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Tropospheric ozone over central and southern Africa

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A number of large field experiments (for example, SAFARI-92, SAFARI-2000) have been undertaken in the last decade or so over southern Africa. Routine ozone profiling as part of the SHADOZ ozonesonde network takes place at Irene and Nairobi, and aircraft measurements in the MOZAIC programme have contributed both upper tropospheric data and profile data at selected airports. All have highlighted the build-up of tropospheric ozone over central and southern Africa and hence support the notion of a giant natural photochemical reactor over the region.

Attention is drawn in the first instance to the spatial and temporal features of the ozone enhancement. It is shown that there is a strong latitudinal gradient in total tropospheric ozone, with peak values experienced over Zambia, and a longitudinal migration of the season of peak ozone from west to east. Back trajectory analysis from 11 data stations support the dynamic prerequisites for ozone buildup (viz. anticyclonic recirculation), which when coupled with ozone production from a rich and diverse mixture of sources (fires, lightning, urban-industrial, biogenic) provide all the ingredients for ozone enhancment and support the notion of a giant natural photochemical reactor.