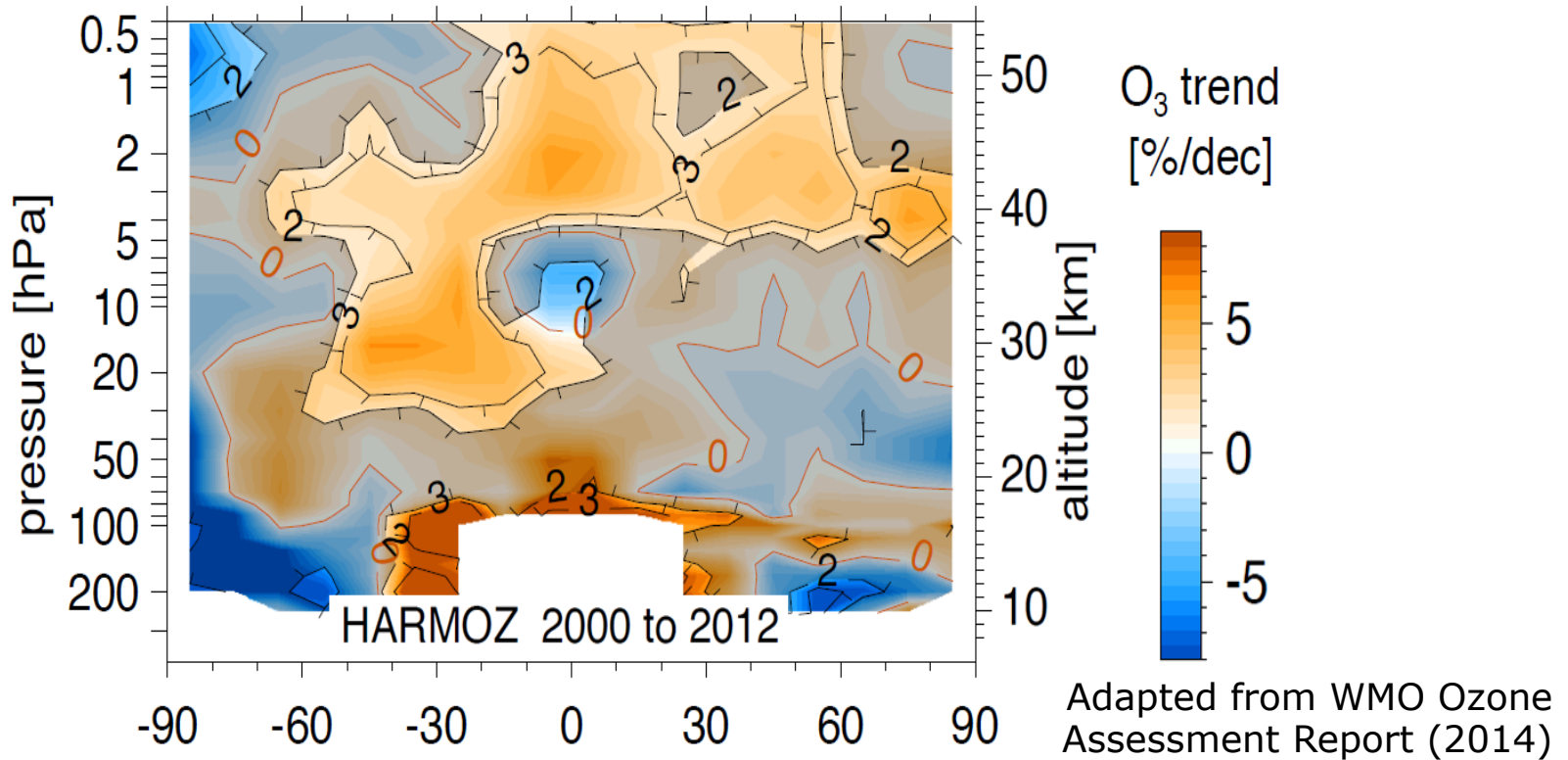


Ozone_cci Legacy

7th CCI Collocation meeting, ESA/ESRIN, Frascati, 4-6 October 2016



M. Van Roozendael, on behalf of the Ozone_cci consortium





1) What was the status of the Ozone landscape at the start of the CCI programme?

- Total ozone monitored from the ground since 1926 (Dobson)
- NASA ozone program started in the seventies (BUV/TOMS)
- European ozone program kicked-off in 1995 with ERS-2 GOME, 10 years after discovery of the Antarctic ozone hole
- **15 years later (2009):** ozone measurements available from many sensors: GOME, SCIA, MIPAS, GOMOS, OMI, GOME-2,... However no coordinated effort to harmonize data production
- Multiplication of data products (operational/scientific). Access difficult and often confusing for the (non-expert) user



2) What is the status of the ozone landscape at the end of 6 years of CCI

- In the **US**: reprocessed NASA/NOAA SBUV ozone CDR (1970-2011)
- In **Europe** (CCI):
 - Complete reprocessing of nadir UV sensors (1995-2015) using common algorithm selected from Round-Robin
 - HARMOZ limb data sets generated from 10 different ESA, ESA/TPM and NASA sensors.
 - Extensive validation of all data sets
 - All data sets accessible on single entry point in NetCDF-CF format

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Some outcomes... and a concern

- Ongoing transfer of most mature CCI processing chains to **C3S**
- 4 ozone data sets submitted for inclusion in **Obs4MIPS**
- 6 CCI ozone data sets included in **ERA5** reanalysis
- Contributions to WMO **Ozone Assessment 2014**
- Major concern → Limb sensor gap awaited in few years
 - No European successor after ENVISAT (lost in 2012) and the ESA/TPM ODIN and SciSat/ACE in flight since 2001
 - On US side, Aura/MLS in flight since 2003
 - The only current limb mission is the US OMPS (ozone only)
 - ALTIUS mission recently approved, but not flying before 2020+



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3) What are the activities in CCI that have served to change from Status 1 to Status 2

- CCI has created a community of European satellite ozone experts working together in a single project!



- Keys to success
 - Improved algorithms consistently applied to many sensors
 - Coordinated validation using common approaches
 - New data standards (NetCDF-CF) enforced by DSWG-SEWG
 - Harmonised documentation
 - Access to high-performance processing systems (e.g. at UK Jasmin/CEMS facility)



4) What are the lessons learned from CCI to provide to future projects

- Data production and research expertise must be closely linked → strength of distributed processing at expert laboratories, ensure state-of-the-art CDR generation and efficient transfer/scaling to new sensors
- Coordination essential to ensure regular and consistent data flow (risk of broken chain and/or error in production higher than for centralised system)
- Transfer to C3S is a success for CCI, however there remains a strong need for continued R&D (e.g. adaptation of successful baselines to Sentinels)



4) What are the lessons learned from CCI to provide to future projects (cont.)

- GCOS requirements are not fulfilled on a number of aspects, e.g. time resolution, vertical resolution, accuracy and stability in certain ranges of altitudes (troposphere and UTLS)
- New sensors will help to close some of the gaps → e.g. time resolution and coverage, through combination of Sentinels 4 & 5 + extra-European GEO missions
- More research needed on OMPS to link with historical Limb sensors
- More research needed on integration of nadir TIR sensors in synergy with UV
- ...