



SHADOZ Notes

Southern Hemisphere Additional OZonesondes

A NASA public archive of tropical ozonesonde profile data for remote sensing research, model studies and education

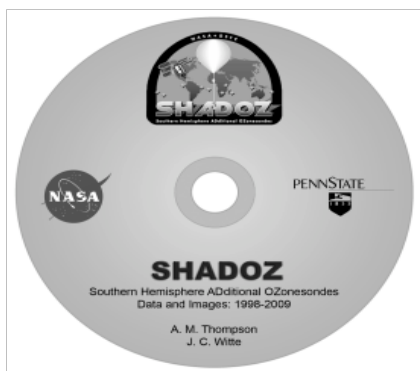
SHADOZ is a NASA project to augment and archive balloon-borne ozonesonde launches and to archive data from tropical and sub-tropical operational sites. The project was initiated in 1998 by NASA/Goddard Space Flight Center with other US and international co-investigators. There are currently fourteen stations launching ozonesondes in the SHADOZ network; Malindi-Kenya, Cotonou-Benin, and Tahiti Is. have stopped operations. 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.

Data are public <<http://croc.gsfc.nasa.gov/shadoz>>

SHADOZ Sites



SHADOZ CD-ROM



To increase access to SHADOZ data beyond the internet, a cd-rom is available that mimics the website providing the bulk of the archival data from 1998 to 2009. Campaigns data are also included. Contact SHADOZ PI Anne M. Thompson at anne@met.psu.edu for a copy.

SHADOZ Participates in NDACC

One component of the Network for the Detection of Atmospheric Composition Change (NDACC) is maintaining a high-quality global network of ozonesonde data for long-term trend studies and establishing a coherent set of standard operating procedures for ozonesondes. SHADOZ has been designated as a "Cooperating Network" under NDACC to foster greater collaborative measurement and analyses activities through mutual data access and representation.

For more information go to the NDACC website: <http://www.ndsc.ncep.noaa.gov/>

Past Meetings Feature Ozonesondes

- NDACC Steering Committee, Oct./2010, Queenstown, New Zealand.
 - A topic of discussion was new research on background currents and whether or not too high background currents lead to spuriously low ozone readings in the tropopause region. The topic was not resolved but was re-visited in several other meetings (below). SHADOZ was represented by Bryan Johnson, NOAA/ESRL/GMD, Boulder.
- Ozone Profiles Meeting, Jan./2011, WMO, Geneva.
 - With assessments in mind, the background current topic appeared on the agenda along with changes in recommended ozone cross-sections. SHADOZ Co-I Sam Oltmans presented 25 years of NOAA ozone profile research, including SHADOZ.
- Tropospheric Ozone Trends, Apr./2011, Toulouse, France.
 - This concluded with a Wiki page formed with contributors grouped according to topics (J-P Cammas, Lead; M. Fujiwara and A. Thompson, members). See <<http://mozaic.aero.obs-mip.fr/web/features/workshop.html>>.

Future Meetings Feature Ozonesondes

- WCRP (World Climate Research Program) Open Science Conference, Denver, CO USA
 - <http://www.wcrp-climate.org/conference2011/>
 - The C15 session and several others feature SHADOZ. Deadline for early registration is 12 July 2011.
- NDACC Symposium XX at St Paul, La Réunion Island.
 - This is a SHADOZ site, at St-Denis!
 - Registration: <http://ndacc2011.univ-reunion.fr>

Station Updates

- **New Station:** Ha Noi, Vietnam, joined January 2011: Thanks to Co-I Masato Shiotani for introducing us to Dr Shin-ya Ogino at JAMSTEC, whose ties with the Vietnamese Meteorological Dept (Ms Ms. Hoang Thi Thuy Ha, makes this possible. Data from 2006 onward are posted at the SHADOZ website.
- **Re-activated Station:** Irene, South Africa. Soundings suspended since 2008, resumed in December 2010 with support from the South African Weather Service. Many thanks to Co-I Dr. Gerrie Coetsee and his South Africa Weather Service Management team led by Mr. Lucky N. Ntsangwane.

Recently published: SHADOZ features in this Review Article published in April 2011:

Thompson, A. M., S. J. Oltmans, D. W. Tarasick, P. Von der Gathen, H. G. J. Smit, J. C. Witte, Strategic ozone sounding networks: Review of design and accomplishments, *Atmos. Environ.*, doi:10.1016/j.atmosenv.2010.05.002, 45, 2145-2163, 2011.

If you are unable to obtain a copy, contact Anne Thompson at amt16@psu.edu

A word from the SHADOZ PI

For the past 8 months I have been in South Africa on a Fulbright Scholar Award from the US Department of State. Started in 1946, the Fulbright Program supports US scholars for research and teaching assignments in 50-plus countries with the long-term goal of peace through international understanding and cooperation, <http://fulbright.state.gov>.

As a visiting Scholar to Northwest University-Potchefstroom in Dean J. J. Pienaar's group, my Fulbright was also hosted by the Climatology Research group at the University of the Witwatersrand, the Council for Scientific and Industrial Research (CSIR) in Pretoria and the South African Weather Service (SAWS). While in South Africa, I have been analyzing the nearly 20-year Irene sounding data and assembling surface ozone data from monitoring stations in the region around Irene. In addition, Penn State has loaned a surface ozone analyzer to SAWS so that Irene soundings can be calibrated. We demonstrated a Pandora spectrometer that is used to ground-truth OMI, GOME and SCIAMACHY satellite measurements of NO₂, ozone and formaldehyde. The Pandora operated for a week in May at the Irene site along with sondes, launched day and night, the Irene Dobson and UV sensor (photo below) and a 532-nm aerosol lidar from CSIR.

In February the NOAA GCOS office (Global Climate Observing System) sponsored me and two other US scientists to visit Ascension Island, where our 13-year SHADOZ soundings were interrupted last year due to the departure of the US Weather Service from Ascension. Ascension is a unique SHADOZ location with its position in the heart of the Atlantic downwelling region of the Walker circulation and its sounding record goes back to 1990. Ascension experiences clean-air episodes in March-April-May during a convective period as well as biomass burning pollution from north and south of the ITCZ and from Africa and South America. NOAA flask samples for CO and CO₂ are collected at Ascension; Prof. Euan Nisbet's group at Royal Holloway College, UK, operates a Piccaro gas analyzer. NASA and NOAA are working on resumption of SHADOZ with the US Air Force, the Royal Air Force and the UK Meteorological Office.

The last SHADOZ visit during the Fulbright will be to the Nairobi station operated by Kenya Meteorological Department and Meteoswiss. Seminars will be given at KMD, the University of Nairobi and the US University in Nairobi's Environmental Program. Through the Fulbright residency I have tried to strengthen SHADOZ stations and connect groups within Africa working on environmental science. Near Irene, we conducted a Workshop on 'Changing Chemistry in a Changing Climate over the southern African Region,' 31 May to 3 June at which 65 regional and overseas scientists, industry and government partners exchanged new findings and looked ahead to further collaborative work in the area. The outcome of the Workshop will be a review article and a book: see <<http://cc.netgen.co.za>>. The scientific accomplishments, hospitality and support throughout the Fulbright have been incomparable! I came with ambitious goals that thanks to many South African colleagues were fulfilled beyond my greatest dreams. – Anne Thompson



SAWS Operator Katlego P Ncongwane shows Dobson #89 to University of Pretoria meteorology students during the SANOX campaign, 23-27 May 2011, at Irene.



Irene launch by SHADOZ Co-I Dr. Gerrie Coetzee of South African Weather Service (SAWS).

SHADOZ Science Team

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SHADOZ Notes is published for and about the data archive and stations. SHADOZ is supported by ACMAP an Aura NASA programs. Individual SHADOZ stations are supported by in-country agencies and universities.

The SHADOZ homepage provides technical information for each station and contact information. The station managers are responsible for the original data processing and should be consulted for details of their methods and appropriate references to their work.

SHADOZ Principal Publications

- Thompson, A. M. et al., Southern Hemisphere Additional Ozonesondes (SHADOZ) 1998-2004 tropical ozone climatology. 3. Instrumentation, Station-to-station variability, evaluation with JOSIE-2000 results, *J. Geophys. Res.*, doi:10.1029/2005JD007042, 2007.
- Thompson, A. M., et al., Southern Hemisphere Additional Ozonesondes (SHADOZ) 1998-2000 tropical ozone climatology. 2. Tropospheric variability and the zonal wave-one, *J. Geophys. Res.*, 108, 8241, doi: 10.1029/2002JD002241, 2003.
- Thompson, A. M. et al., Southern Hemisphere Additional Ozonesondes (SHADOZ) 1998-2000 tropical ozone climatology. 1. Comparison with Total Ozone Mapping Spectrometer (TOMS) and ground-based measurements, *J. Geophys. Res.*, 108, 8238, doi: 10.1029/2001JD000967, 2003.