Ozone_cci
Overview of results and
Data products

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on behalf of the Ozone_cci team

The Ozone_cci team

16 institutes from 10 ESA member state countries

3 EO Science Teams

Total ozone   Nadir profiles   Limb /occultation profiles

Validation Team (VALT)   Climate Research Team (CRG)   System Eng. Team (SET)

EO sensors

Agency	Satellite	Sensor	Time period *
ESA	ESR-2	GOME	1995 – 2011
ESA	ENVISAT	SCIAMACHY	2002 – 2012
ESA	ENVISAT	GOMOS	2002 – 2012
ESA	ENVISAT	MIPAS	2002 – 2012
EUMETSAT	METOP	GOME-2	2007 – 2012
NASA	AURA	OMI	2004 – 2012
SNSB CSA	ODIN	OSIRIS	2001 – 2012
SNSB CSA	ODIN	SMR	2001 – 2012
CSA	SCISAT	ACE-FTS	2004 – 2012

* Maximum time period available; ozone_cci products generally use subsets of EO data (see details on slide 2). All time-series will be extended in Phase-2.

Main achievements (1)

Total ozone

❖ **Direct-fitting algorithm adapted to GOME, SCIAMACHY and GOME-2 sensors**

❖ **Level-2 full reprocessing of all 3 sensors (1996-2012)**

❖ **Level-3 GTO-ECV v2 (1996-2011)**

Nadir ozone profiles

❖ **Round-Robin selection of algorithm baseline for CCI Phase-1 (RAL algorithm optimised for the troposphere)**

❖ **Level-2, 3 & 4 demonstration data sets generated for GOME (1997) and GOME-2 (2007-2008)**

Main achievements (2)

Limb ozone profiles

❖ **MIPAS round-robin → selection of CCI baseline algorithm**

❖ **Data and error characterization for all ENVISAT + ESA TPM (ODIN, ACE-FTS) limb sensors**

❖ **HARMOZ data set → harmonised single instrument level-2 data set, reported on common pressure/altitude grid**

❖ **Bias and drift tables for all couple of sensors**

❖ **Multiple level-3 data sets:**

➢ **Single instrument monthly zonal mean data sets**

➢ **Merged monthly zonal mean data set (2007-2008)**

➢ **Merged semi-monthly global data set (2007-2008)**

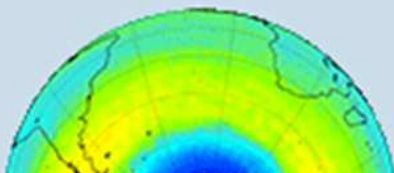➢ **Fine-resolution gridded data sets from all sensors (2007-2008)**

Ozone_cci CRDP (TC)

Ozone

Navigation

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Total Ozone Columns (DU)
2006

latitude (°)

Home

Climate Research Data Package (CRDP)
Submitted by adminbisa on Mon, 2013-03-11 11:24

The Ozone_cci Climate Research Data Package (CRDP) contains all the data
the project. The data base is hosted on a freely accessible ftp site and is or
products: Total ozone products (TC=Total Column), Nadir ozone profile produ
(LP=Limb Profile) products.

The Ozone_cci data products are listed in the table below. All data sets are
compliant with CCI rules.

No password is required to access the data in reading mode. To access the c
corresponding product ID and immediately after on the 'OK' box.

Or direct access to the ftp: ftp://cci_web@ftp-ae.oma.be/esacci/ozone. No

	Product	Sensor	Product description	
	TC_L2_GOME	ERS-2 GOME	Harmonized GODFIT multi-sensor prototype level 2 data product	

Ozone_cci CRDP (TC)

Validation

❖ **WOUDC Dobson and Brewer networks**

❖ **WMO/GAW NDACC**

❖ **SAOZ network**

TOC dependence
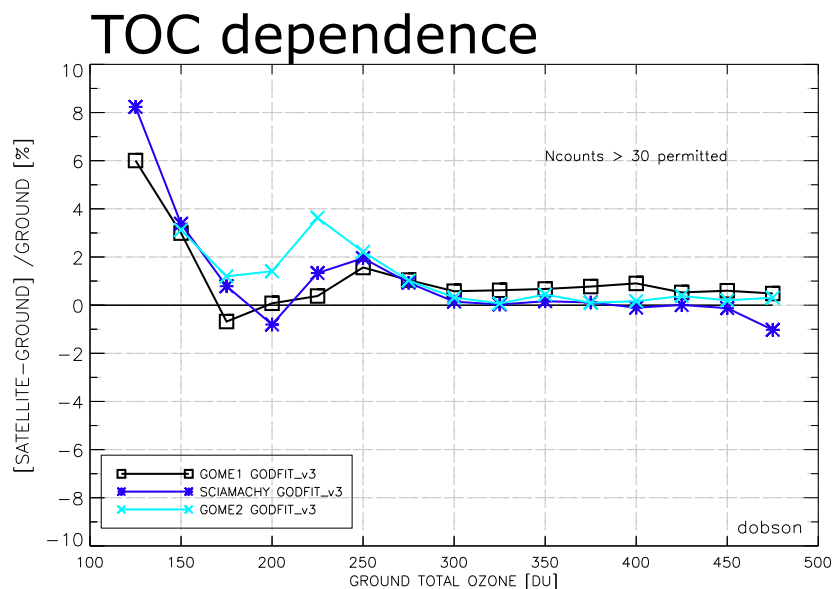
CCI Level-2 against Dobson network

Created on Fri May 10 07:24:45 2013

Aristotle University of Thessaloniki
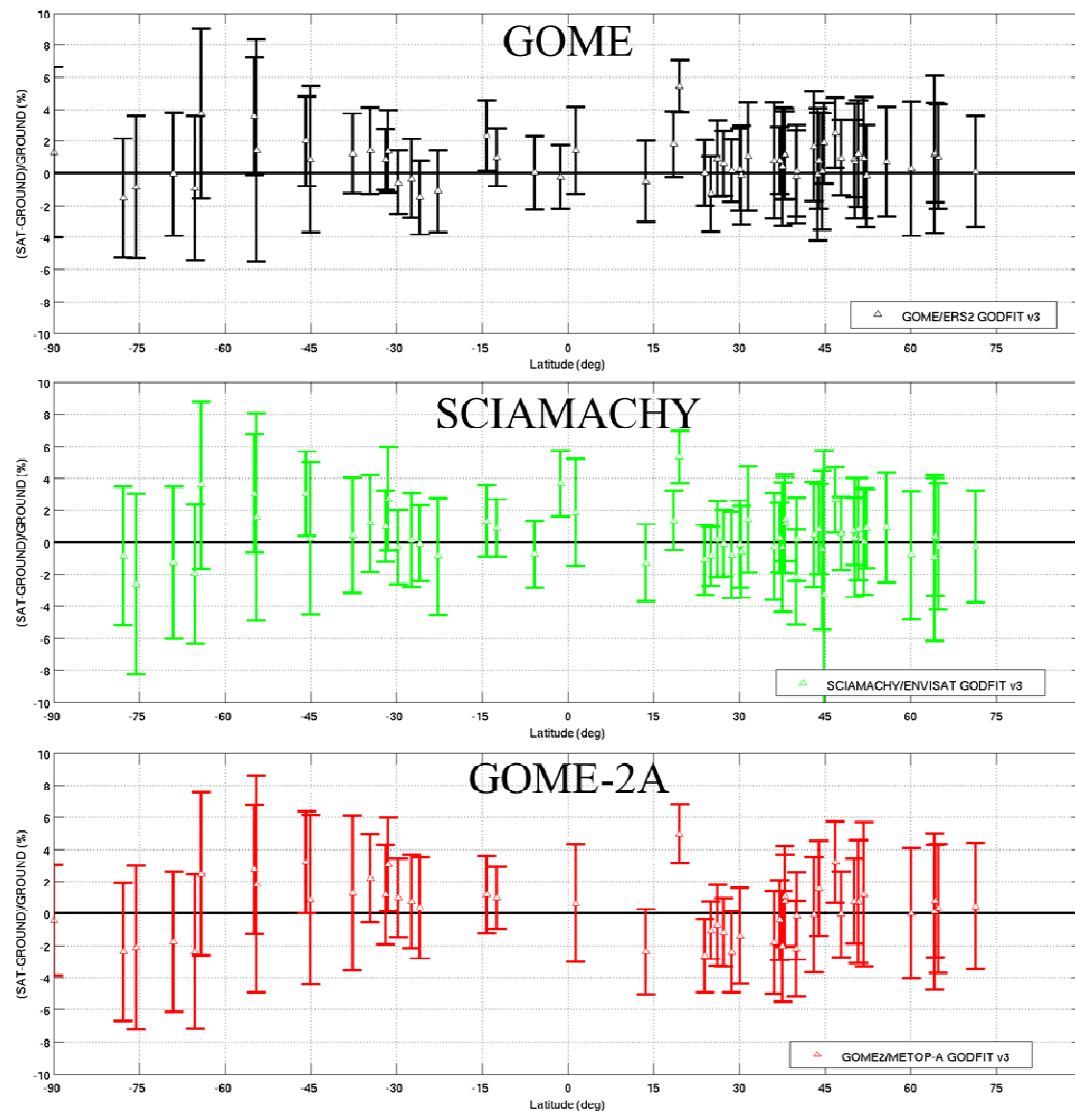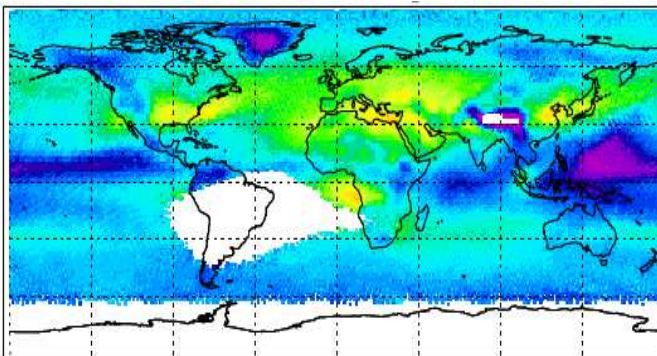
Ozone_cci CRDP (NP)

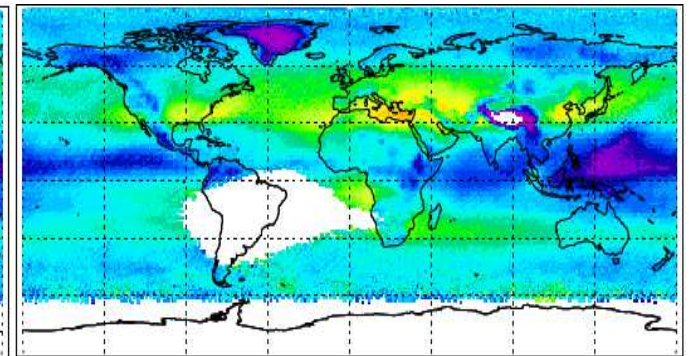| Nadir Ozone Profiles		
Level-2	Demonstration CCI algorithm, with profiles on fixed pressure levels common to limb products	GOME (1997) GOME-2 (2007-2008)
Level-3	Monthly mean gridded data	GOME (1997) GOME-2 (2007-2008)
Level-4	Assimilated ozone profiles on 6 hourly global fields	GOME (1997) GOME-2 (2007-2008)
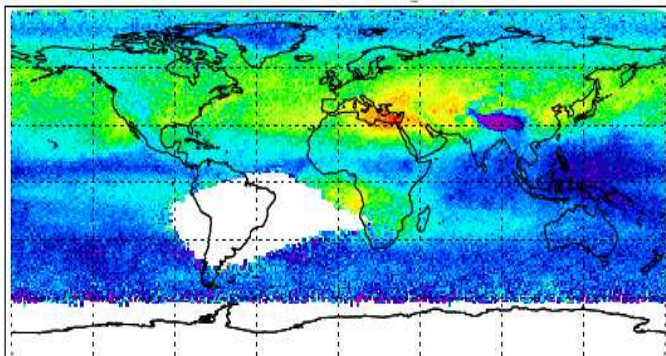
GOME2   TOMCAT   TOMCAT (GOME2 AKs)

Ozone_cci CRDP (LP)

Limb Ozone Profiles		
Level-2	Harmonized Single Instrument (HARMOZ): individual profiles with a common pressure grid and concentration unit	SCIAMACHY, GOMOS, MIPAS, OSIRIS, SMR, ACE (all lifetime)
Level-3	Single Instrument Monthly Mean Zonal Mean	SCIAMACHY, GOMOS, MIPAS, OSIRIS, SMR, ACE (all lifetime)
	Merged Monthly Zonal Mean	SCIAMACHY, GOMOS, MIPAS, OSIRIS, SMR, ACE (2007-2008 demonstration)
	Merged Semi-Monthly data set (20° longitude, 10° latitude)	SCIAMACHY, GOMOS, MIPAS, OSIRIS, SMR, ACE (2007-2008 demonstration)
	Single Instrument Fine-Resolution gridded data set (5°x5°, 3 day time step)	SCIAMACHY, GOMOS, MIPAS, OSIRIS, SMR (2007-2008 demonstration)

HARMOZ: vertical grid and altitude range

- **Extended SPARC-DI grid**
- **All CCMVal levels are included**
- **Vertical spacing**
    - ~ 1 km below 20 km
    - ~2-3 km above 20 km
- **Altitude range is instrument-dependent**
- **Altitude profiles are also provided**
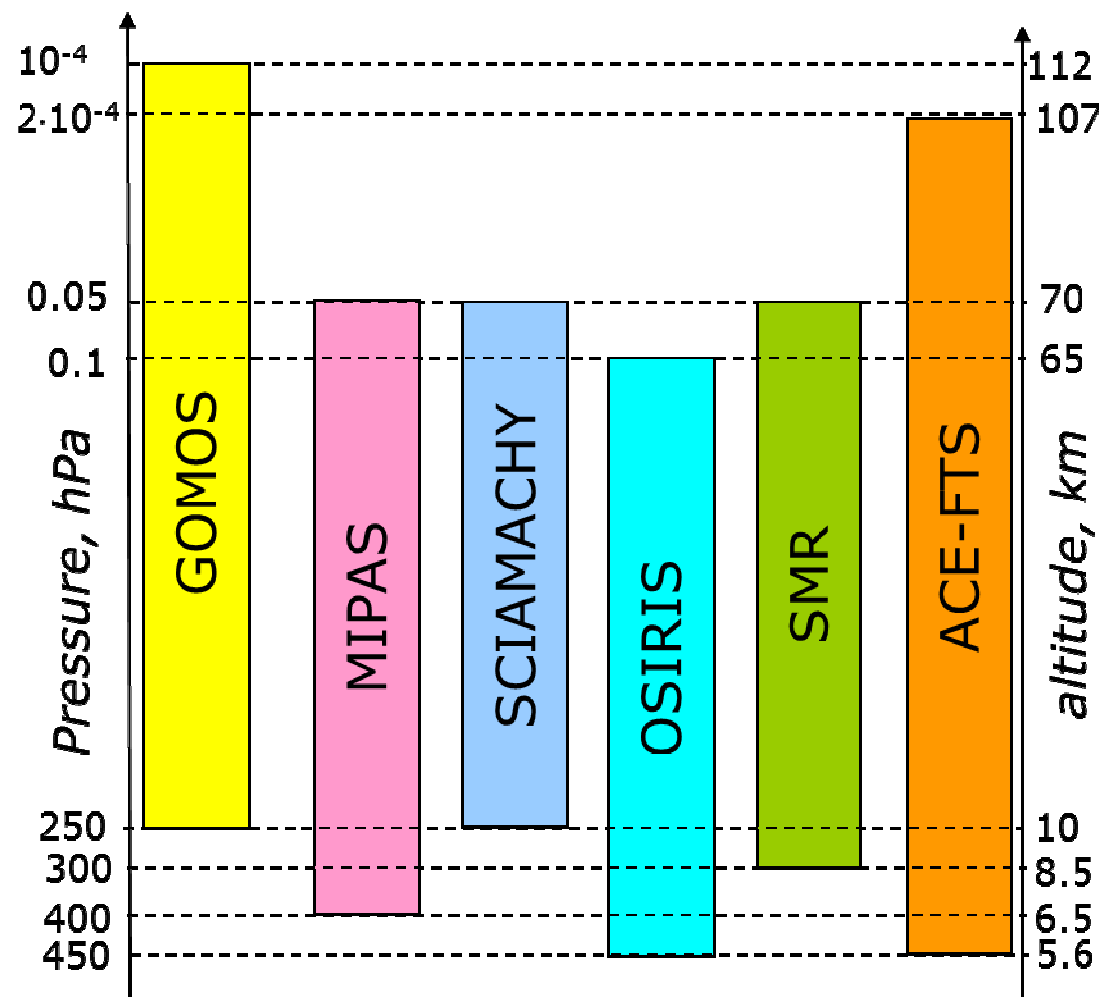
Bias tables

- **For each pair of instruments**
- **For each month**
- **2 types of collocation criteria**
  - Standard: $|\Delta t| \leq 24$ h $\quad |\Delta d| \leq 1000$ km $\quad |\Delta lat| \leq 2°$
  - Tight (for pairs including MIPAS and SCIAMACHY)

  $$|\Delta t| \leq 4 \text{ h} \quad |\Delta d| \leq 400 \text{ km} \quad |\Delta lat| \leq 2°$$

- **Parameters**

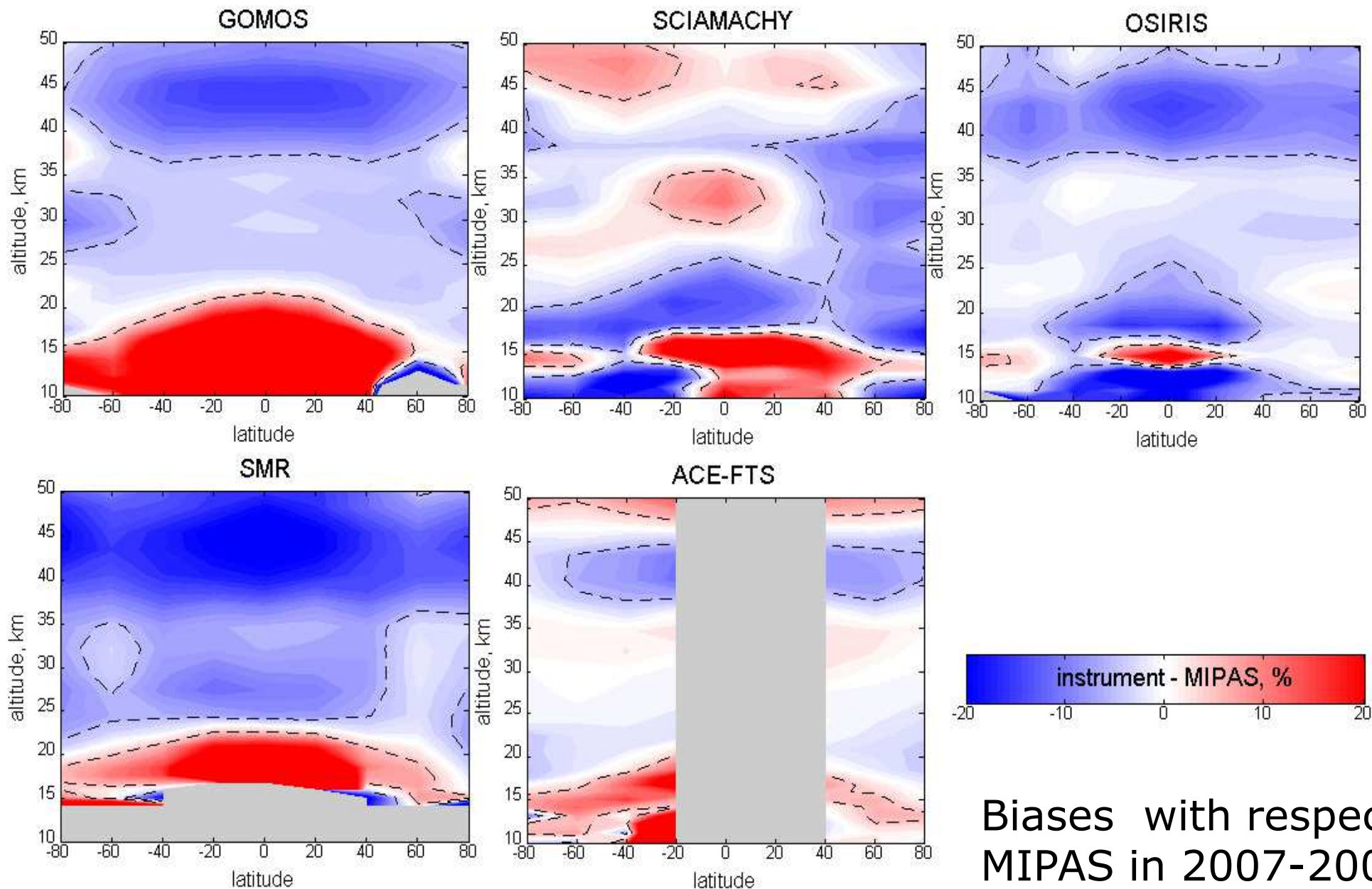 - Bias $b = 2 \dfrac{\langle x_1 - x_2 \rangle}{\langle x_1 \rangle + \langle x_2 \rangle}$

  - Uncertainty of bias $\sigma_b = \dfrac{\sigma}{\sqrt{N}}$

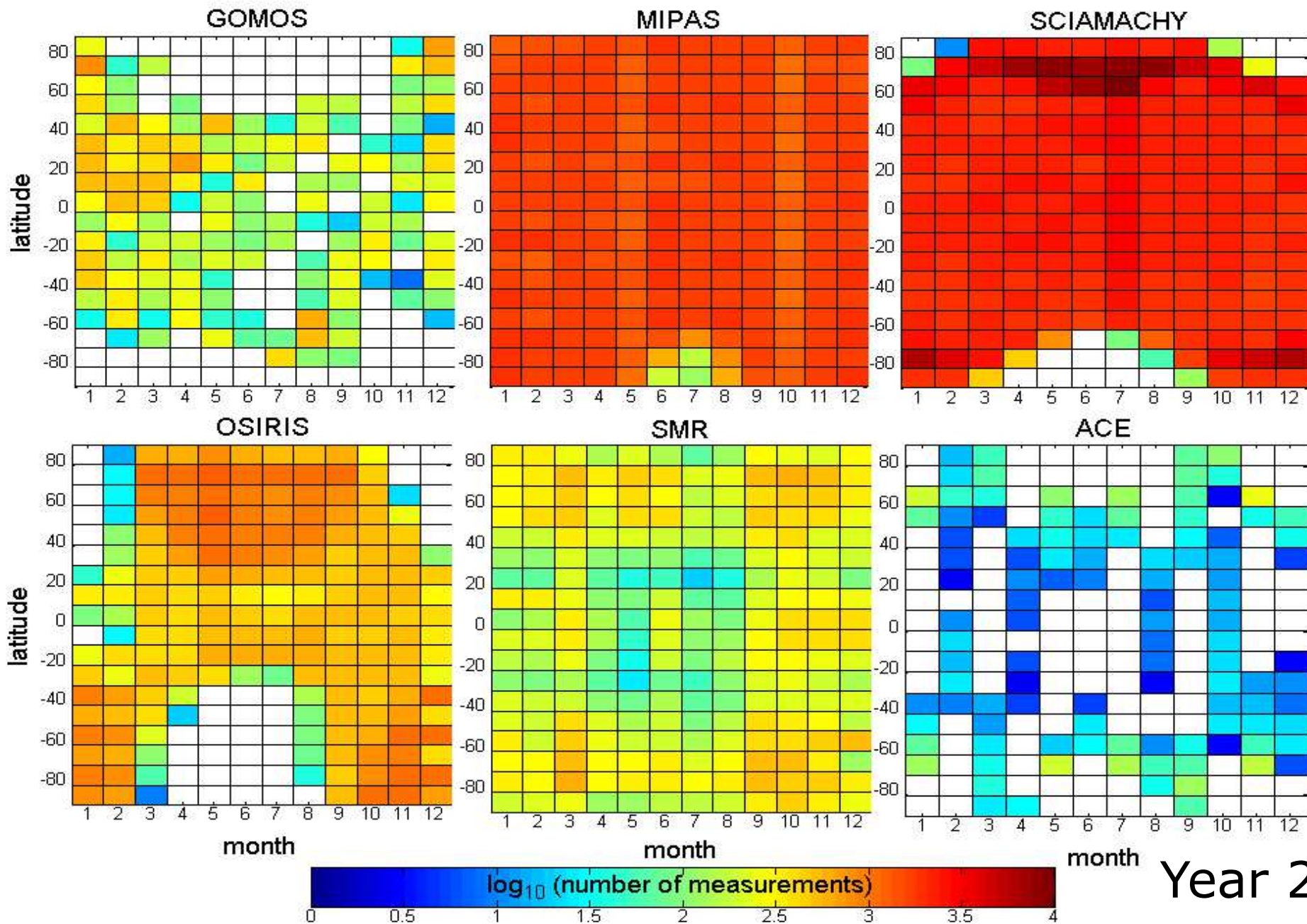 - Estimates based on mean/rms and median/inter-percentile range are provided
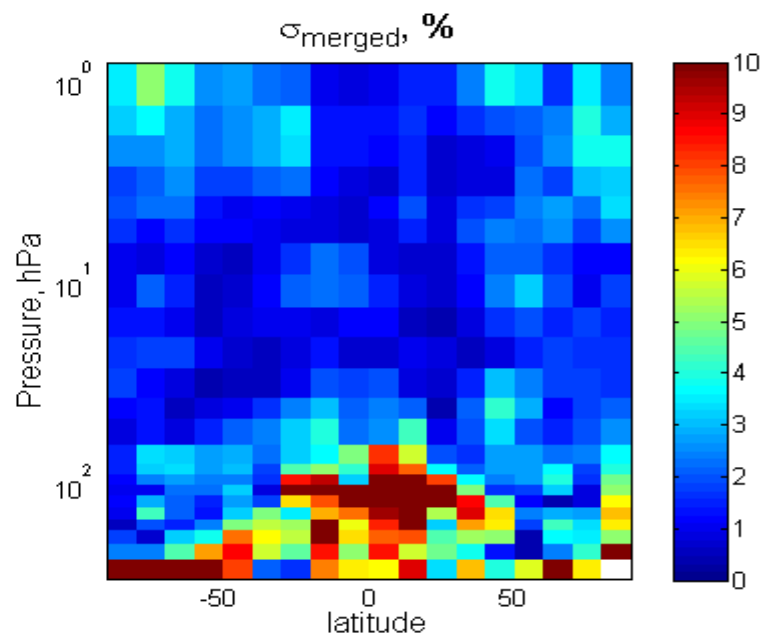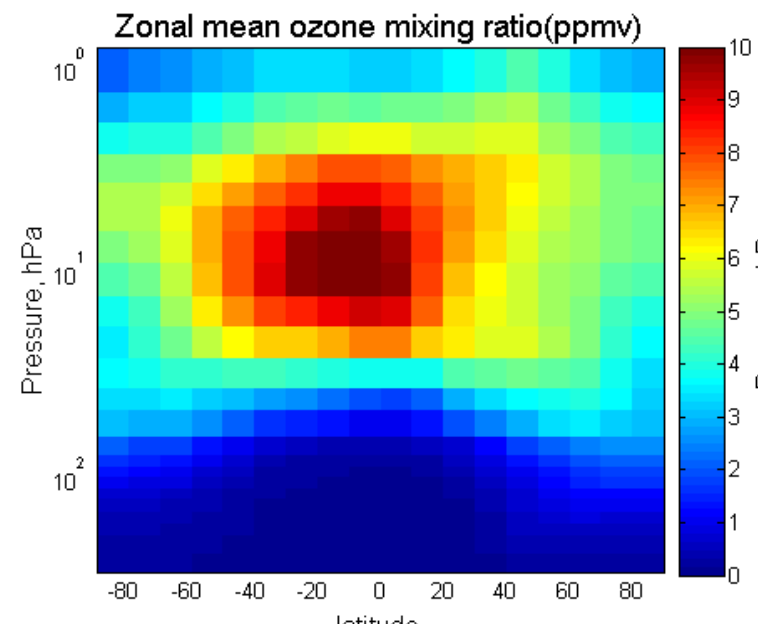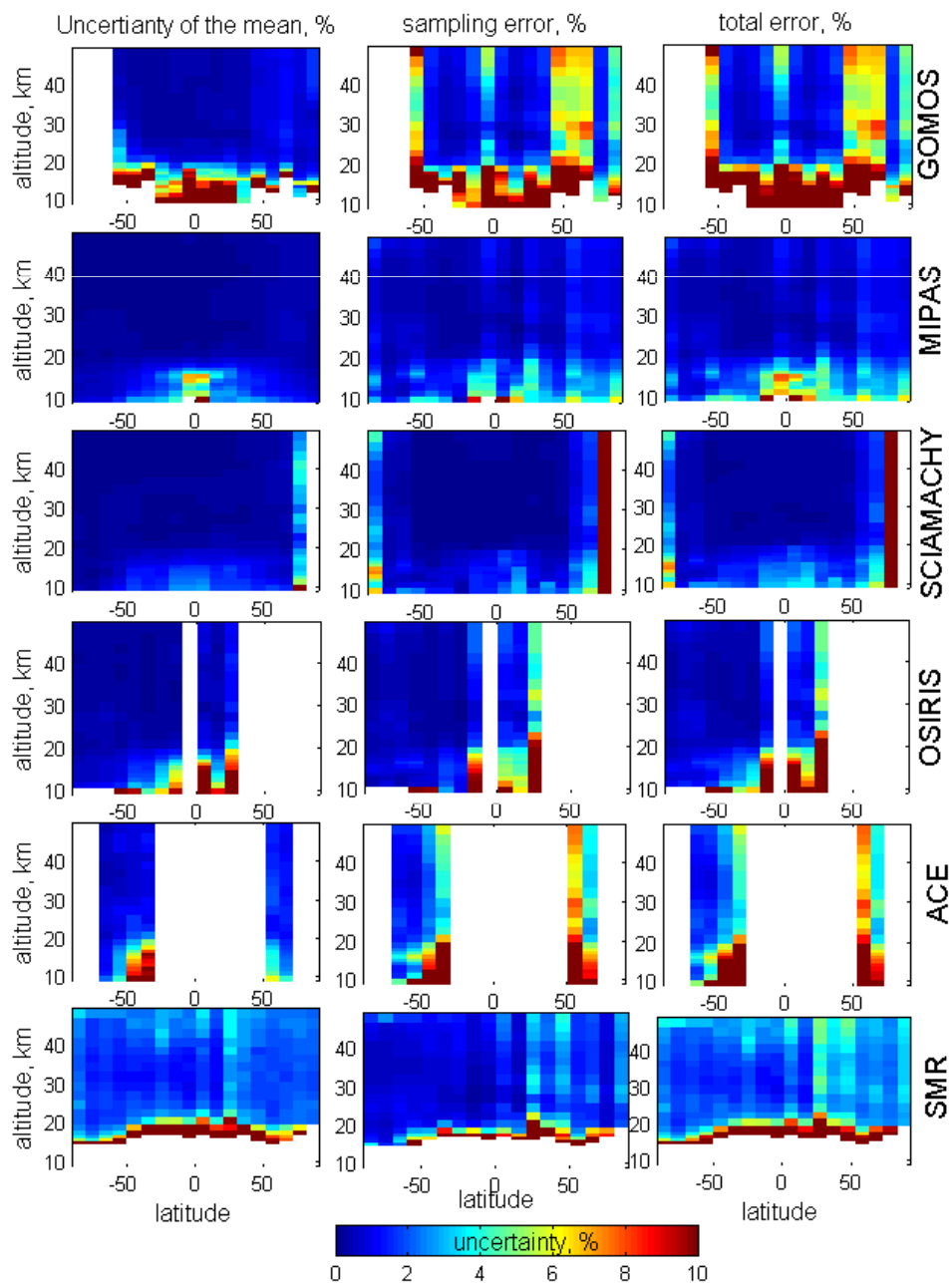
- **Format: netcdf**

2-3 km

300-400 km
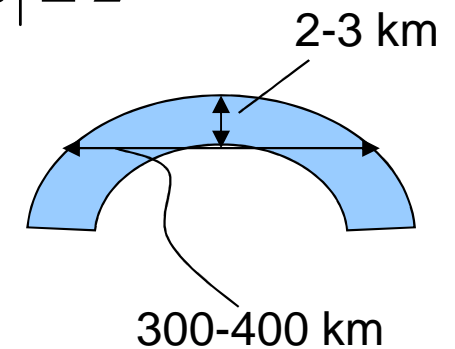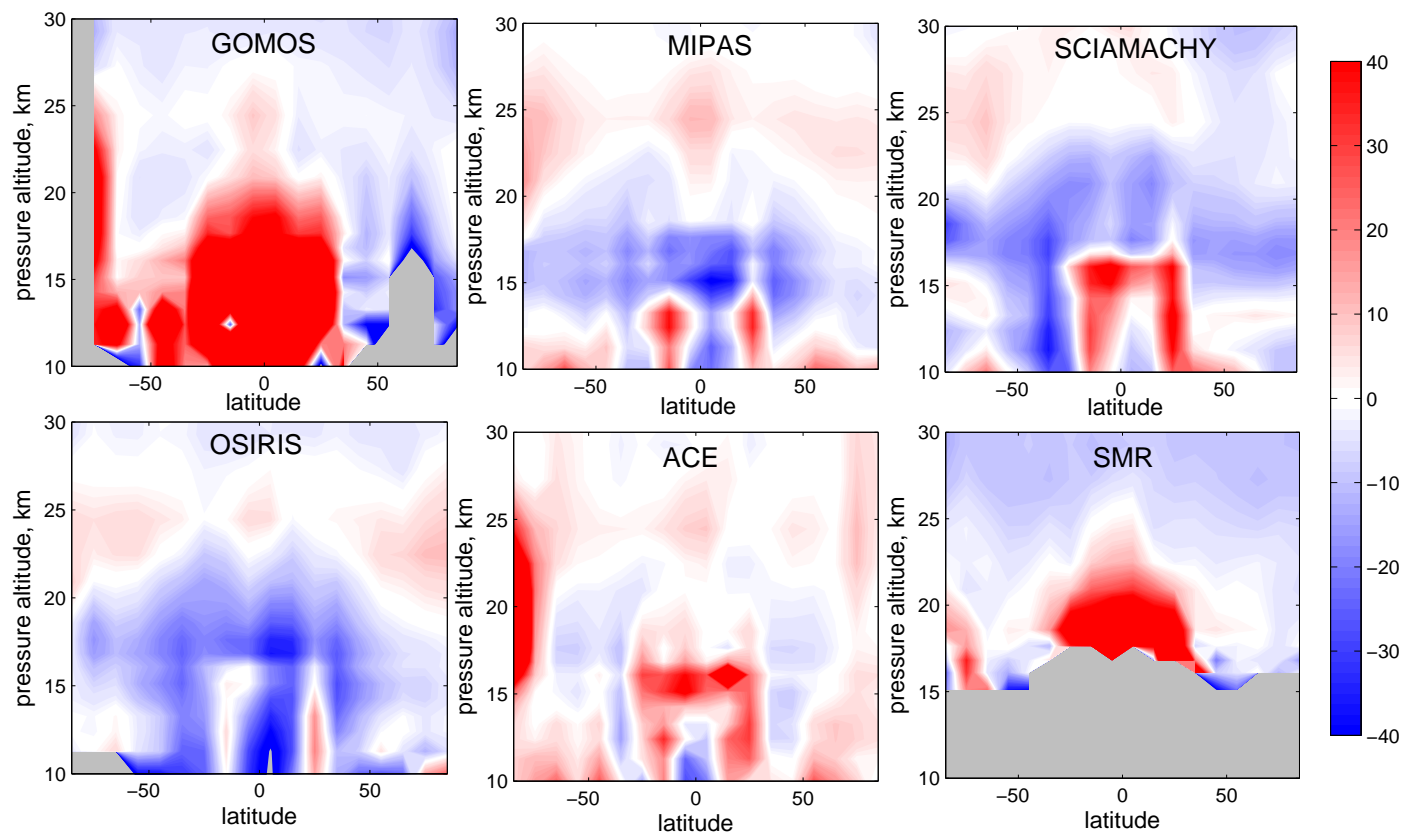
A higher level analyses of data consistency using the bias tables

Biases with respect to MIPAS in 2007-2008

Coverage by the limb datasets
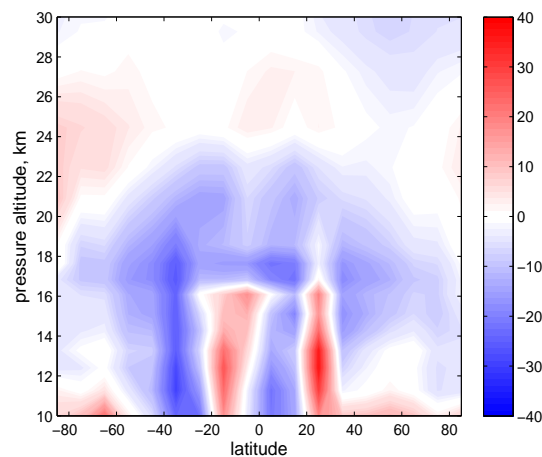

Year 2008

Merged monthly mean data set

Preliminary evaluation (UTLS)

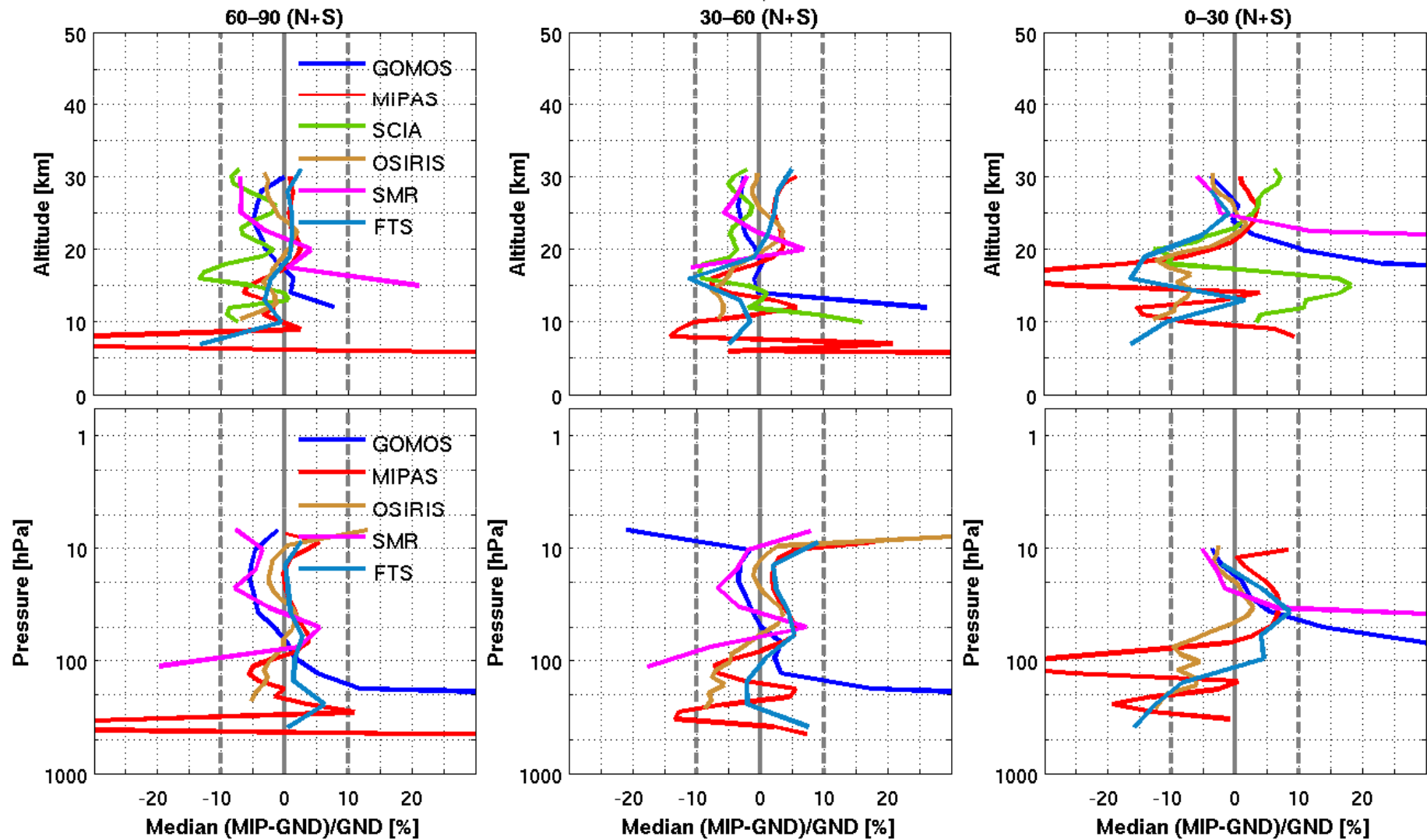Mean deviations from McPeters-Labow climatology (expressed in %) for year 2008

Ground-based validation

Comparison to NDACC-WOUDC sondes (Median bias)

Next step – CRG assessment

- Chemistry-Climate Model (CCM) simulations for evaluation purposes, in particular with 'ozone_cci' data products.

- CCMs: **UMUKCA** (UCAM), **EMAC** (DLR) and **TM5** (KNMI), in a "nudged set-up", i.e., relaxing the modelled dynamics towards observations (ERA-Interim):

  ➤ Strong link to SPARC CCMI (REF-C1SD simulation).
  ➤ Processing of model data for the 'golden year' 2008.
  ➤ First check with CCI precursor IASI (Infrared Atmospheric Sounding Interferometer).

Conclusion

- Ozone_cci CRDP is ready (for most data sets)
- New total ozone, nadir profiles and limb L2 & L3 data sets have been produced and characterized
- Major effort in data harmonisation for all types of ozone products but time-series are still limited
- Data sets are freely downloadable from the Ozone_cci web site
- Validation is ongoing
- CRG assessment is starting/ongoing

www.esa-ozone-cci.org