# REDUCTION IN AIR POLLUTION NEAR THE ISCOR WORKS IN PRETORIA WEST

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## INTRODUCTION

The particulate sampling site on the premises of Afrox in Pretoria West forms part of the CSIR's countrywide sampling network for airborne trace elements. This site has been in operation since 1976 and is only about 500 m from the Iscor works. Fall-out samples from deposit gauges have been collected and analysed since 1977. The following elements were measured regularly:

Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb and Zn. Although several other industries also contribute to pollution at this site it is ideally situated to reflect any major changes in pollution coming from the Iscor works. The following changes likely to influence pollution by Iscor have taken place since 1982.

1. Total steel production dropped by more than 50% after July 1982, and has remained low.
2. The Bessemer converters, which were not fitted with fume collection devices, ceased operation on the same date.
3. A Rotor furnace, with partially effective fume collection remained in service till 31 October 1985.
4. Two new Arc furnaces, fitted with effective fume collectors now produce more than 600 000 tons liquid steel annually.

## EXPERIMENTAL

Routine sampling and analysis methods which have been previously reported (Ref 1, 2, 3) were used. Analysis was by flame Atomic Absorption using an air/acetylene flame for all elements except Fe, Mg, Cr and Ca where a nitrous oxide/acetylene flame was used.

## RESULTS

Figure 1 shows the monthly total fall-out by weight with a marked reduction after 1982. Figure 2 uses the same data expressed as mean monthly deposits for two periods, namely, August 1977 to June 1982 and July 1982 to July 1986. The presentation in Figure 2 irons out some of the noise in Figure 1 due to meteorological effects and clearly indicates that the deposition rate has been roughly halved.

The metal most expected in pollution from Iscor is iron. Figure 3 shows the mean monthly deposition rates for iron before and after June 1982 while Figure 4 shows the concentration if iron in airborne dust for the two periods. These figures both indicate a marked reduction in iron pollution. It is interesting to note that both before and after June 1982 iron formed about 10%by weight of the deposits.

Calcium from the limestone used in slags is a potential pollutant from Iscor. However there are two other significant calcium sources in the area, namely: a slagment factory and the use of calcium carbide by Afrox. Figure 5 indicates that the larger particles collected by the deposit gauges have diminished in calcium content whereas Figure 6 indicates a smaller change in the finer material collected on the filters. Thus the changes at Iscor may have contributed to a reduction in airborne calcium concentrations but the relationship is not as clear as for iron.

In most urban situations nearly all airborne lead can be ascribed to motor vehicle exhaust pollution. Thus lead concentrations could be expected to be unaffected by changes at Iscor. This expectation is confirmed by Figure 8 which shows the mean airborne lead concentrations, only a small change is observed. Figure 7 shows a reduction in the lead deposition rate. This result is surprising and suggests that perhaps some source, possibly but not necessarily Iscor, has in the past contributed a coarse aerosol containing lead. Another conceivable explanation could be that the lead in the deposit gauges originates as fine particles from car exhausts and that these particles are scavenged by the coarser Iscor aerosol. Thus a reduction in the scavenging aerosol could give rise to a reduced lead deposition rate.

Other elements which showed some reduction since 1982 are Mg, Mn, Zn, Cu and Cr.

For comparison two other sites with filter units and deposit gauges, in Hamilton Street, Pretoria and at Paardefontein outside Pretoria, did not show any decreases in trace element concentrations or fall-out after 1982. This indicates firstly that the effect is not a climatic one. Secondly the results from Hamilton Street in central Pretoria also indicate that the site is not greatly influenced by pollution from Iscor.

This ia an encouraging example of how a major air pollution problem can be abated.

## REFERENCES

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3. CROSSLEY, P. and HILL, C.W. Field comparison of the relative efficiency of two types of deposit gauges. *Clean Air Journal,* Vol. 12, No. 3, 91.

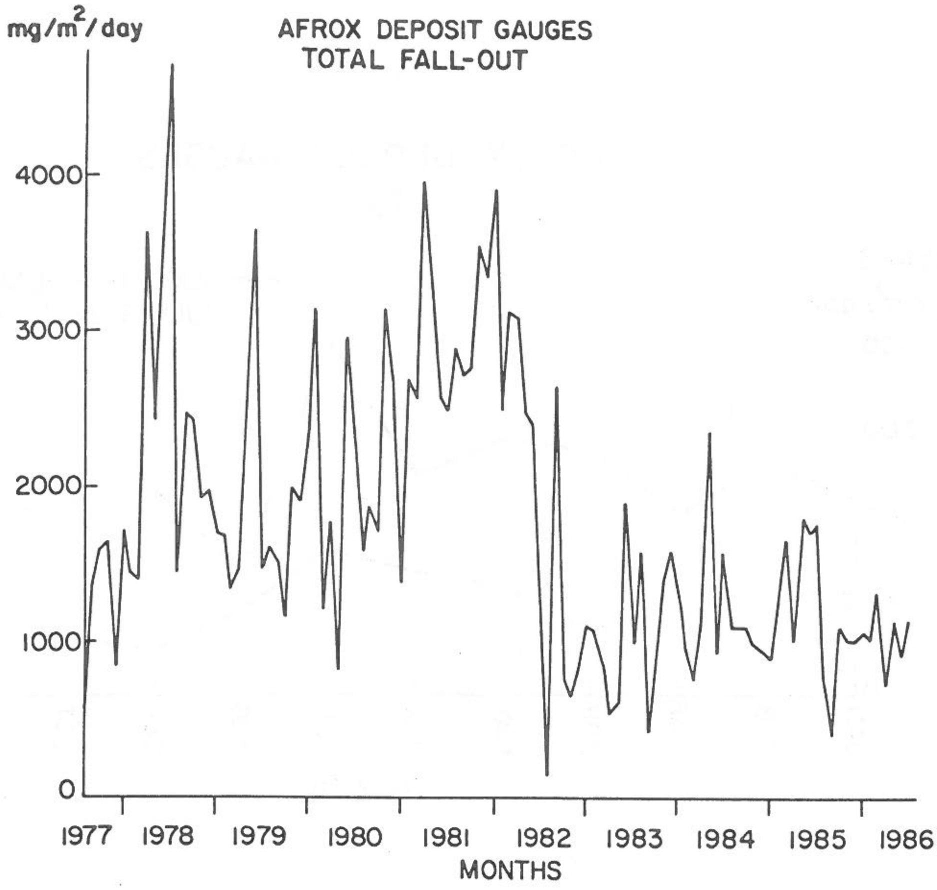


FIGURE 1.

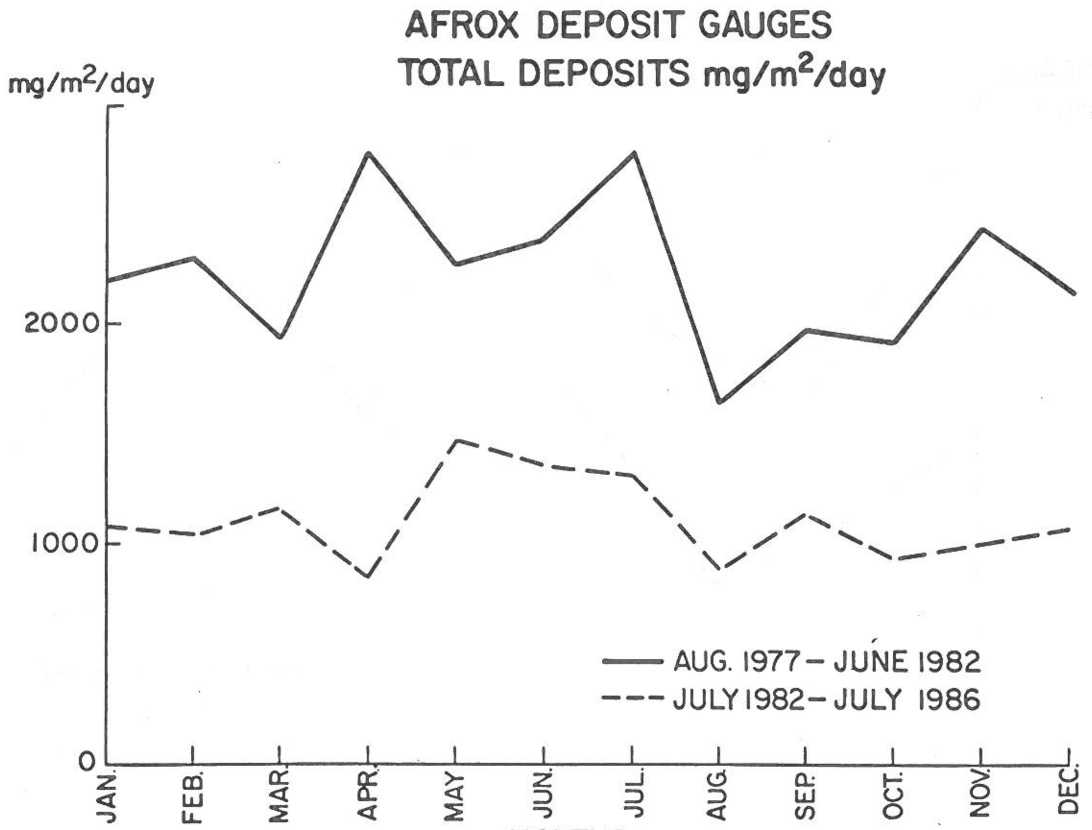


FIGURE 2.

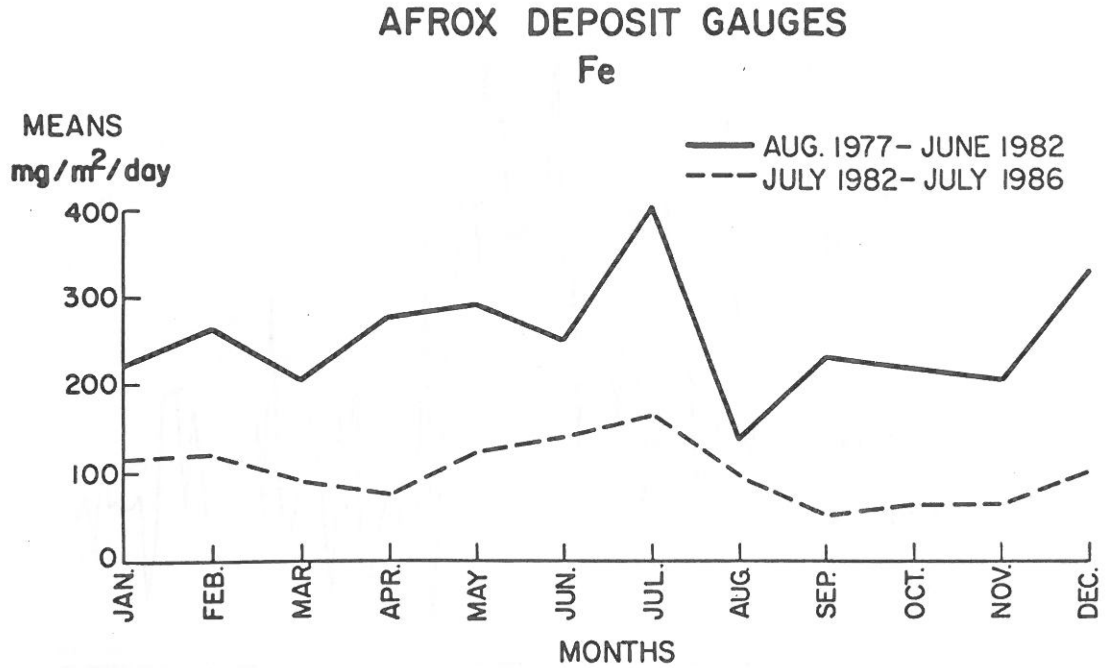


FIGURE 3.

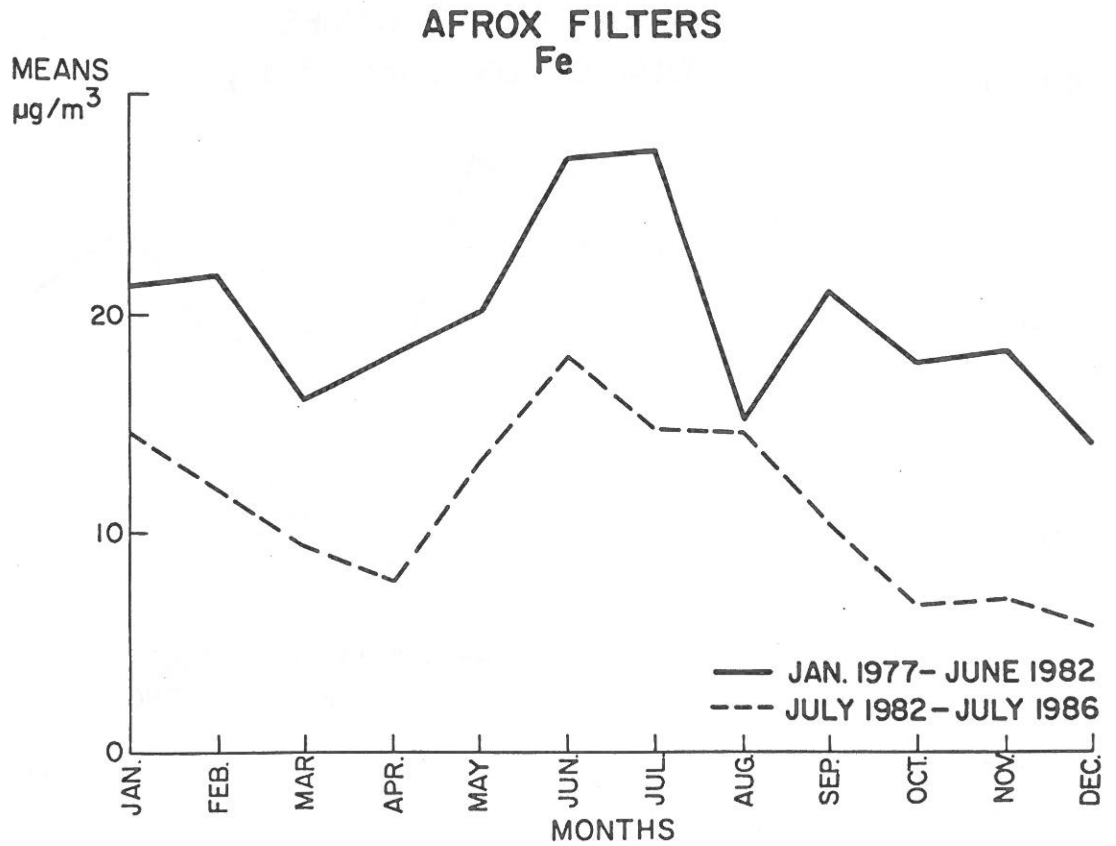


FIGURE 4.

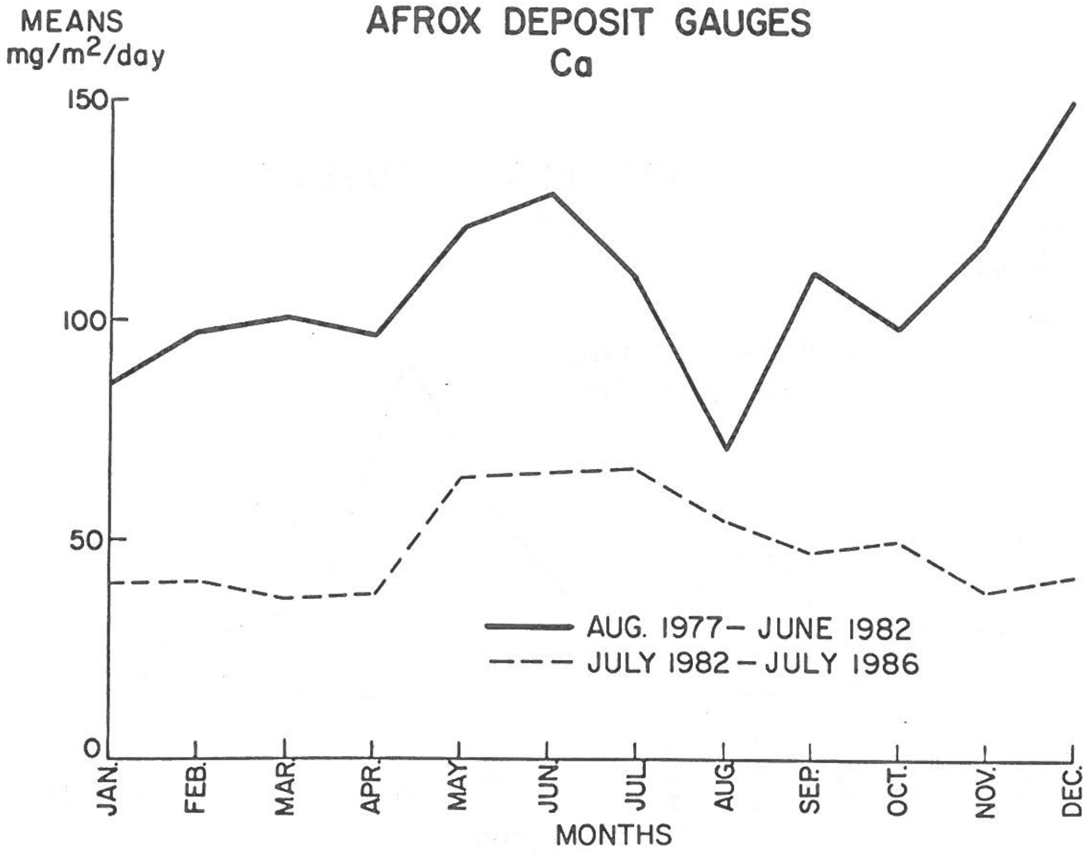


FIGURE 5.

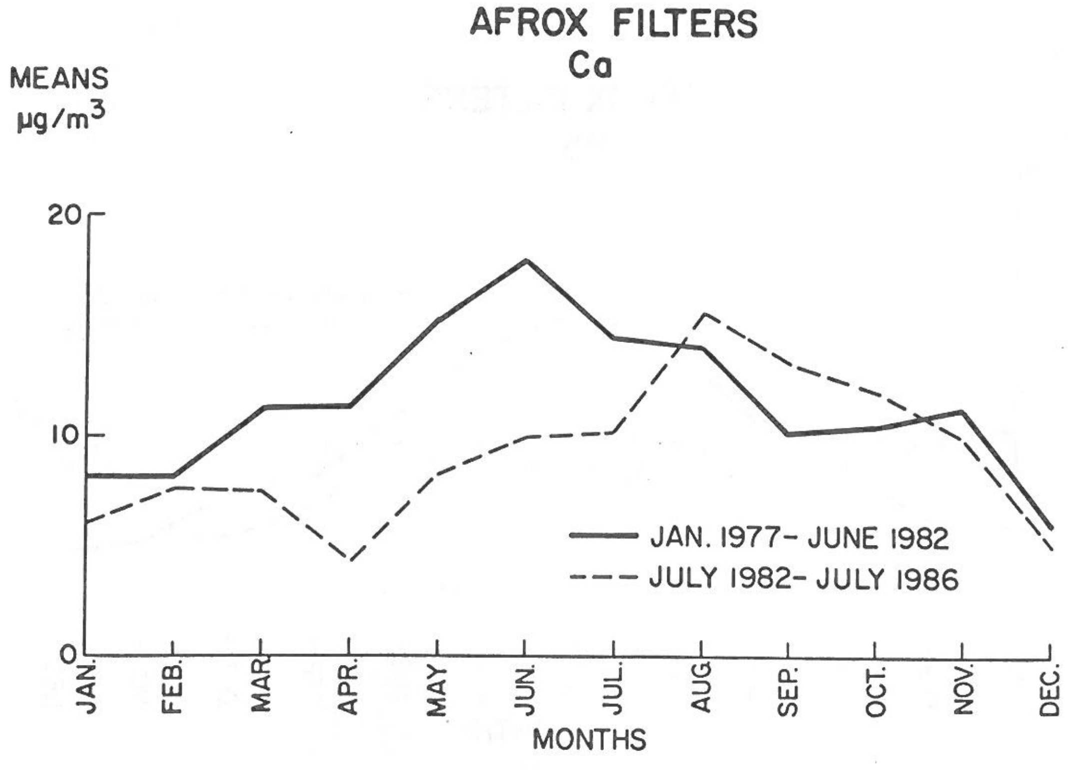


FIGURE 6.

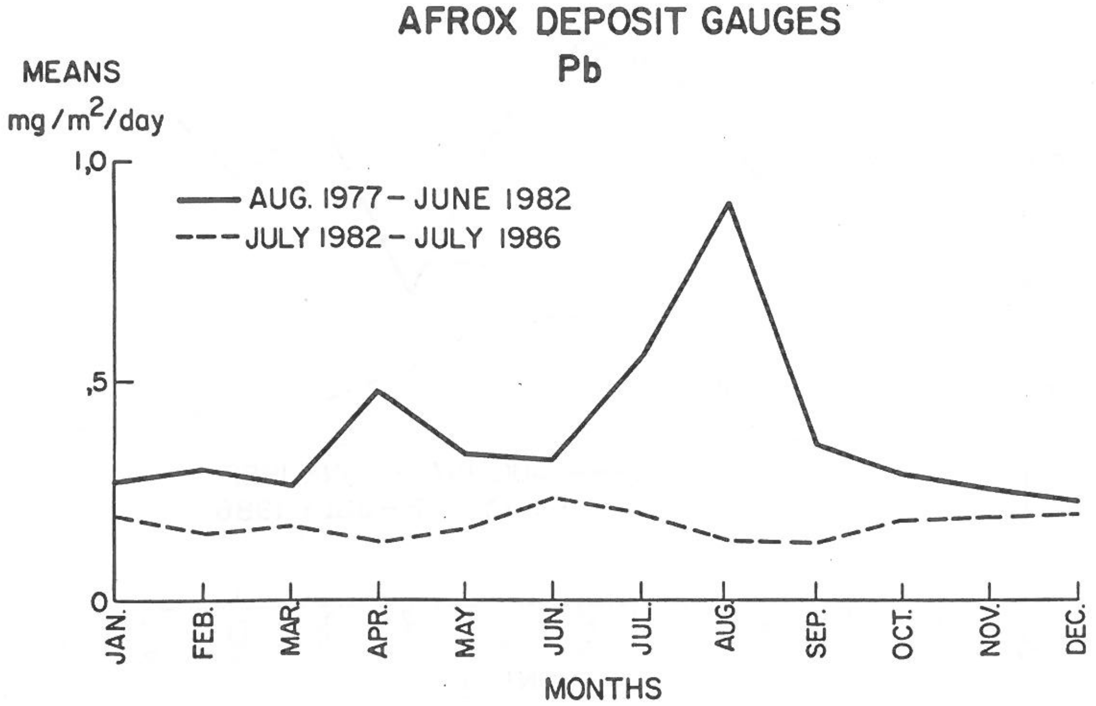


FIGURE 7.

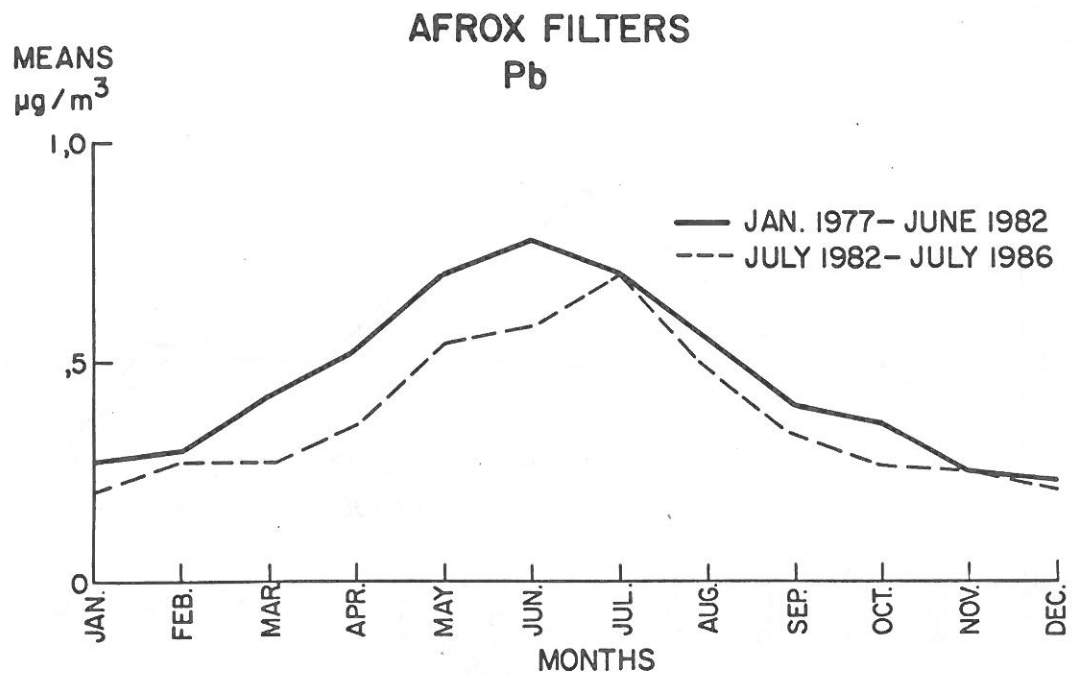


FIGURE 8.