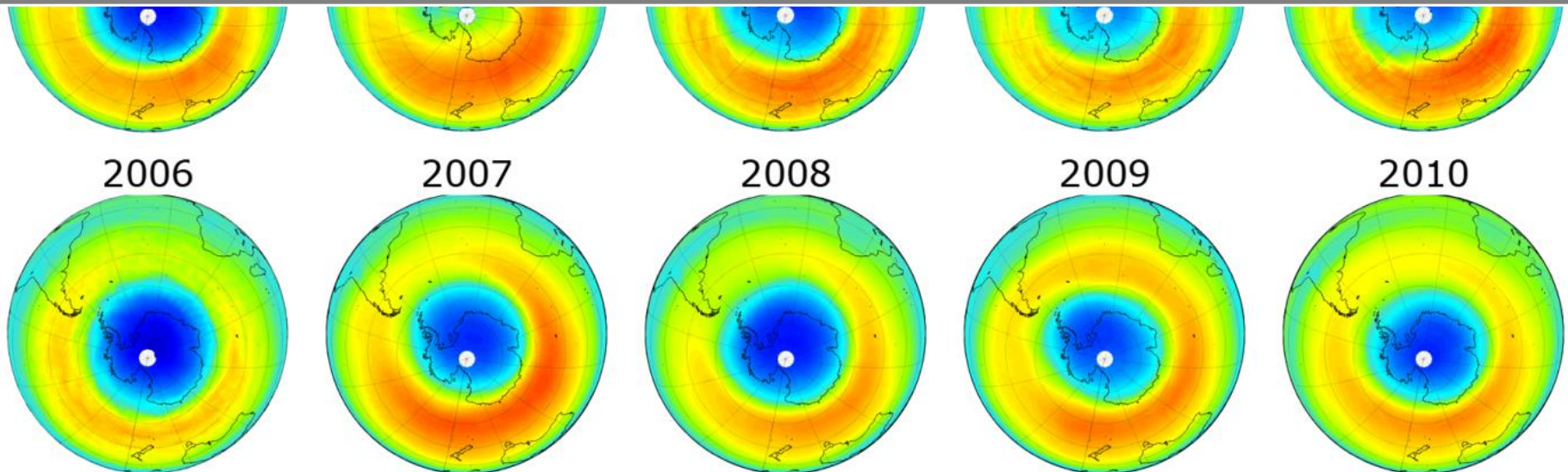




Ozone_CCI Contribution

Peter Braesicke (CRG) on behalf of the Ozone_CCI Team
Science Lead: Michel Van Roozendael, BIRA

IMK-ASF



Data sets

- Total ozone from nadir UV and TIR sensors
- Ozone profiles from nadir UV and TIR sensors (Trop/Strat)
- Ozone profiles from limb/occultation sensors (UTLS/Strat/Meso)

- Improved & harmonised level-2 algorithms
- Improved & harmonised level-3 algorithms
- Consistent NetCDF-CF formatting of all data sets
- Open distribution on Ozone_CCI web-site (CDRP)

- Common approach to error characterization for all products (ATBD)
- Validation and information content analysis → systematic assessment of status w.r.t. User Requirements (PVIR)

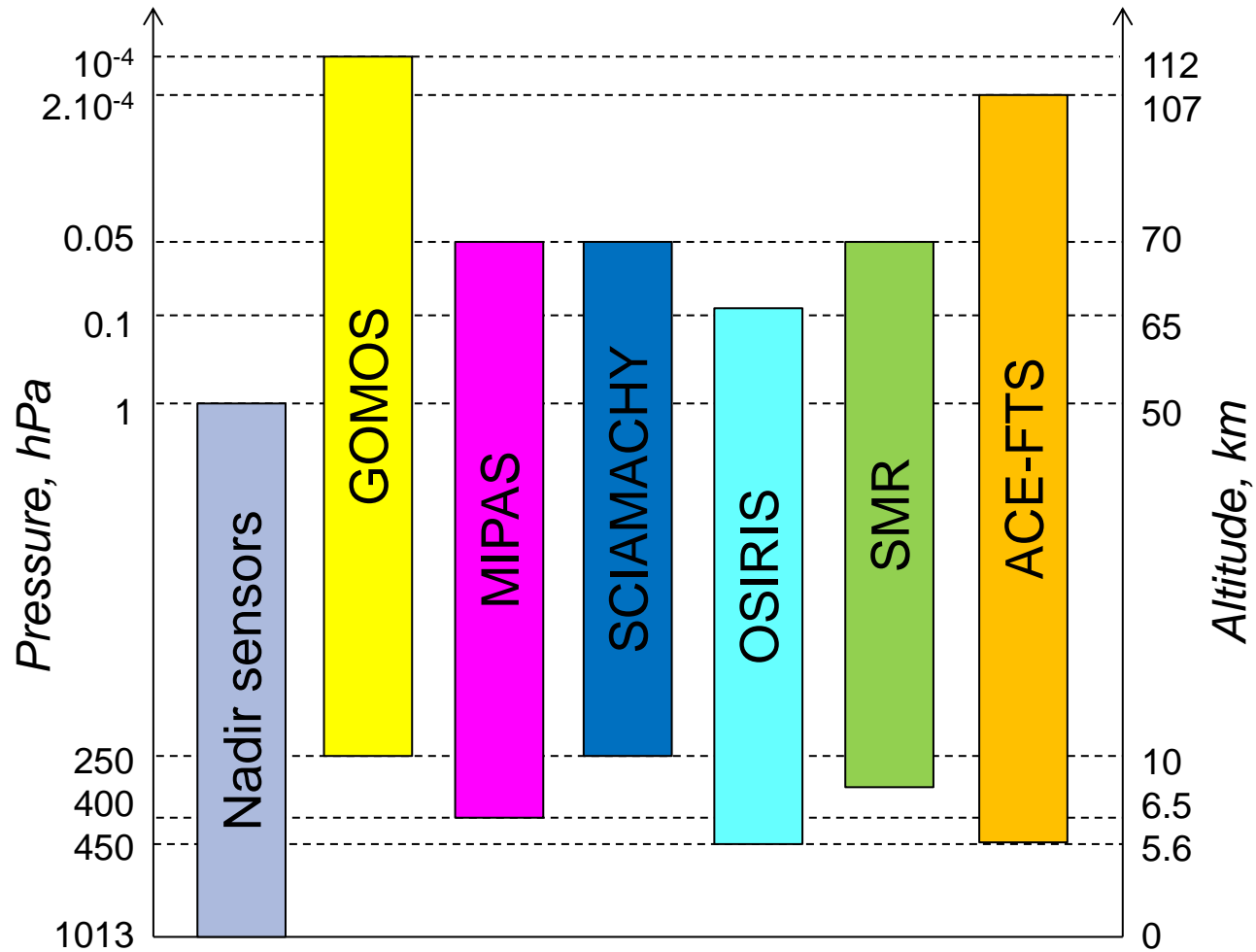
Data sets (phase-2 improvements)

- Algorithm improvements (level-2 and level-3)
- Extend products in time forward and backward (full re-processing)
- Extend/improve products in troposphere and UTLS
- Extend/improve products in mesosphere
- Link European data sets to historical long-series from NASA
- Better match user requirements on accuracy, long-term stability, uncertainty characterization, validation
- Optimize (re)processing methodology and system(s)

Platforms and sensors

Agency	Satellite platform	Sensor	Time period																					
			96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15		
ESA	ERS-2	GOME	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█		
ESA	ENVISAT	SCIAMACHY									█	█	█	█	█	█	█	█	█	█	█	█		
		GOMOS									█	█	█	█	█	█	█	█	█	█	█	█		
		MIPAS									█	█	█	█	█	█	█	█	█	█	█	█	█	
EUMETSAT	METOP-A	GOME2-A																			█	█	█	
		IASI-A																				█	█	█
	METOP-B	GOME2-B																				█	█	█
		IASI-B																					█	█
NASA	NPP-Suomi	OMPS																				█	█	█
SNSB CSA	ODIN	OSIRIS									█	█	█	█	█	█	█	█	█	█	█	█	█	█
		SMR									█	█	█	█	█	█	█	█	█	█	█	█	█	█
CSA	SCISAT	ACE																				█	█	█

Altitude range



Available Ozone CCI Data



Ozone

Home



Climate Research Data Package (CRDP)

Submitted by adminbisa on Mon, 2015-05-11 11:24

The Ozone_cci Climate Research Data Package (CRDP) contains all the data products that have been generated within the project. The data base is hosted on a freely accessible ftp site and is organised according to three types of ozone products: Total ozone products (TC=Total Column), Nadir ozone profile products (NP=Nadir Profile) and Limb ozone profile (LP=Limb Profile) products.

The Ozone_cci data products are listed in the table below. All data sets are delivered in NetCDF-CF format and are compliant with CCI rules.

To get more information about the different products, click on the names in the Product level column. To access directly the different data products, just click on the corresponding Product ID and immediately after on the 'OK' box. No password is required to access the data in reading mode.

If you want to be informed by email about future updates of the data sets provided on this webpage, register by clicking on the green S next to the products you want to subscribe for.

Show my subscriptions

Navigation

- About OZONE CCI
- Project Plan
- Project Content
- Support
- Data Products
- Private Area

Website Hosted By

BIRA-IASB



Belgian Institute For Space
Aeronomy

Recent Updates

- User Groups
41 Weeks 4 Days Ago
- Products Description
41 Weeks 4 Days Ago
- Round Robin
41 Weeks 4 Days Ago

Product level	Product ID	Sensor	Product description	Provider	Time coverage
ESA CCI total ozone data sets	TC_L2_GOME	GOME-2 GOME	Harmonized GODFIT multi-sensor prototype level 2 data product	BIRA-IASB	Global coverage lost after June 2003
	TC_L2_SCI_A	SCIAMACHY	Harmonized GODFIT multi-sensor prototype level 2 data product	BIRA-IASB	1997-2003 (SCI-A)
	TC_L2_GOME2	NETOP-A GOME-2	Harmonized GODFIT multi-sensor prototype level 2 data product	BIRA-IASB	1997-2007 (GOME-2)
ESA CCI nadir profile ozone data sets	NP_L3_MRG	combined	GOME, SCIAMACHY and GOME-2 merged prototype level 3 harmonized data record	DLR	1999-2011
	NP_L2_GOME	GOME-2 GOME	CCI algorithm, with profiles on fixed pressure levels from SPARC Cf grid	RAL	Demonstration data set
ESA CCI limb profile ozone data sets	NP_L2_GOME2	NETOP-A GOME-2	CCI algorithm, with profiles on fixed pressure levels from SPARC Cf grid	RAL	2007-2008
	NP_L3_MRG	combined	CCI level 3 algorithm	KNMI	1997 (GOME) 2007-2008 (GOME-2)
	NP_L4_MRG	combined	CCI level 4 algorithm	KNMI	1997 (GOME) 2007-2008 (GOME-2)
	HARMONIZED dataset of Ozone profiles (HARMOZ)	FP_L2_SCI_A	SCIAMACHY	Individual profiles with a common pressure grid and concentration unit, auxiliary information for converting into mixing ratio and/or geometric altitude	UBR
FP_L2_GBL		GBL	PHI		
FP_L2_BOMDS		BOMDS	PHI		
FP_L2_MIPAS		MIPAS	KIT		
FP_L2_DSIRIS		ODIN/DSIRIS	JoS		
FP_L2_SHR		ODIN/SHR	CHAMBERS		
FP_L2_ACE		SCISAT/ACE	JoTT		
FP_L3_SCI_A		SCIAMACHY	UBR		
FP_L3_BOMDS		BOMDS	PHI		
FP_L3_MIPAS		MIPAS	KIT		
ESA CCI limb ozone data sets	FP_L3_DSIRIS	ODIN/DSIRIS	Single instrument, zonal mean time series (10° latitude bin); uncertainty/variability of the MZM	JoS	1997-2008 (MIPAS: RR mode only (>2005))
	FP_L3_SHR	ODIN/SHR		CHAMBERS	
	FP_L3_SHR_S44_60Hz	ODIN/SHR(S44, 60Hz)		CHAMBERS	
	FP_L3_ACE	SCISAT/ACE		JoTT	
	Merged Monthly Zonal Mean (MMZM)	FP_L3_MRG-MMZM	combined	Same as MZM but a composite of all limb data; associated uncertainties	PHI
Merged Semi-Monthly Mean (MSHM)	FP_L3_MRG-MSHM	combined	Bimonthly merged data set (20° longitude, 10° latitude, bimonthly)	PHI	2007-2008
High resolution data			Time resolved merged data set (5°x5°, 3 day time step)	PHI	2007-2008

Consortium

Calendar

4 May 2015

Mon	Tue	Wed	Thu	Fri	Sat	Sun
			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Upcoming Events

No Upcoming Events Available

Search

Search This Site:

Search

User Login

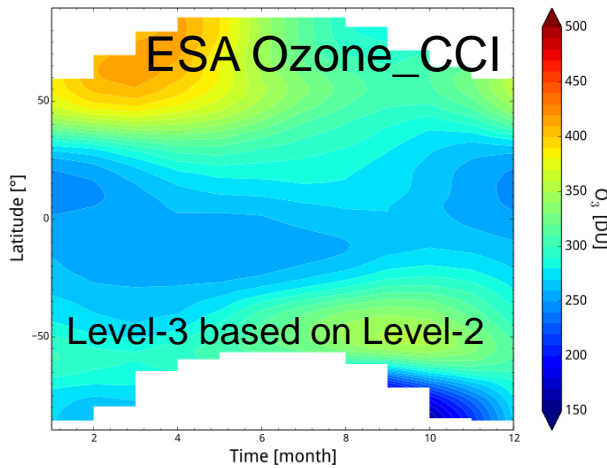
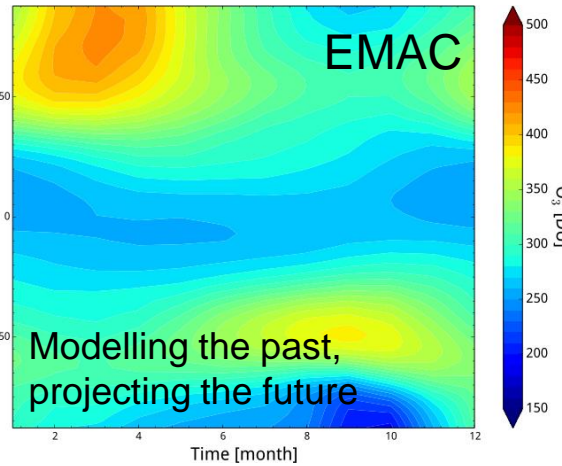
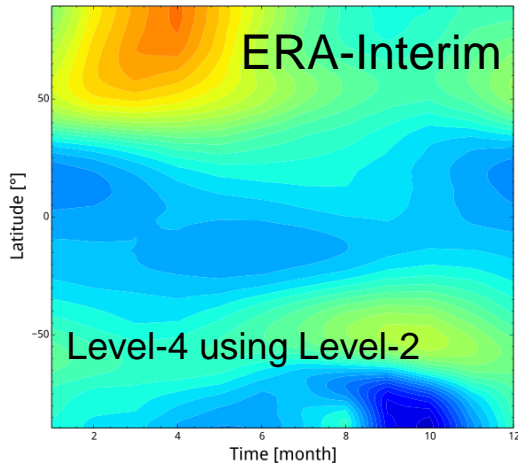
Username: *

Password: *

Login

Request New Password

Example: Total Ozone



Chemistry-climate model

ESA Ozone_CCI



Image: ESA

Home
Climate Research Data Package (CRDP)
Submitted by admin@esa on Mon, 2013-03-11 10:24

The Ozone_cci Climate Research Data Package (CRDP) contains all the data products that have been generated within the project. The data base is hosted on a freely accessible ftp site and is organised according to three types of ozone products: Total ozone products (TC=Total Column), nadir ozone profile products (NP=Nadir Profile) and Limb ozone profile (LP=Limb Profile) products.

The Ozone_cci data products are listed in the table below. All data sets are delivered in NetCDF-CF format and are compliant with CCI rules.

To get more information about the different products, click on the names in the Product level column. To access directly the different data products, just click on the corresponding Product ID and immediately after on the "DC" box. No password is required to access the data in reading mode.

Product level	Product ID	Sensor	Product description	Provider	Time coverage
Level 2	TC_L2_GOME	ERS-2 GOME	Harmonized GODFIT multi-sensor prototype level 2 data product	BIRA-SAS3	Global coverage lost after June 2003
	TC_L2_SCI4	SCIAMACHY	Harmonized GODFIT multi-sensor prototype level 2 data product	BIRA-SAS3	Lifetime (2002-2012)
	TC_L2_GOME2	METOP-A GOME-2	Harmonized GODFIT multi-sensor prototype level 2 data product	BIRA-SAS3	Lifetime (since 2007)
Level 3	TC_L3_MRG	combined	GOME, SCIAMACHY and GOME-2 merged prototype level 3 harmonized data	DLR	1995-2011



Image: ESA/EUMETSAT

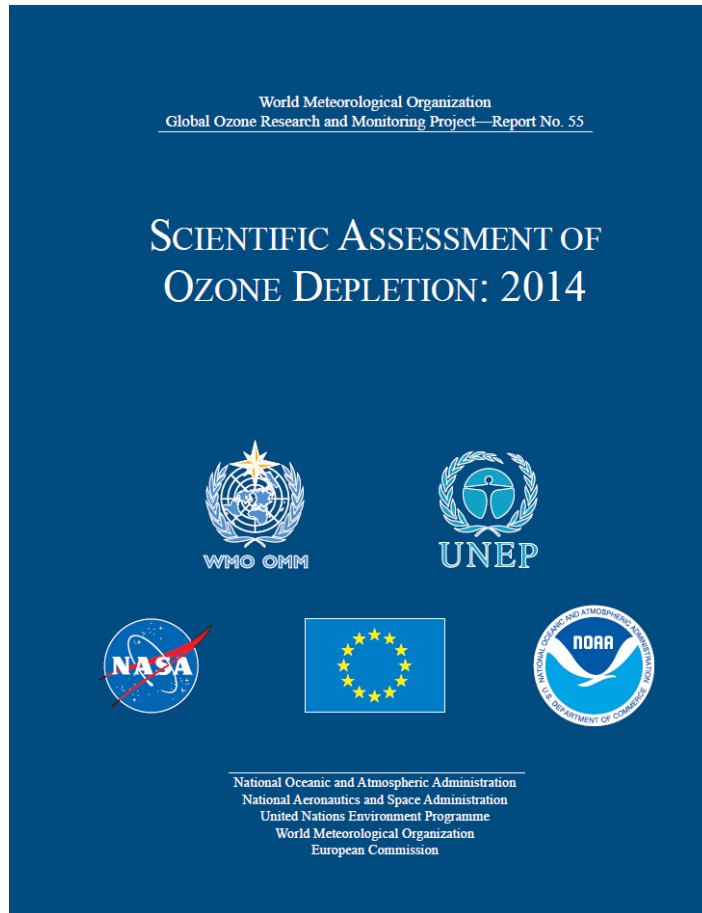
Why and how?

- Monitoring: long-term trends and changes
 - Is the Montreal Protocol working?
 - Data assimilation (KNMI, ECMWF)

- Climate sensitivity
- Attribution of variability:
 - QBO induced ozone changes
 - ENSO fingerprinting
- Climatic relevance of systematic changes:
 - Polar processes, e.g. PSC formation potential
 - Ozone hole and surface climate change
 - Other examples: Monsoon anticyclone, cold surges

- Data mining

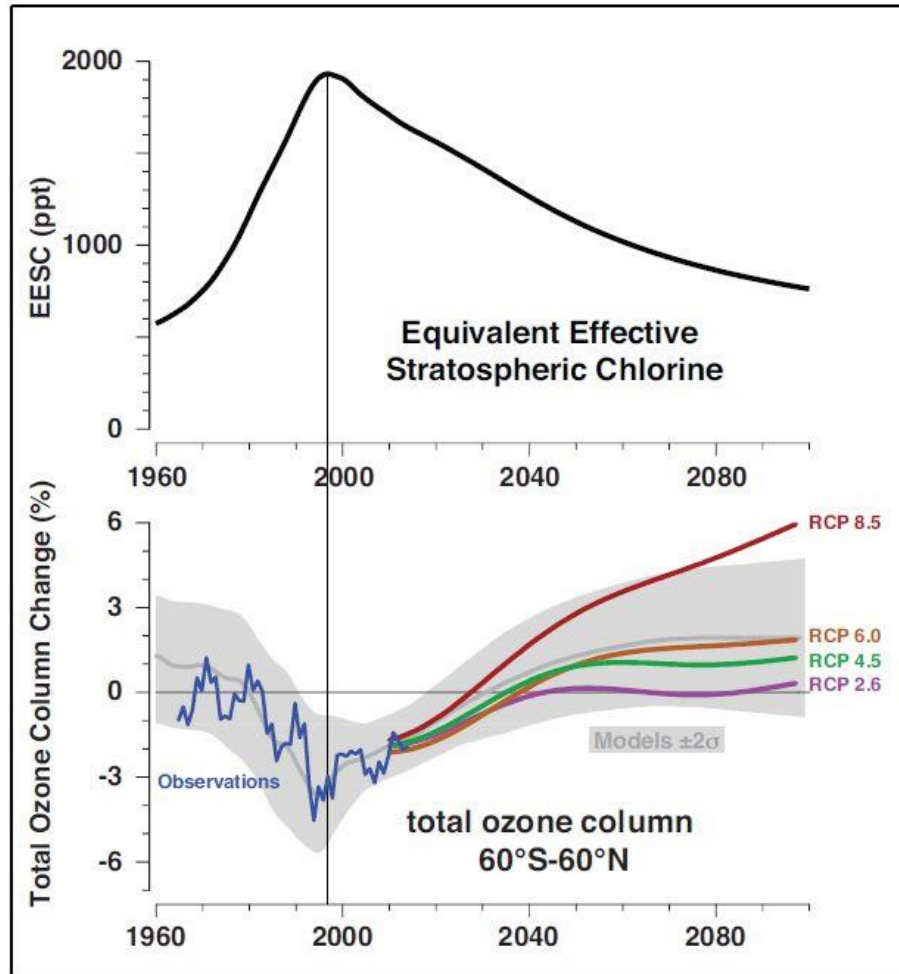
UNEP/WMO Ozone Assessment



- The current UNEP/WMO ozone assessments has been published in December 2014.
- Members of the Ozone_CCI CRG have contributed significantly to the UNEP/WMO ozone assessment.
- Ozone_CCI data products and CRG data from (Chemistry-)Climate Model simulations have been used in the assessment.

After the current assessment is before the next one ...

Evolution of the stratospheric ozone layer



Top figure:

Variation of EESC in midlatitudes from 1960 to 2100.

Bottom figure:

Evolution of the total ozone column depending on (four) different greenhouse gas scenarios (with different concentrations of CO₂, CH₄ and N₂O):

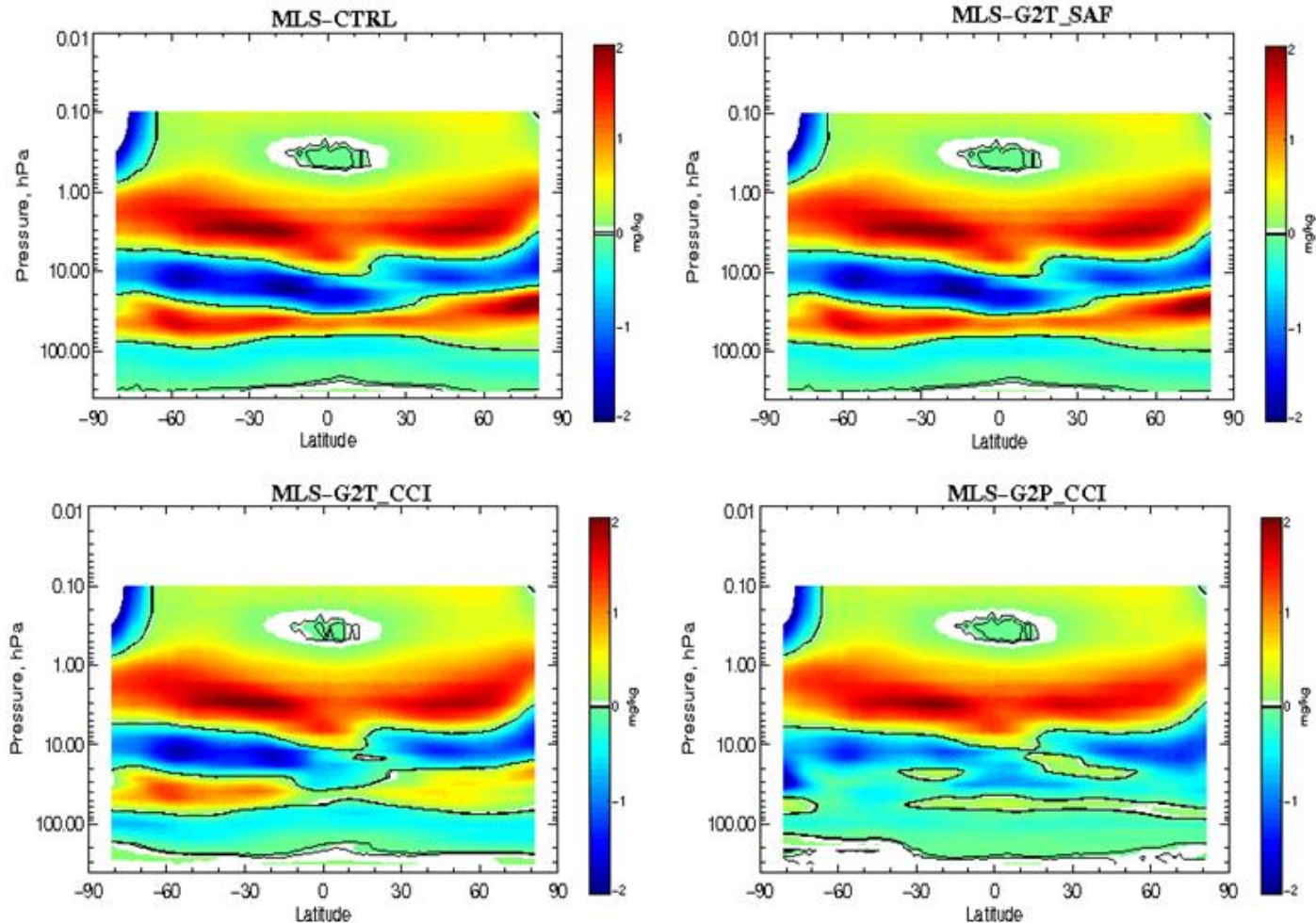
The four scenarios correspond to a global radiative forcing of

- +2.6 (blue),
- +4.5 (green),
- +6.0 (brown), and
- +8.5 (red) in W m⁻².

(WMO, 2014)

Zonal Mean Temporal Mean (MLS-Analyses):
Aug – Oct 2008

Comparisons with MLS ozone profiles



Climate Sensitivity

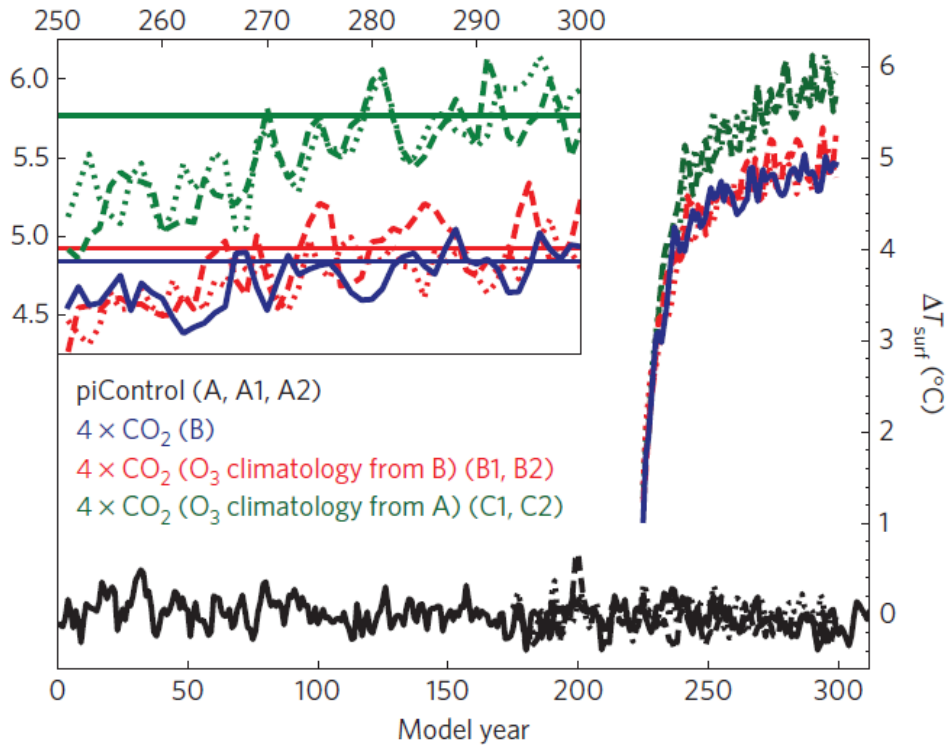
nature
climate change


LETTERS

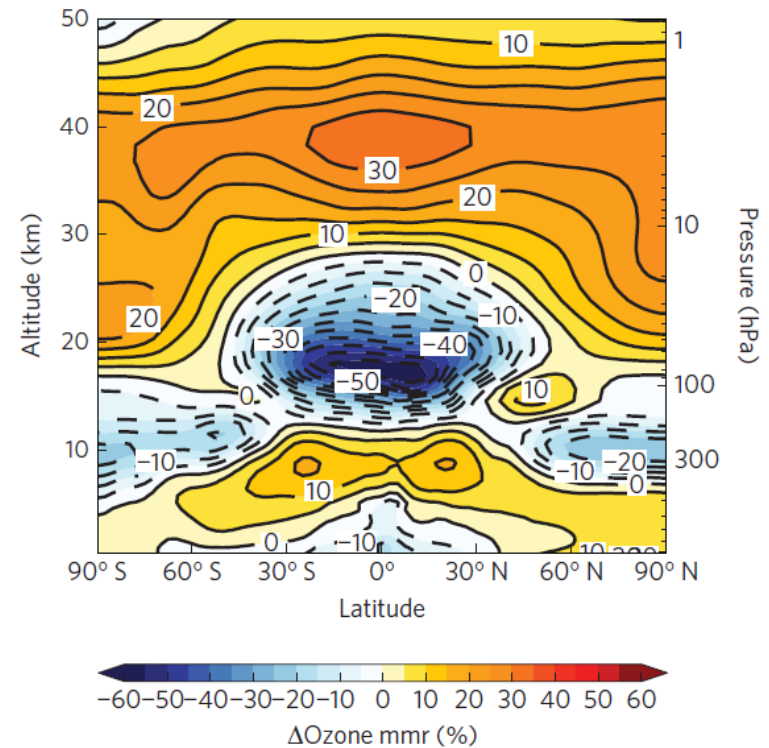
PUBLISHED ONLINE: 1 DECEMBER 2014 | DOI: 10.1038/NCLIMATE2451

A large ozone-circulation feedback and its implications for global warming assessments

Peer J. Nowack^{1*}, N. Luke Abraham^{1,2}, Amanda C. Maycock^{1,2}, Peter Braesicke^{1,2†}, Jonathan M. Gregory^{2,3,4}, Manoj M. Joshi^{2,3†}, Annette Osprey^{2,3} and John A. Pyle^{1,2}



 See also Dietmüller et al., 2014 for ozone changes when CO₂ is doubled.

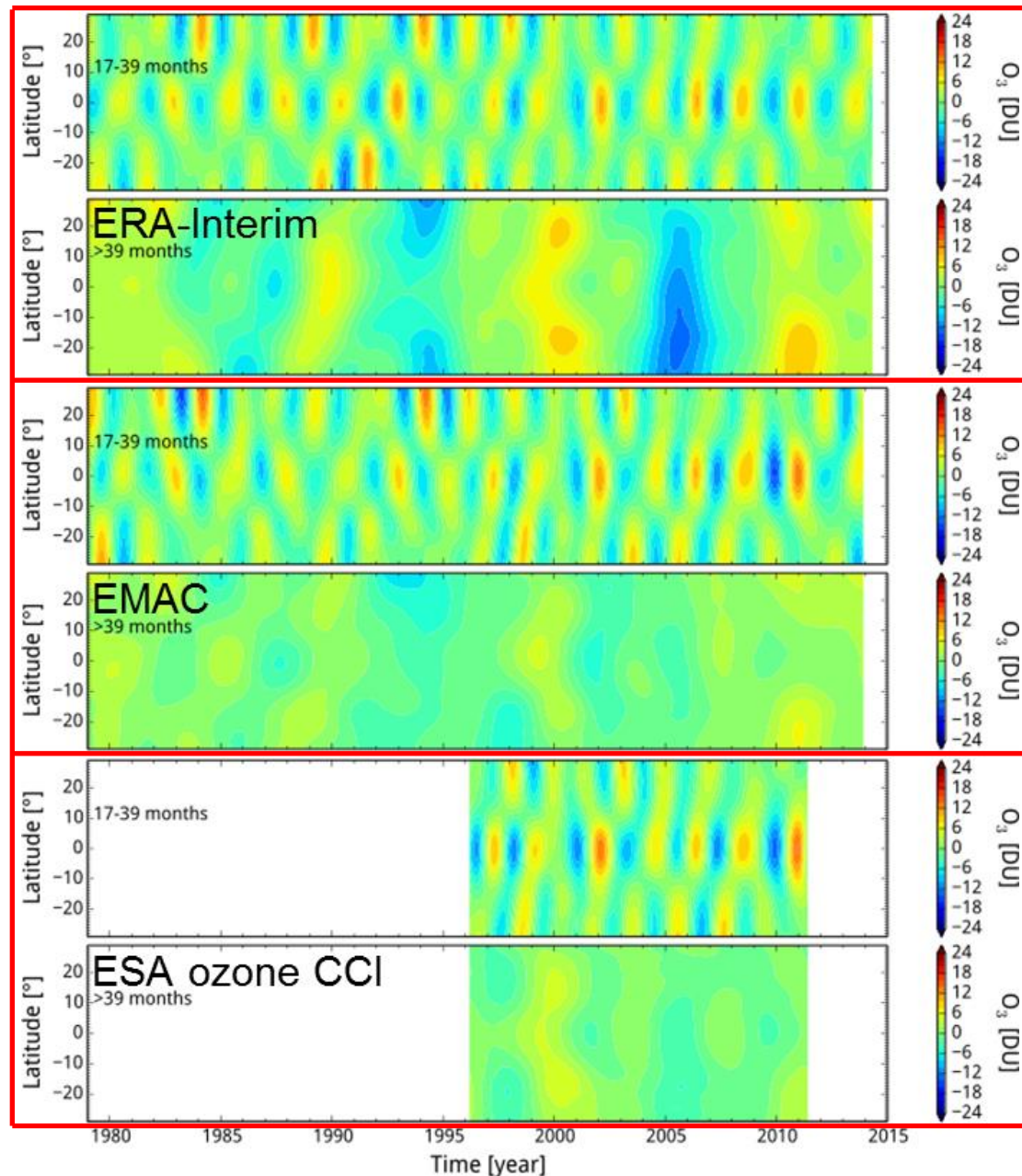


Ozone-QBO

Q: Quasi
B: Biennial
O: Oscillation

Alternating easterly and westerly wind bands in the equatorial lower stratosphere (~27 months periodicity).

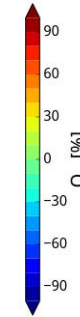
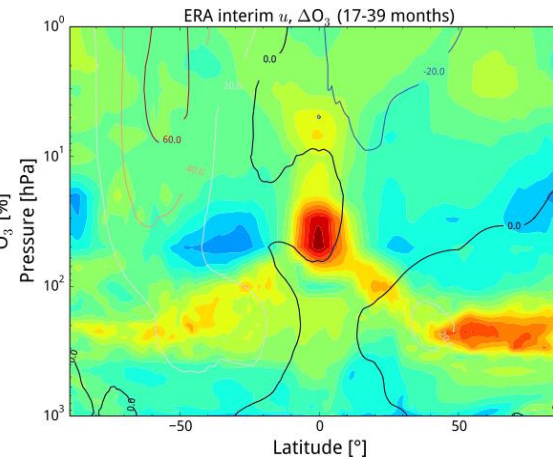
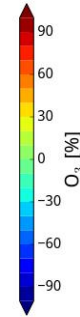
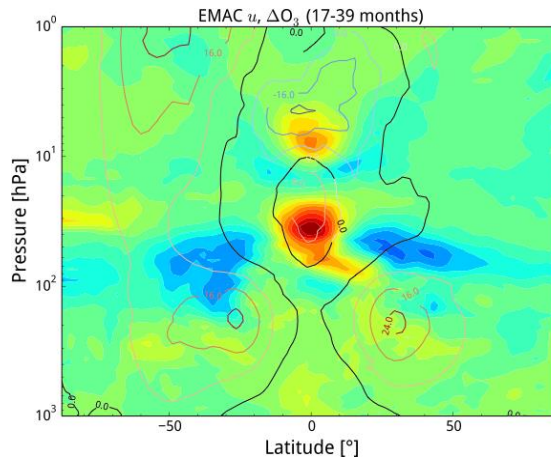
- Comparison between observations and models (using a bandpass filter)
- What is changing? How are regions outside the tropical belt affected?



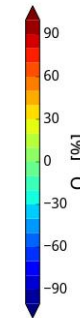
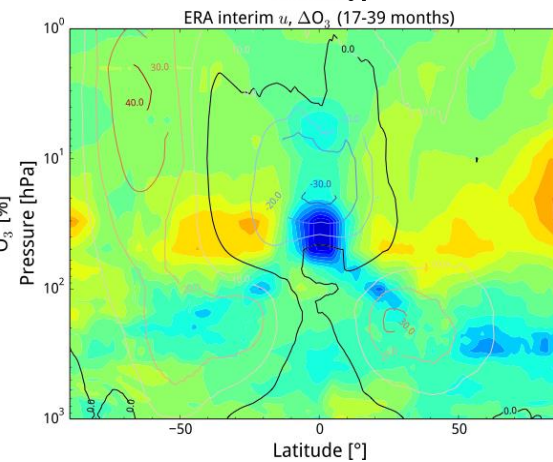
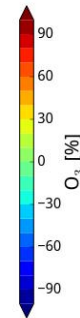
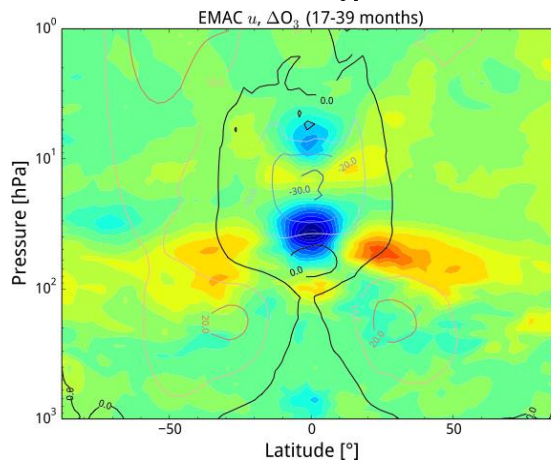
Ozone-QBO

Characterising changes (column versus profile - TTWG)

QBO Max



QBO Min



Emerging SPARC QBO Initiative

ENSO Fingerprinting

AGU PUBLICATIONS

Geophysical Research Letters

RESEARCH LETTER

10.1002/2014GL060212

Key Points:

- Global assessment of ozone trends using 18 years of European satellite data
- Natural variability masks ozone recovery in middle latitudes
- Additional 5–10 years of observations are required to detect expected onset

Correspondence to:

M. Coldevey-Egbers,
Melanie.Coldevey-Egbers@dlr.de

Citation:

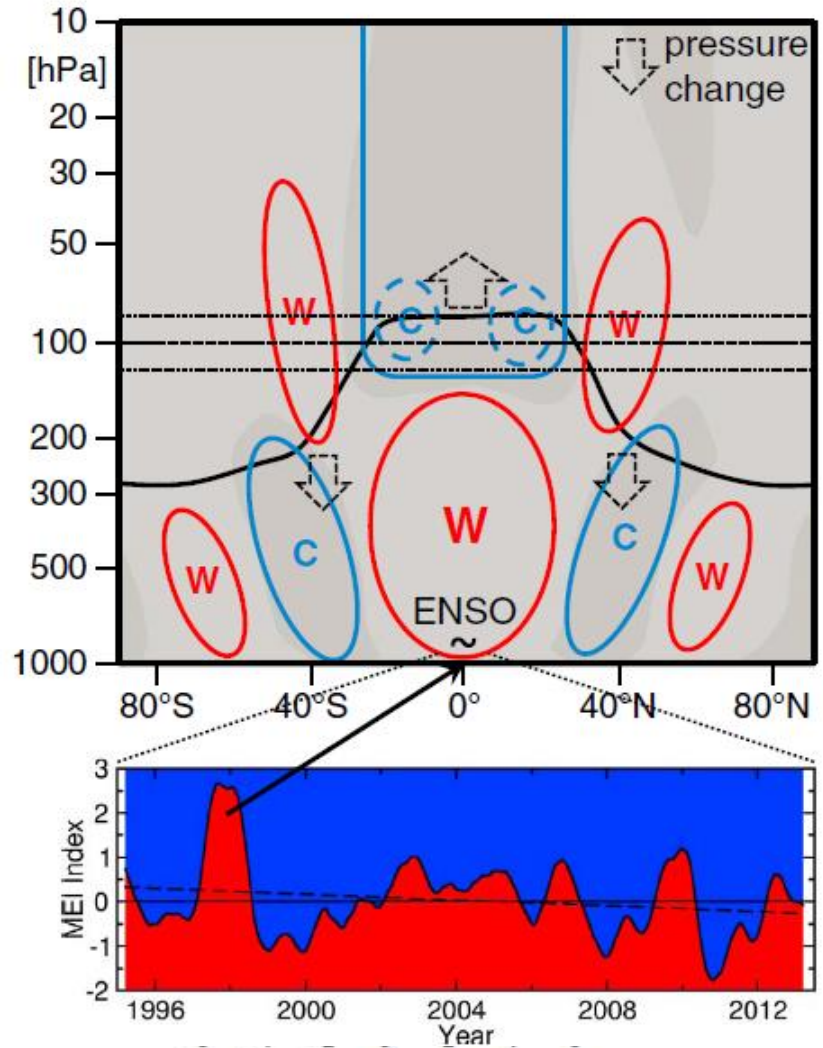
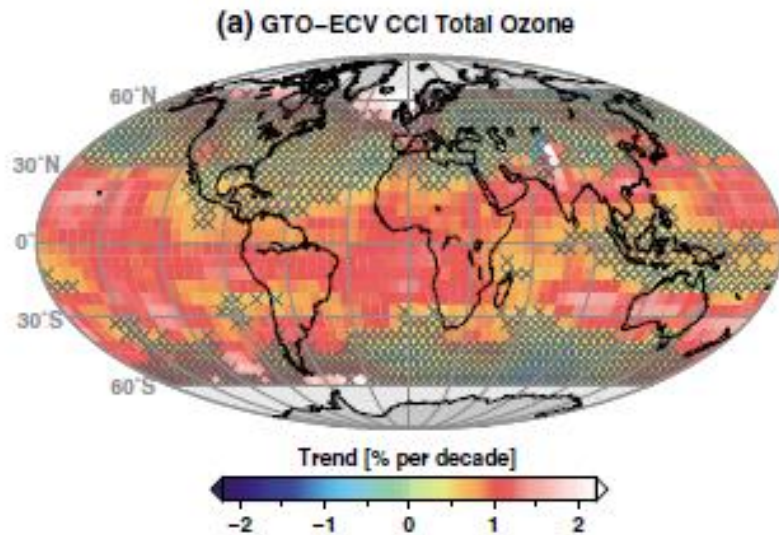
Coldevey-Egbers, M. D. G., Loyola R., P. Braesicke, M. Dameris, M. van Roozendael, C. Lerot, and W. Zimmer (2014), A new health check of the ozone layer at global and regional scales, *Geophys. Res. Lett.*, 41, 4363–4372. doi:10.1002/2014GL060212.

A new health check of the ozone layer at global and regional scales

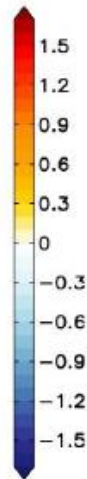
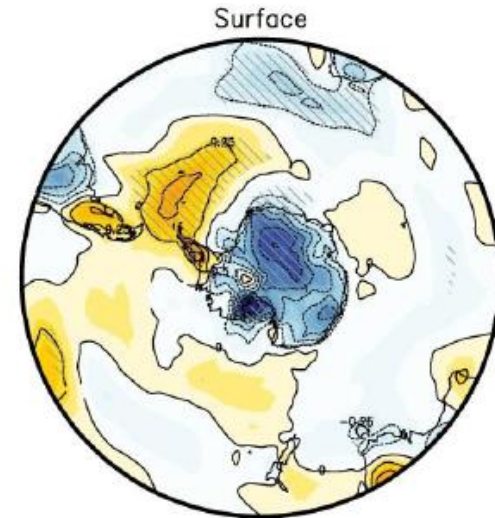
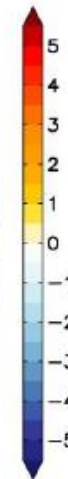
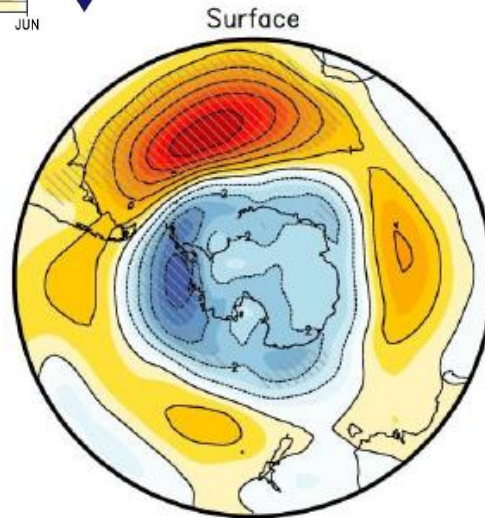
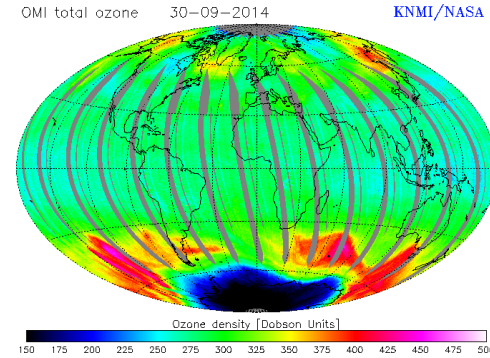
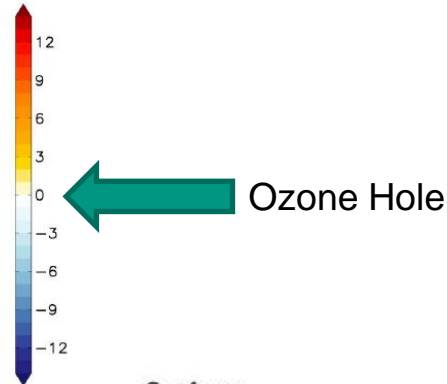
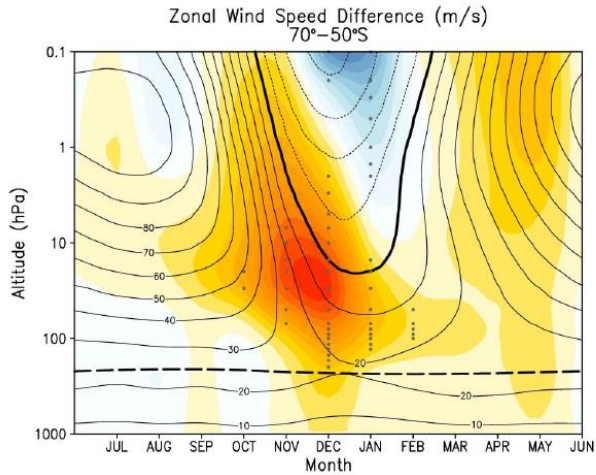
Melanie Coldevey-Egbers¹, Diego G. Loyola R.¹, Peter Braesicke², Martin Dameris³, Michel van Roozendael⁴, Christophe Lerot⁴, and Walter Zimmer¹

¹Remote Sensing Technology Institute, German Aerospace Center, Welfling, Germany, ²Karlsruhe Institute of Technology, Institute for Meteorology and Climate Research, Karlsruhe, Germany, ³Institute for Physics of the Atmosphere, German Aerospace Center, Welfling, Germany, ⁴Belgian Institute for Space Aeronomie BIRA-IASB, Brussels, Belgium

Abstract In this study, we provide a new perspective on the current state of the ozone layer using a comprehensive long-term total ozone data record which has been recently released within the framework of the European Space Agency's Climate Change Initiative. Based on a multivariate regression analysis, we disentangle various aspects of ozone change and variability on global and regional scales, thus enabling the monitoring of the effectiveness of the Montreal Protocol. Given dominant natural variability the expected midlatitude onset of ozone recovery is still not significant and would need additional 5 years of observations to be unequivocally detectable. A regional increase in the tropics is a likely manifestation of a long-term change in El Niño–Southern Oscillation intensity over the last two decades induced by strong El Niño in 1997/1998 and strong La Niña in 2010/2011.



Polar Processes and Climate Change



Keeble, J., Braesicke, P., Abraham, N. L., Roscoe, H. K., and Pyle, J. A.: The impact of polar stratospheric ozone loss on Southern Hemisphere stratospheric circulation and climate, *Atmos. Chem. Phys.*, 14, 13705-13717, doi:10.5194/acp-14-13705-2014, 2014.

IGAC TOAR (Tropospheric Ozone)



The screenshot shows the IGAC TOAR website. At the top left is the IGAC logo with the text 'INTERNATIONAL GLOBAL ATMOSPHERIC CHEMISTRY'. To its right is the tagline: 'Coordinating and fostering atmospheric chemistry research towards a sustainable world'. In the top right corner, there are links for 'Contact | Calendar | Join IGAC' and social media icons for Twitter, Facebook, and LinkedIn. Below this is a navigation menu with 'About', 'Activities', 'Publications', 'Events', and 'Community'. The main content area features a large heading 'Tropospheric Ozone Assessment Report (TOAR)' followed by a sub-heading 'Global metrics for climate change, human health and crop/ecosystem research'. Below this, it lists the 'Chair' as Owen Cooper and 'Steering Committee Members'. A large 'TOAR' logo is followed by a paragraph describing the report's purpose. A 'Mission' section follows. On the right side, there is a 'Current Activities' sidebar listing various projects: ACAM, AICI, Air Pollution & Climate, CCMI, DEBITS, Fundamentals of Atmospheric Chemistry, GEIA, HiT, IBBI, OASIS, POLARCAT, and TOAR.

Contact | Calendar | Join IGAC |  |  | 

About Activities Publications Events Community

Tropospheric Ozone Assessment Report (TOAR)

Global metrics for climate change, human health and crop/ecosystem research

Chair:
Owen Cooper, NOAA Earth System Research Laboratory/University of Colorado

Steering Committee Members

TOAR

tropospheric ozone assessment report

Tropospheric ozone is a greenhouse gas and pollutant detrimental to human health and crop and ecosystem productivity. Since 1990 a large portion of the anthropogenic emissions that react in the atmosphere to produce ozone have shifted from North America and Europe to Asia. This rapid shift, coupled with limited ozone monitoring in developing nations, has left scientists unable to answer the most basic questions: Which regions of the world have the greatest human and plant exposure to ozone pollution? Is ozone continuing to decline in nations with strong emission controls? To what extent is ozone increasing in the developing world? How can the atmospheric sciences community facilitate access to the ozone metrics necessary for quantifying ozone's impact on human health and crop/ecosystem productivity? TOAR is designed to answer these questions through the development of an assessment report based on expert opinion and analysis, and the generation of a range of ozone metrics at hundreds of sites around the world.

Mission:
To provide the research community with an up-to-date scientific assessment of tropospheric ozone's global distribution and trends from the surface to the tropopause.

Current Activities



- ACAM
- AICI
- Air Pollution & Climate
- CCMI
- DEBITS
- Fundamentals of Atmospheric Chemistry
- GEIA
- HiT
- IBBI
- OASIS
- POLARCAT
- TOAR




UNEP/WMO Ozone Assessment

For the next assessment:


World Meteorological Organization
Global Ozone Research and Monitoring Project—Report No. 55

SCIENTIFIC ASSESSMENT OF OZONE DEPLETION: 2014

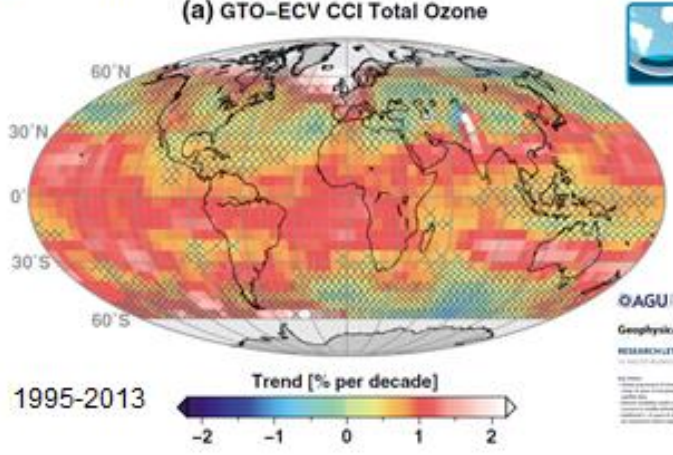
National Oceanic and Atmospheric Administration
National Aeronautics and Space Administration
United Nations Environment Programme
World Meteorological Organization
European Commission



Motivation

- Regional (trend) assessments are becoming more important.
- After the ozone assessment (2014) is before the next one ...
- Example:

(a) GTO-ECV CCI Total Ozone



2 18.05.2015 Peter Braesicke – REKLIM WS 2015

IMK-ASF



INTERNATIONAL CONFERENCE
OUR CLIMATE 2014
Regional perspectives on a global challenge **OUR FUTURE**

SPARC QBOi, CCMi

After the current assessment is before the next one ...

Thank you for your attention!

QUESTIONS?

A GREAT WIND IS BLOWING, AND THAT GIVES YOU EITHER IMAGINATION
OR A HEADACHE.



CATHERINE II OF RUSSIA (1729-1796)

L2 Data Product	Processing entity	Time period																				
			96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
TC_GOME	BIRA																					
TC_SCIAMACHY	BIRA																					
TC_GOME2A	BIRA																					
TC_GOME2B	BIRA																					
TC_OMI	BIRA																					
TC_OMPS#	BIRA																					
NP_GOME	RAL																					
NP_SCIAMACHY	RAL																					
NP_GOME2A	RAL																					
NP_GOME2B	RAL																					
NP_OMI#	RAL																					
NP_IASI	ULB																					
LP_SCIAMACHY	UBR/FMI																					
LP_OMPS#	UBR/FMI																					
LP_MIPAS	KIT/FMI																					
LP_GOMOS	ESA/FMI																					
LP_OSIRIS	UoS/FMI																					
LP_SMR	CHALM/FMI																					
LP_ACE	UofT/FMI																					
LP_SAGEII	FMI																					
LP_HALOE	FMI																					
UTLS_SCIA	UBR/FMI																					
UTLS_MIPAS	KIT/FMI																					
UTLS_GOMOS	FMI																					
UTLS_OSIRIS	UoS/FMI																					
UTLS_ACE	UofT/FMI																					
MLT_MIPAS_DN_DCA*	KIT																					
MLT_GOMOS_DN_DCA*	ESA/KIT																					
MLT_ACE_DN_DCA*	UofT/KIT																					
MLT_SMR_DN_DCA*	CHALM/KIT																					
MLT_MIPAS_SM#	KIT/IAA																					

L3/4 Data Product	Processing entity	Time period																				
			96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
TC_MRG	DLR																					
NP_MRG	KNMI																					
NP_ASSIM	KNMI																					
TTOC_GOME	DLR																					
TTOC_GOME2A [∞]	DLR																					
TTOC_GOME2B [∞]	DLR																					
LNTOC_ENVISAT	UBR																					
LNTOC_OMPS	UBR																					
LNTOC_OMPSG2#	UBR																					
LP_SCIA_MZM	UBR/FMI																					
LP_OMPS_MZM#	UBR/FMI																					
LP_MIPAS_MZM	KIT/FMI																					
LP_GOMOS_MZM	ESA/FMI																					
LP_OSIRIS_MZM	UoS/FMI																					
LP_SMR_MZM	CHALM/FMI																					
LP_ACE_MZM	UofT/FMI																					
LP_SAGEII_MZM	FMI																					
LP_HALOE_MZM	FMI																					
LP_MRG_MZM	FMI																					
LP_MRG_BWM	FMI																					
LP_MRG_FRM	FMI																					
UTLS_SCIA_L3\$	UBR/FMI																					
UTLS_MIPAS_L3\$	KIT/FMI																					
UTLS_GOMOS_L3\$	FMI																					
UTLS_OSIRIS_L3\$	UoS/FMI																					
UTLS_ACE_L3\$	UofT/FMI																					
UTLS_MRG_L3\$	FMI																					
MLT_MIPAS_MZM_DN	KIT/IAA																					
MLT_MIPAS_MZM_DN_DCA*	KIT/IAA																					
MLT_MRG_MZM_DN	KIT/IAA																					
MLT_MRG_MZM_DCA*	KIT/IAA																					