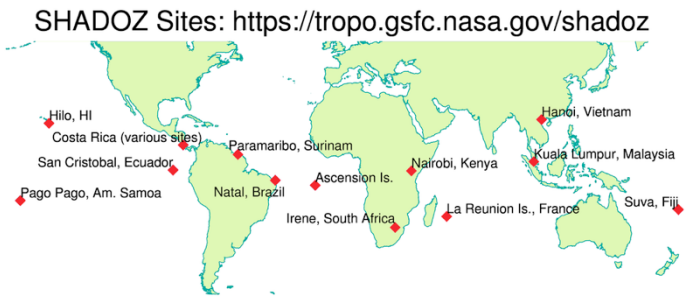
Newsletter No. 28, 12/2019

SHADOZ Notes

Southern Hemisphere ADditional OZonesondes

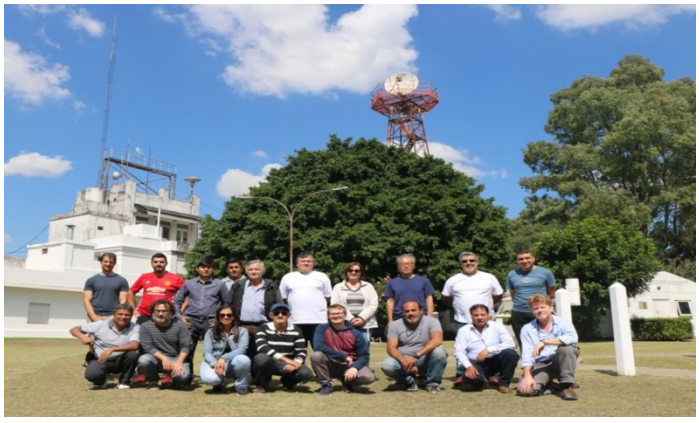
A NASA/Goddard Space Flight Center public archive of tropical and remote ozonesonde profile data

SHADOZ is a NASA project to augment and archive balloon-borne ozonesonde launches and to archive data from tropical and remote operational sites. The project was initiated in 1998 by NASA/Goddard Space Flight Center, the NOAA/Global Monitoring Division, and international co-investigators. There are currently thirteen stations launching ozonesondes in the SHADOZ network. The collective data set provides the first climatology of tropical ozone in the equatorial region, enhances validation studies aimed at improving satellite remote sensing techniques for tropical ozone estimations, and serves as an educational tool to students, especially in participating countries.



❖ Dobson Intercomparisons in South America❖

From March 4, 2019 to March 22, 2019, Dr. Francisco Raimundo Sa Silva, SHADOZ Natal station manager, and Tércio Luiz Bezerra Penha, Natal Dobson operator, both of INPE (the Brazilian Space Agency), participated in the World Meteorlogical Organization (WMO)- and US National Oceanic and Atmospheric Administration (NOAA)-sponsored **Regional Campaign for the Intercomparison/Calibration of Dobson Spectrophotometer** at the Argentine National Meteorological Service (ASMN) in Buenos Aires (**Photo on right**). This campaign, held at the GAW Regional Dobson Calibration Center (RDCC), aimed to maintain the network of Dobson ozone spectrometers operated in South America under the guidance of Drs. Glen McConville and Koji Miyagawa (both of NOAA). Participants (**Photo on left**) included operators from: Argentina, Brazil (Dobson #093 from Natal and Dobson #114 from Cachoeira Paulista – São Paulo, both supported by INPE), Cuba, Mexico, Peru, Uruguay and with NOAA's "traveling standard". Regular Dobson Intercomparisons serve as an assurance of the quality of the total ozone data sets provided. They also represent fulfillment of WMO/GAW quality control (QC) requirements for monitoring of atmospheric total ozone. **Note:** The SHADOZ Natal site started operations in 1978, launching ozonesondes and operating a Dobson (and Brewer) spectrophotometer. The site joined SHADOZ in 1998. **Photo credit: F. R. da Silva**



Intercomparison participants

Measurements with all Dobson Spectrophotometers

❖ Ozonesonde Quality Experts Meet in Belgium❖

Anne Thompson, Ryan Stauffer and Debra Kollonige traveled to Brussels, Belgium, 17-19 September on behalf of the SHADOZ ozonesonde team. Attendees from the two –day Workshop (**Photo on right**) held at the National Archives (St-Gilles area) are producing a WMO Report on updated Standard Operating Procedures (SOPs) for ozonesonde preparation and launches as a part of the Assessment of Standard Operating Procedures for Ozone Sondes (ASOPOS 2.0). Ryan presented recent analyses of sonde instrument changes and their effects on SHADOZ ozonesonde data at the Workshop.

On 19 September, the group attended a celebratory Symposium (**Photo gallery below**) on "50 Years of Ozonesondes at Uccle," the home of the Royal Meteorological Institute (RMI) of Belgium. Symposium speakers included the President of the Intl. Ozone Commission (S. Godin-Beekman), NDACC Co-Chair (M. de Maziere), founder of the Uccle Ozonesonde program (D. DeMuer), G. Brasseur (Max Planck-Hamburg, NCAR), P. Taalas (WMO-Secretary General) and Herman Smit (Jülich Research Centre; ASOPOS). Anne Presented "SHADOZ and the Special Role of Tropical Ozonesondes". An ozonesonde launch accompanied lunch (**Photo below**).

ASOPOS 2.0 Workshop Attendees (left-to-right): Hugo DeBacker (RMI), David Tarasick (ECCC), Debra Kollonige (SHADOZ Archiver; NASA), Bryan Johnson (SHADOZ Co-I; NOAA), Anne Thompson (SHADOZ PI; NASA), Peter VonDerGathen (AWI Germany), Holger Vömel (SHADOZ Costa Rica; NCAR), René Stübi, (SHADOZ Nairobi; Meteoswiss), Marc Allaart (SHADOZ Paramaribo; KNMI), Herman Smit (Jülich), Ryan Stauffer (SHADOZ; NASA), Roeland Van Malderen (RMI), and Gary Morris (St. Edwards Univ., USA). **Photo credit: Ryan Stauffer.**

❖ "50 Years of Ozonesondes at Uccle" Photo Gallery❖

Venue for "Uccle 50" celebration.

A. Thompson, SHADOZ speaker

H. Smit on JOSIE experiments

Uccle site (Royal Met. Institute).

Host R. vanMalderen; A. Thompson.

P. von der Gathen; R. Stübi, H. Vömel

❖ SHADOZ Updates at NDACC Meeting in Japan❖

The annual meeting of the Network for the Detection of Atmospheric Composition Change (NDACC) Steering Committee (SC) was held October 15-18 at the Epochal Tsukuba Intl Congress Center, Tsukuba, Ibaraki, Japan (**Photo on right**). Co-Chair of the SC is Anne Thompson who also reported on SHADOZ (**Figure bottom right**). Ken Jucks, who is the NASA program manger that supports NDACC & SHADOZ activities, was also present. René Stübi presented for the Ozonesonde Working Group, showing recent analyses, including work from Ryan Stauffer on ozonesonde data artifacts. Ryan was also elected the new Co-Lead for the Ozonesonde Working Group during the meeting. Congratulations, Ryan!

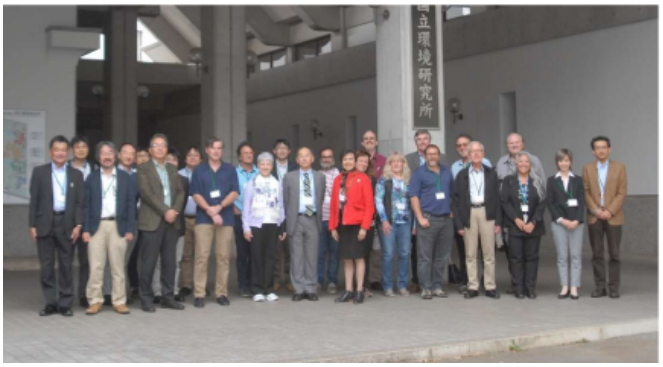
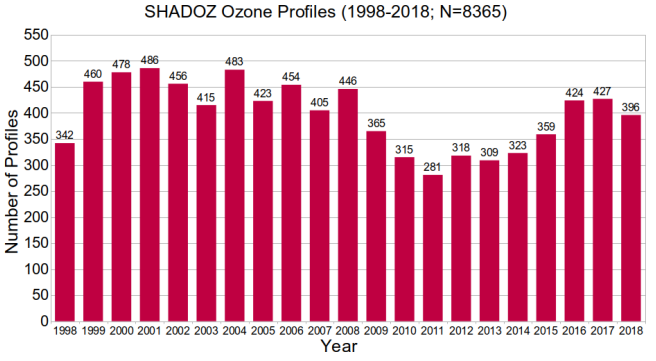


Photo above: The NDACC SC group photo was taken during a visit to the nearby National Institute for Environmental Science (NIES). **Credit: H. Nakajima**
Figure below: Statistics presented by Anne Thompson reporting on SHADOZ total ozone profiles reprocessed 1998-2018 as of 2019-10-15 (**Credit: D. Kollonige**).



❖ Recent noteworthy ozonesonde publications ❖

Stauffer, R. M., A. M. Thompson, L. D. Oman, and S. E. Strahan (2019). The effects of a 1998 observing system change on MERRA-2-based ozone profile simulations. J. Geophys. Res., 124. https://doi.org/10.1029/2019JD030257

Witte, J. C., Thompson, et al. (2019). The NASA Wallops Flight Facility digital ozonesonde record: Reprocessing, uncertainties, and dual launches. Journal of Geophysical Research: Atmospheres, 124. https://doi.org/10.1029/2018JD030098

Thompson, A. M., et al. (2019). Ozonesonde Quality Assurance: The JOSIE-SHADOZ (2017) Experience. Bull. Amer. Meteor. Soc. https://doi.org/10.1175/BAMS-D-17-0311.1

Tarasick et al. (2019). Quantifying stratosphere-troposphere transport of ozone using balloon-borne ozonesondes, radar windprofilers and trajectory models, Atmospheric Environment, 198, https://doi.org/10.1016/j.atmosenv.2018.10.040

Stauffer, R. M., Thompson, A. M. & Witte, J. C. (2018). Characterizing Global Ozonesonde Profile Variability from Surface to the UT/LS with a Clustering Technique and MERRA-2 Reanalysis. J. Geophys. Res., 123. https://doi.org/10.1029/2018JD028465

Sterling, C. W., et al. (2018). Homogenizing and estimating the uncertainty in NOAA's long term vertical ozone profile records measured with the electrochemical concentration cell ozonesonde. Atmos. Meas. Tech. https://doi.org/10.5194/amt-2017-397

Witte, J. C., A. M. Thompson, H. G. J. Smit, H. Vömel, R. Stübi, and F. Posny (2018). First Reprocessing of Southern Hemisphere ADditional OZonesondes (SHADOZ) Profile Records. 3. Uncertainty in Ozone Profile and Total Column. J. Geophys. Res., 123. https://doi.org/10.1002/2017JD027791

Thompson, A. M. et al. (2017). First Reprocessing of Southern Hemisphere ADditional OZonesondes (SHADOZ) Ozone Profiles (1998-2016). 2. Comparisons with Satellites and Ground-based Instruments. J. Geophys. Res., 122. https://doi.org/10.1002/2017JD027406

Witte, J. C., A. M. Thompson, et al. (2017). First reprocessing of Southern Hemisphere ADditional OZonesondes (SHADOZ) profile records (1998-2015) 1: Methodology and evaluation. J. Geophys. Res., 122. https://doi.org/10.1002/2016JD026403

❖ Upcoming Relevant Meetings ❖

SHADOZ will be represented at the following:

9-13 Dec. 2019:
American Geophysical Union Meeting
San Francisco, California USA

12-16 Jan. 2020:
American Meteorological Society Meeting
Boston, Massachusetts USA

17-19 March 2020:
ASOPOS 2.0 Panel Meeting
Silver Spring, Maryland USA

Attention Data Users:

- Questions about SHADOZ should be directed to PI, Anne Thompson. SHADOZ data sets are products of evolving research by the site Co-Investigators (Co-Is) and ongoing community collaboration.
- The SHADOZ homepage gives technical and contact information for each station and their Co-Is responsible for the original data processing. Co-Is should be consulted for details of their methods & appropriate references to their work.
- Questions about the final data and any news updates should be directed to the Archiver: Debra Kollonige.

▶*SHADOZ Network Science Team*◀

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SHADOZ Site	Principal Investigator (PI), Station Chiefs and Operators
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San Pedro, Costa Rica	Henry Selkirk (PI; henry.b.selkirk@nasa.gov; NASA/USRA), Holger Vömel (NCAR), Jorge Andres Diaz & Ernesto Corrales (UCR)
Hanoi, Vietnam	Shin-Ya Ogino (PI; ogino-sy@jamstec.go.jp; JAMSTEC), Nguyen Thi Hoang Anh, Tran Thu Huang & Lai Thanh Nga (AMO)
Hilo, HI, USA	Bryan Johnson (PI; bryan.johnson@nasa.gov; NOAA/GMD), David Nardini & Darryl Kuniyuki (NOAA/MLO)
Irene, South Africa	Gert J. R. Coetzee (PI; gerrie.coetzee@weathersa.co.za; SAWS), Tshidi Machinini (SAWS)
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Nairobi, Kenya	Christian Félix (PI; christian.felix@meteoswiss.ch), Réné Stübi & Gonzague Romanens (Meteoswiss), Kennedy Thiongo (KMD)
Natal, Brazil	Francisco R. da Silva, Tercio L. B. Penha (INPE)
Paramaribo, Surinam	Ankie Piters (PI; ankie.piters@knmi.nl) & Marc Allart (KNMI), Sukarni Mitro & George Paiman (MDS)
Pago Pago, Am. Samoa	Bryan Johnson (PI; NOAA/GMD), LTJG Diane M. Perry (NOAA/ASO)
San Cristóbal, Ecuador	Bryan Johnson (PI; NOAA/GMD), Manuel Carvajal and Jimmy Paredes (INAMHI)
Suva, Fiji	Bryan Johnson (PI; NOAA/GMD), Matakite Maata, Francis Mani & Miriama Vuiyasawa (USP)

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