

## KENYA

Ozone research and monitoring activities in Kenya are the country's effort to compliment the international systematic atmospheric observations in support of the spirit of the Vienna Convention. Kenya is committed to provide, in line with the objectives of GAW-GO<sub>3</sub>OS, long-term records of ozone and other species that are essential for determining the variability of these species and their impacts on life and climate. Notably, the goal is the continued monitoring of tropospheric and stratospheric ozone and the assessment of its variations that are relevant to the wellbeing of the environment.

Ozone research and monitoring activities in Kenya are undertaken at three locations closely related to Kenya Meteorological Department. Profiles of Ozone are taken weekly at Kenya Meteorological Department, while continuous measurements of surface ozone and daily column ozone are measured at the Mount Kenya GAW station and the University of Nairobi respectively. This information is exclusive of other related activities that may be going on in the country, such as San Marco, Malindi, Kenya. This site is associated with the military and information concerning the facility is not open to the public.

### **Nairobi Ozonesonde Station:**

Location: Kenya Meteorological Department (1° 18' South, 36° 45' East, Elevation 1795m)

*Period of Observation\_ - since May 1996*

*Instrument - EN-SCI ECC Ozonesonde*

- Frequency of operation is weekly
- Performance and system audit done in January, 2000 and February 2002.
  - Standard Operating Procedures referenced to Manufacturer and Julich Ozonesonde Intercomparison Experiment (JOSIE), 1998,1999, and 2000.
  - QA and Twinning partner is Meteoswiss Aerological station Payerne.

*Exchange of data:*

*Nairobi ozone profile data is available at WOUDC in Toronto via Payerne. The same data is available at SHADOZ (Southern Hemisphere Additional Ozonesondes) website. SHADOZ is a NASA Project whose goal is to address the ozone data gaps in the southern Hemisphere.*

Nairobi vertical ozone data has been requested and sent to local and foreign Universities. A recent paper on tropical ozone data including Nairobi is going to appear in the January edition of the Journal of Geophysical Research (JGR). Similar data was presented in the Ozone Symposium, Sapporo, 2000.

## **UV-B Monitoring**

*Instrument - Broad-band Pyranometer. This instrument has never yielded any good data at all and needs to be replaced. The problems relate to the acquisition and processing software as well as the calibration.*

*- Exchange of data: Not yet started.*

## **Dobson Spectrophotometer**

**Location- Department of Meteorology, University of Nairobi (1° 16' S 36° 48' E, elevation 1710m)**

Period of observations- since 1984

Calibration- Inter-comparison with Brewer in 1992  
- Alignment corrected in October 1998  
- Intercomparison in South Africa, March/April 2000.

Dobson is used to compare and normalize the Nairobi ozone profiles.

Data exchange - Every 4 months. Latest data available at WOUDC, Toronto, Canada, is June 2001.

The operations and management of this instrument is by the University.

The Dobson is currently out of service. Some spares for the instrument electronics are lacking. A recent retrenchment of University staff also adversely affected the smooth operations of the Dobson. It is not possible now to guarantee the previous levels of operation. That is another reason why data gaps may start appearing in future.

## **Mount Kenya Global Atmosphere Watch Station**

Tropical, continental, high altitude (3680m) monitoring station. Auxiliary data of meteorological parameters and precursor gases are measured. These are essential for the better understanding of ozone changes, both in the troposphere and stratosphere. Other monitoring programmes are surface ozone, aerosols (black carbon), solar radiation, carbon monoxide (CO), and precipitation chemistry.

The station started operations in December 1999. But there are many data gaps in the records due to frequent long periods without power at the station.

### **Calibration of surface ozone instrument – February 2002**

Installation of CO Analyzer (TECO 48S) – February 2002

Data Exchange: There is no data at the World Data Centres. Exchange will start as soon as a continuous data record is achieved. A limited initial data set has been exchanged through expert visits. Similar data has also been used locally by scientists and universities.

## **On Going Research**

This is related to the distribution of atmospheric ozone as a climate variable and the increase in UV radiation that may result from the decrease in atmospheric ozone abundance.

1. Characterization of air-masses reaching the Mount Kenya GAW station.
2. Regional build-up of equatorial high altitude ozone.
3. Vertical distribution of ozone in continental equatorial atmosphere.
4. Relative Humidity in the vicinity of the tropopause.
5. Seasonal and annual variation in total ozone (column and integrated).
6. Trends in tropospheric and stratospheric ozone over equatorial Africa.

## **Future Activities**

- Monitoring of GHGs – Flask sampling at GAW station in cooperation with NOAA, CMDL.
- Continuous CO monitoring
- Possibility of the Nairobi ozone station being in the global network of the NDSC (Network for Detection of Stratospheric Change) following the commissioning of the SCHIAMACHY project in Nairobi in March 2002.

## **Recommendations**

- Provide support to the measurement programmes in order to guarantee smooth measurements activities.
- Enhance capacity building in the developing countries to ensure professional competence in data handling.
- Expand the UV measuring network where there is none. Kenya needs a UV instrument along side the Dobson and the ozone profiles.
- Acknowledgement of, and offers of co-authorship to, data providers should be encouraged in order to promote self-confidence and appreciation of their efforts.

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