

CAPE GRIM TROPOSPHERIC OZONE

Ian Galbally Lead Scientist

Malcolm Elsworth Calibration

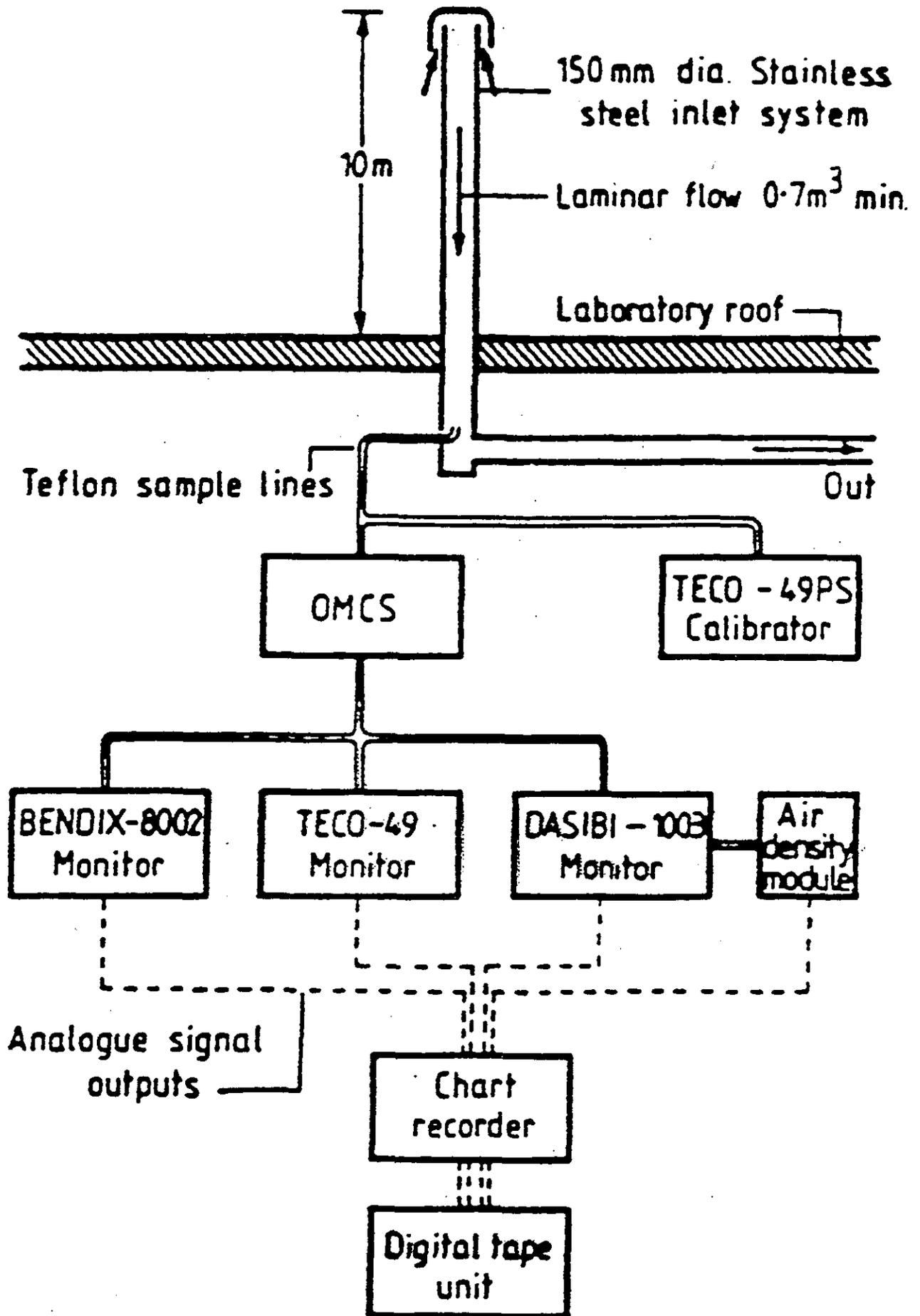
Mick Meyer Analysis

Ross Patterson Processing

Cape Grim Staff Operation

Michael Douglas Programming

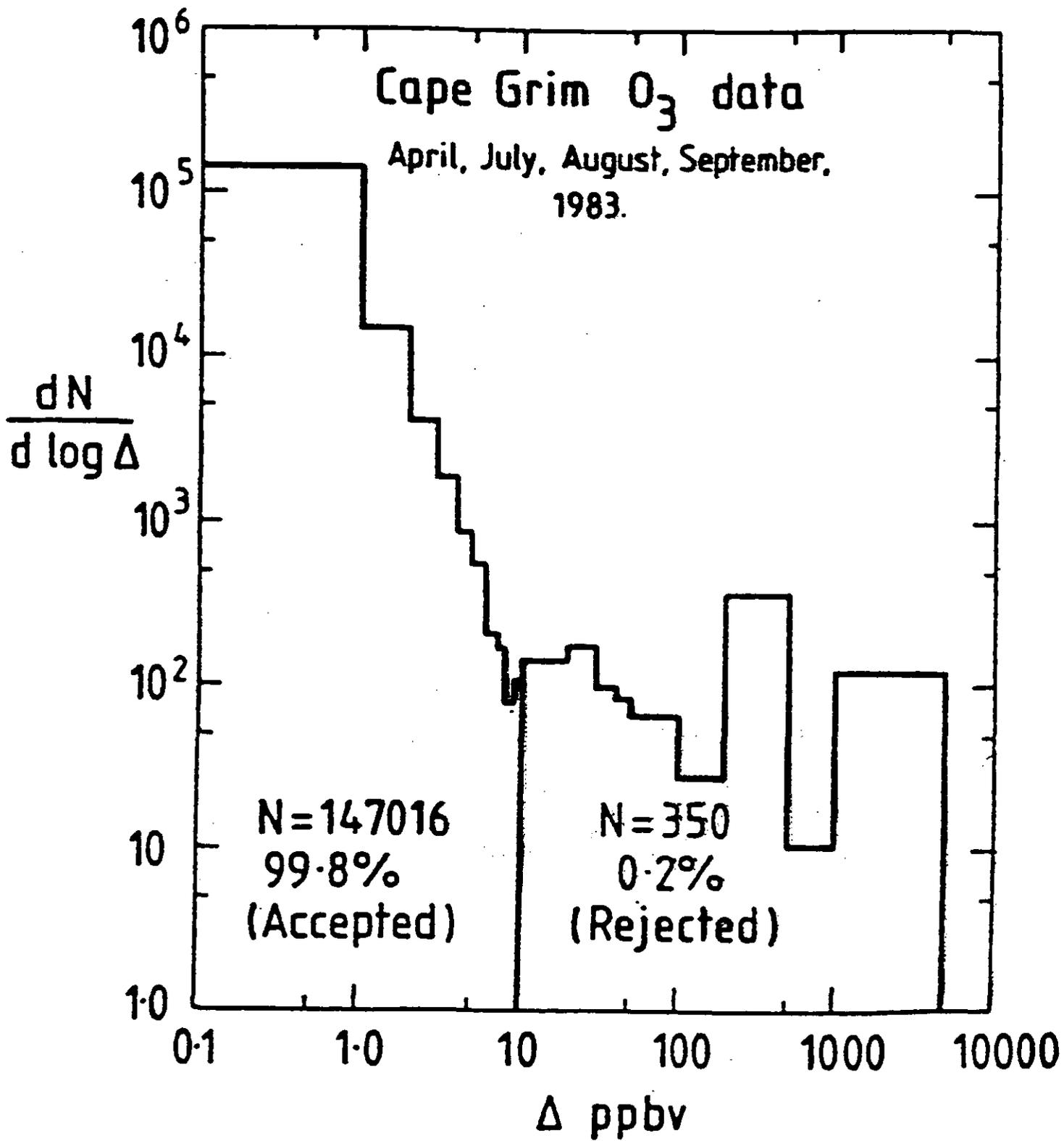
Arnold Bass (NBS) US Calibration



DATA REDUCTION

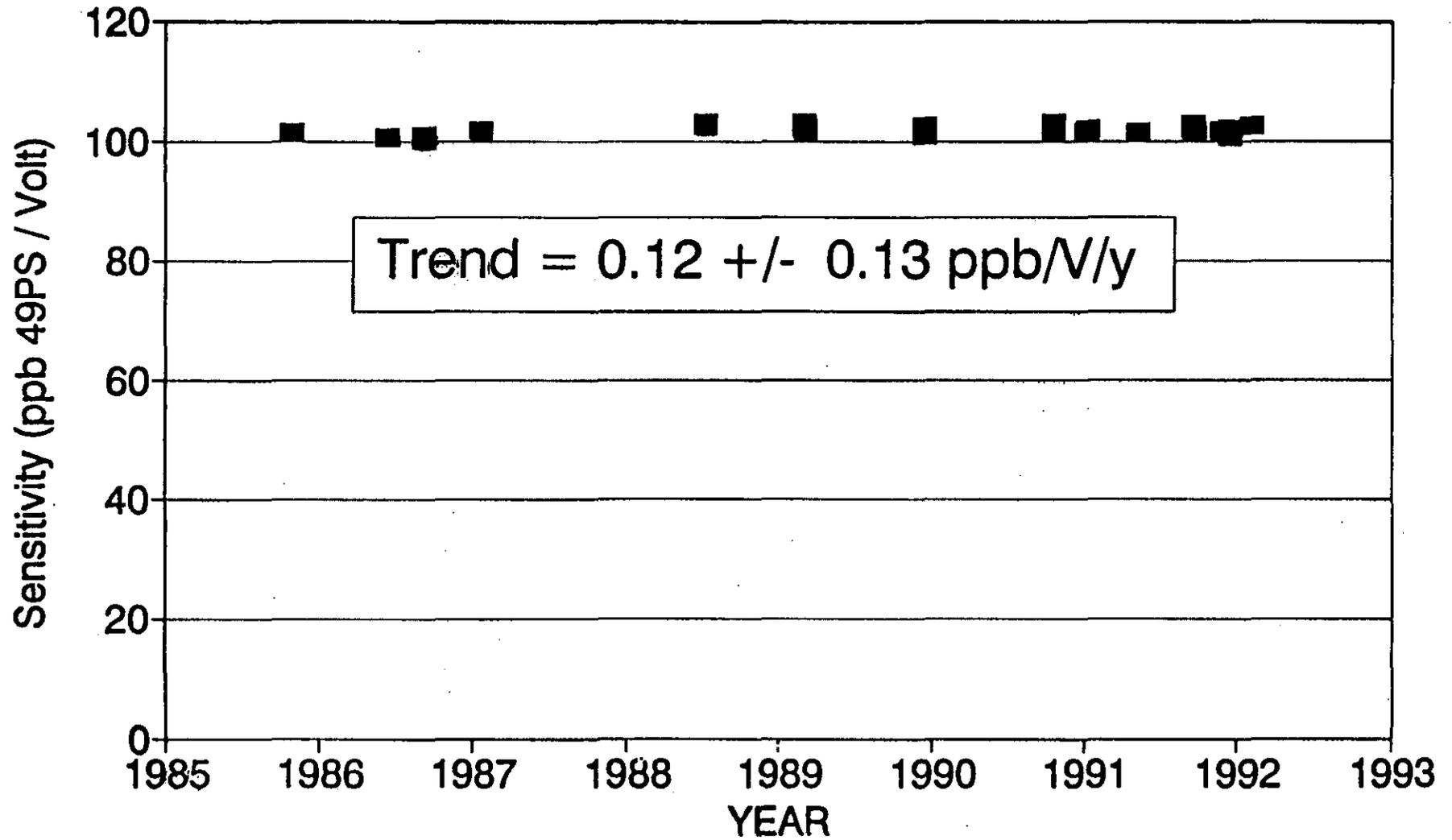
$$\text{O}_3 \text{ (ppbv)} = (\text{mV Signal} - \text{mV Zero})$$

- * Cal Factor
- * inlet Correction



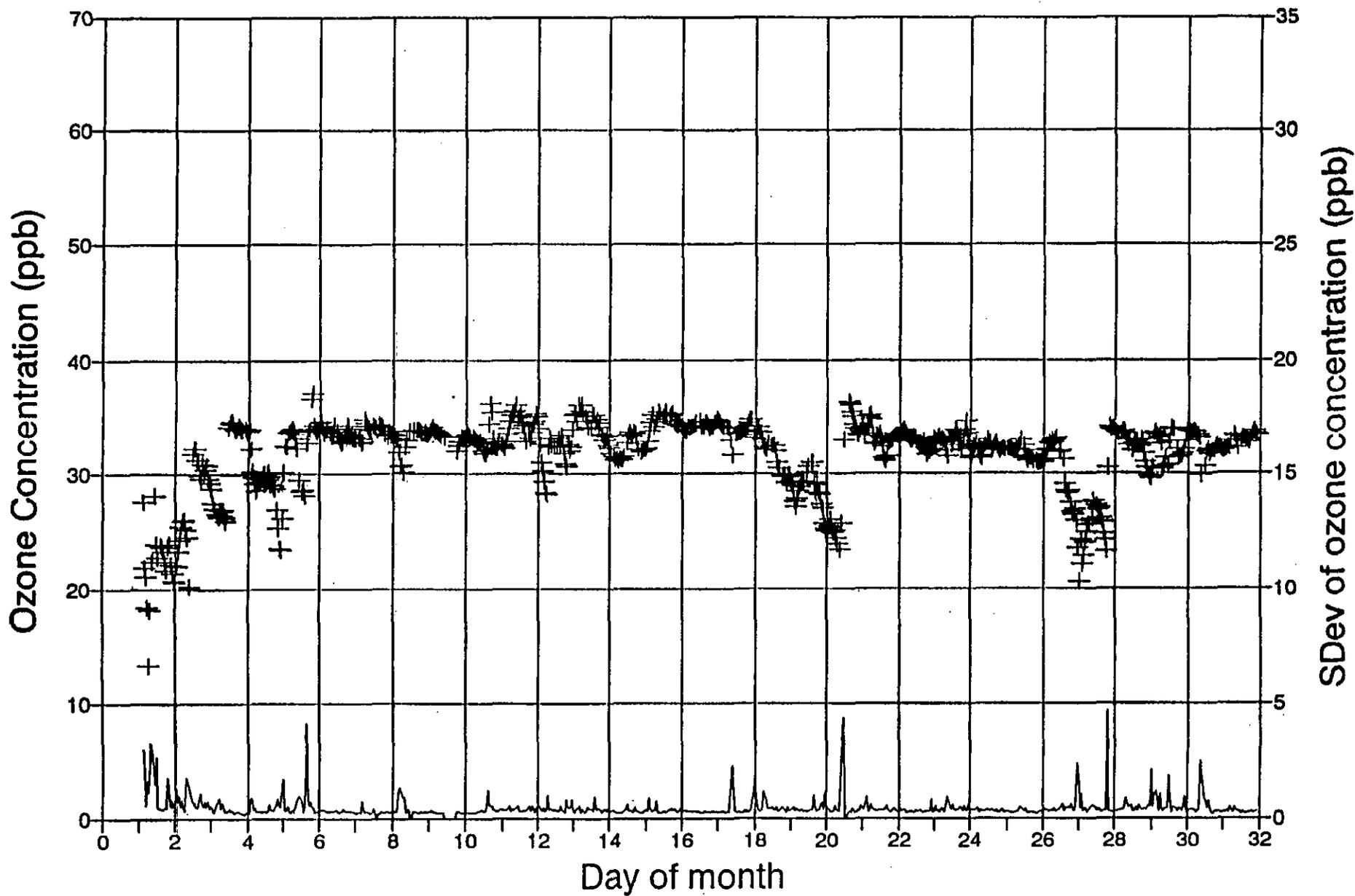
Cape Grim Ozone Calibrations

TECO 2



Cape Grim mean hourly ozone

TECO 1, Aug 1991



Measurement of Peroxide in the Gas Phase at Cape Grim

Prof Stuart Penkett University East Anglia, Norwich

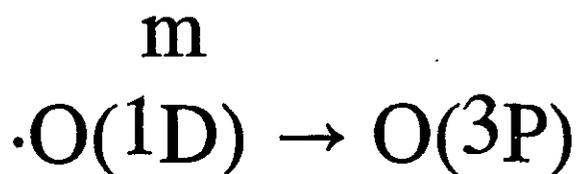
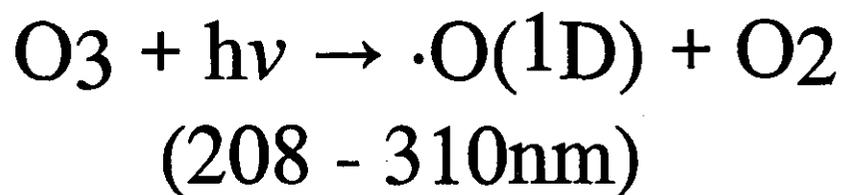
Mr. Brian Bandy University East Anglia, Norwich

Dr. Greg Ayers CSIRO, Atmospheric Research

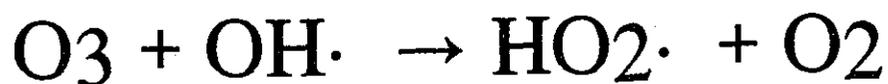
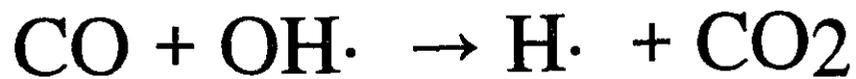
Mr. Rob Gillett CSIRO, Atmospheric Research

Mr. Paul Selleck CSIRO, Atmospheric Research

Hydroxyl production



Hydroxyl destruction



**Recycling of hydroxyl:
production and removal of hydrogen
peroxide**

m



(<360nm)



$\text{H}_2\text{O}_2 \rightarrow$ dry deposition

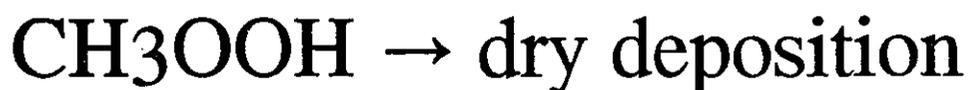
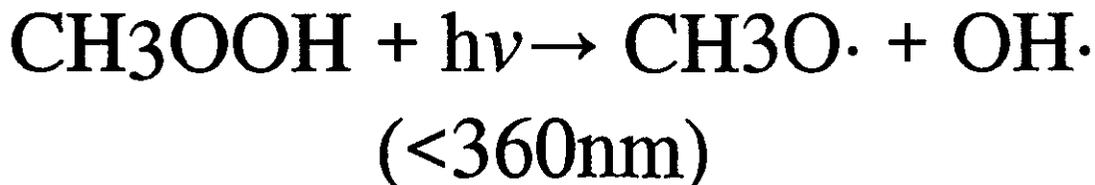
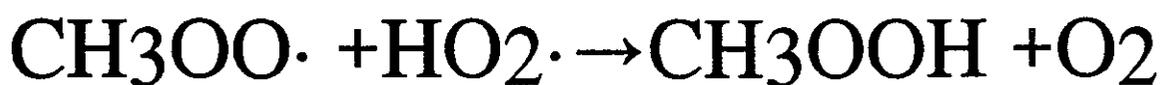
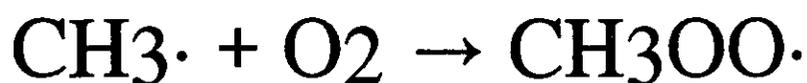
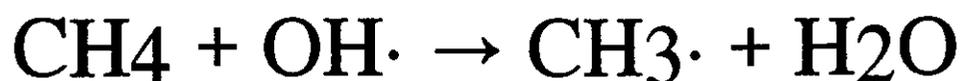
$$\text{dry dep loss rate} = V * [\text{H}_2\text{O}_2] / H$$

where:

V = deposition velocity

H = height of mixed layer

Production and destruction of organic peroxides



Reagents and conditions Used in Wet Chemistry

1. Stripping solution:
potassium hydrogen phthalate
 5×10^{-3} molar
Flow Rate 0.2ml/min
2. Conditioning Reagent:
formaldehyde, to eliminate SO₂
interference
EDTA to complex metal salts
Flow Rate 0.1ml/min
3. Fluorescence Reagent:
p-hydroxyphenylacetic acid
peroxidase
Flow Rate 0.1ml/min

4. 0.1 molar NaOH for pH adjustment
Flow Rate 0.1ml/min

5. Peroxide Standard:
H₂O₂ soln. ~ 5.9μmolar
three calibrations/week

6. Air flow rate: 2L/min

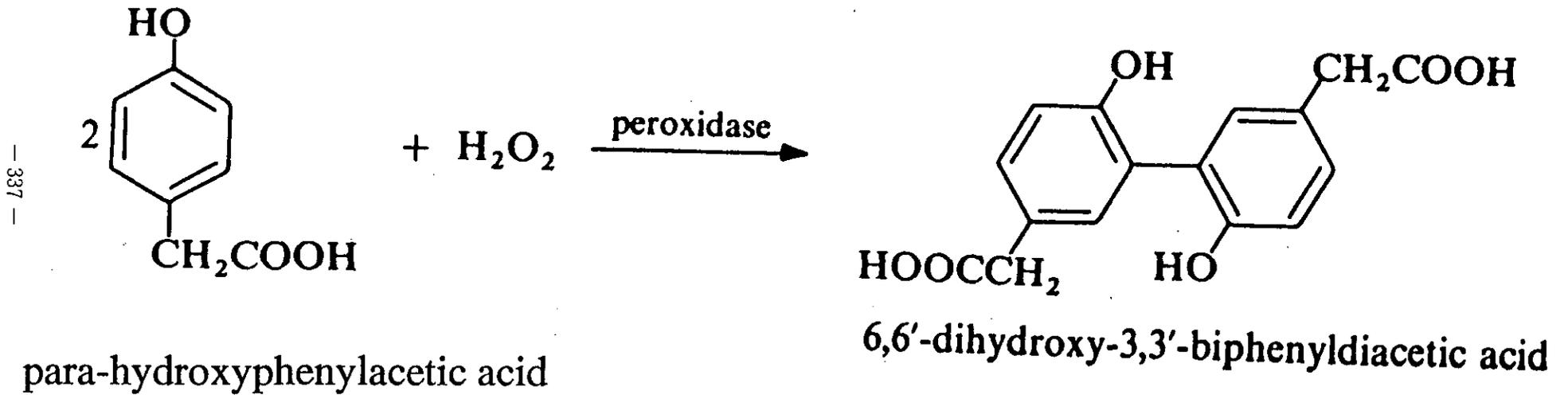
7. Reagents prepared every 6 weeks

8. Dual channel, hydrogen peroxide
measured by difference

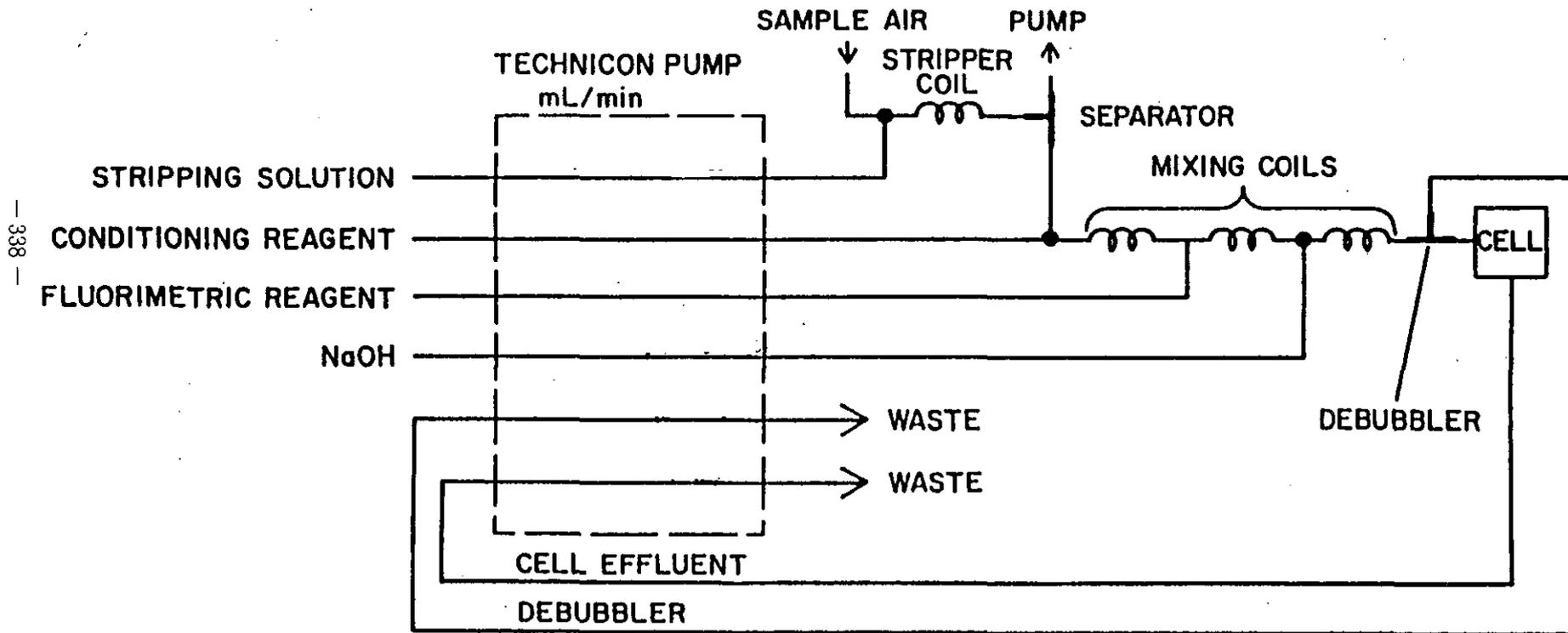


9. Fluorescence of the dimer which is
measured at 400nm is proportional to
peroxide concentration

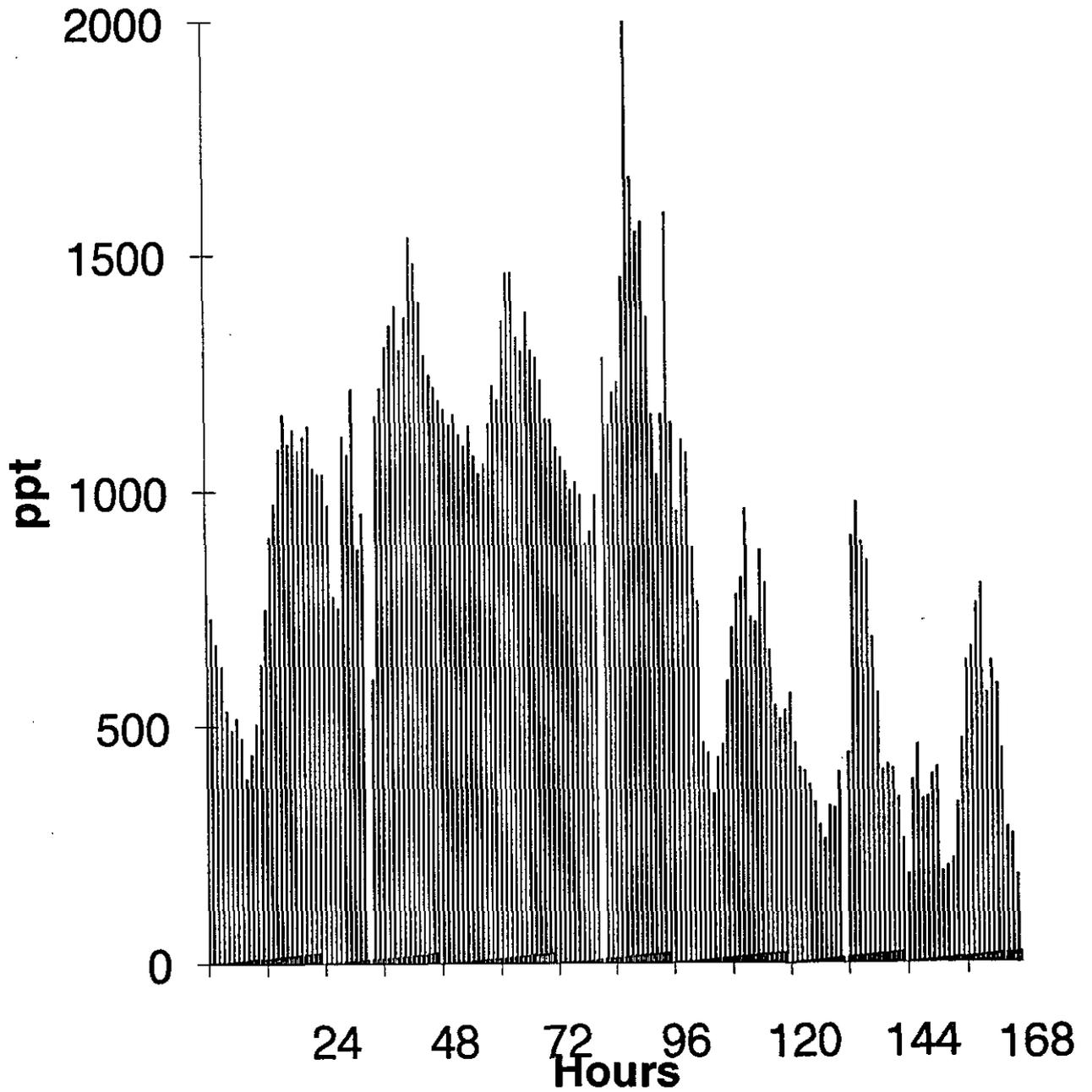
Measurement Technique



Glass Reaction Loom



Peroxide Concentration 10-16th February 1991



peroxide concentration 7-13th April, 1991

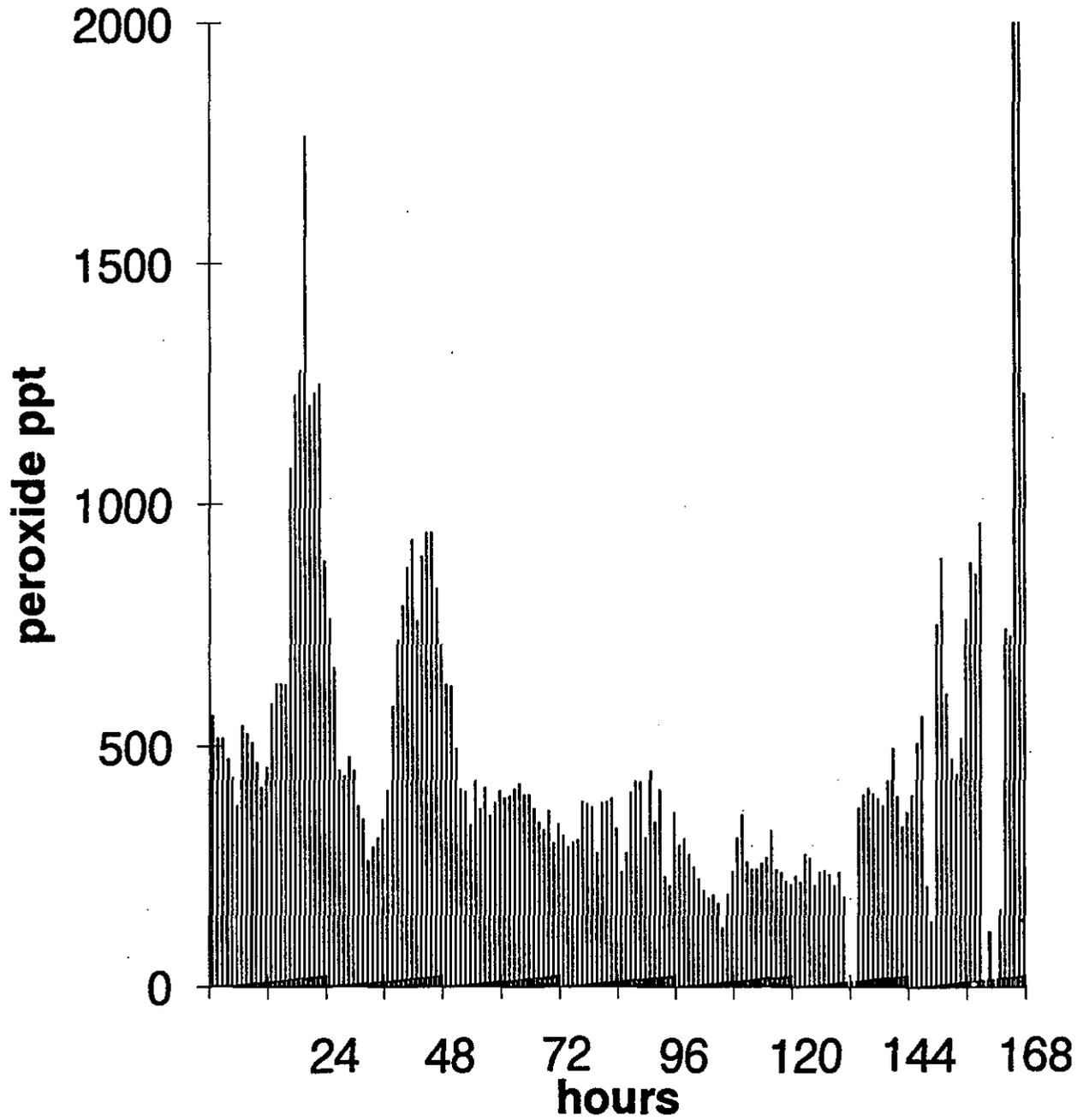


Figure 2. Model generated concentrations of H_2O_2 as a function of day of year and NO concentration. The plot consists of daily (24 hour) averages of hourly values.

