

TOTAL COLUMN WATER VAPOUR RETRIEVAL OVER NAIROBI USING THE MAX-
DIFFERENTIAL OPTICAL ABSORPTION SPECTROMETER (MAX-DOAS) AND
VALIDATION WITH SATELLITE DATA

FRANCIS GACHARI

MASTER OF SCIENCE

(Physics)

JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY

2009

ABSTRACT

The installation of a MAX-DOAS instrument at UNEP headquarters, Gigiri by Bremen University in March 2002 was seen as a possible aid to more accurate weather prediction tools. The purpose of our study was to retrieve water vapour amount in the Nairobi atmosphere using the Gigiri instrument and the validation of these measurements using the water vapour amount obtained through SCIAMACHY, a MAX-DOAS instrument on board the ENVISAT satellite. Validation ensures that the accuracy of the measurements is maintained.

We have in this study obtained water vapour slant columns as well as the vertical columns above Nairobi. Vertical column water vapour above Nairobi reaches a maximum value of 5g/cm^2 during the rainy seasons of March-April and November-December and drops to a minimum of 2.5g/cm^2 in the dry months of June-July and January-February. The values obtained through the Nairobi instrument agree well with the values obtained satellite measurement. Both instruments indicate that atmospheric water vapour amount over Nairobi fluctuates between highs of about 5g/cm^2 and lows of about 3g/cm^2 but has a high tendency to settle at around 4g/cm^2 .