOE HCl observations at sunset (top) and BASCOE HCl from MIPAS assimilation (bottom).



**Figure 7:** Sept-Nov 2003 zonal mean of HALOE CH<sub>4</sub> (upper left), the corresponding BASCOE/MIPAS analyses (upper right), and the relative differences between BASCOE and HALOE (lower left).

\* The original system, the Belgian Assimilation System for Chemical Observations from Envisat, was renamed since it is now also applied to UARS/MLS but to acronym is unchanged.