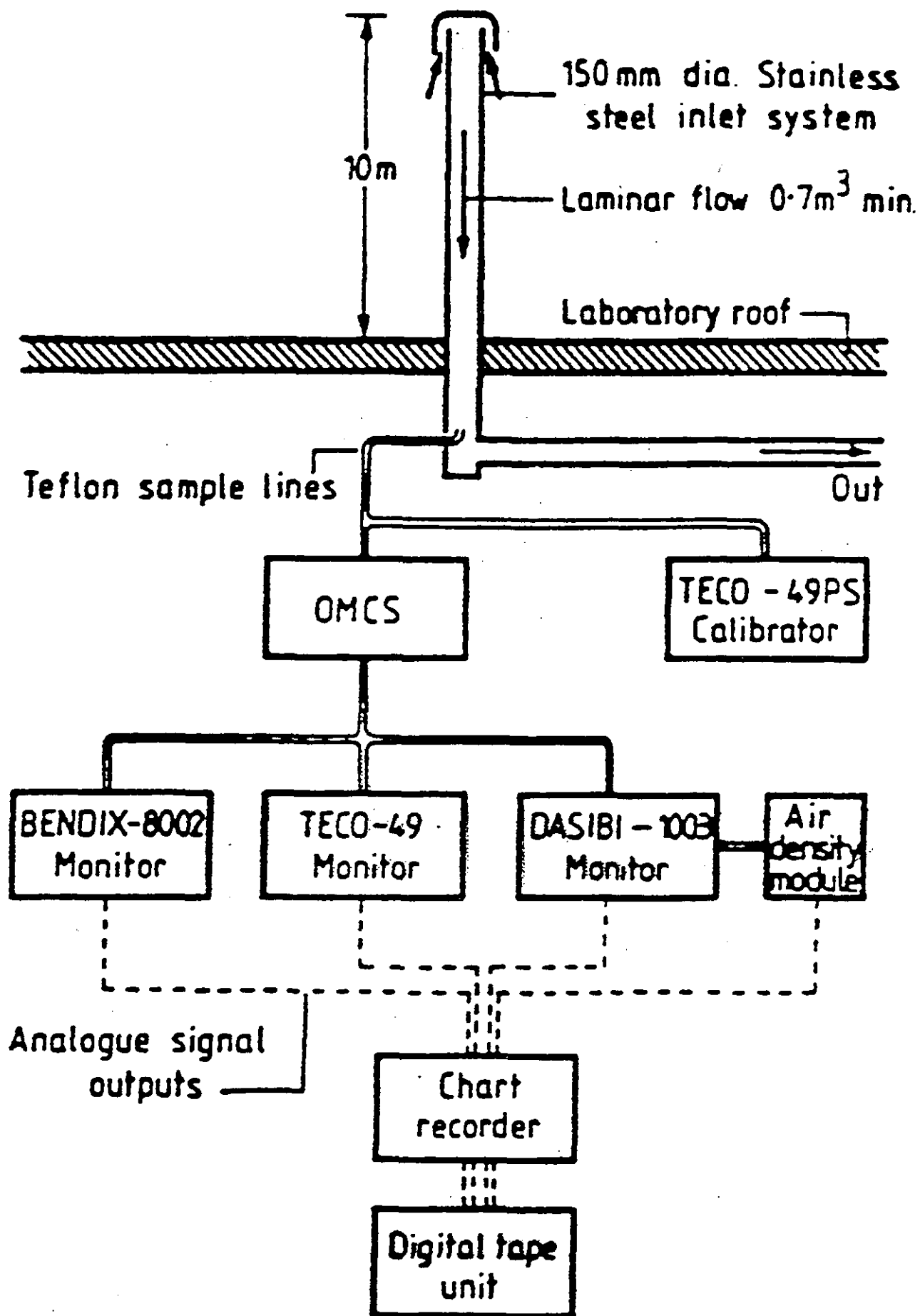


CAPE GRIM TROPOSPHERIC OZONE

Ian Galbally	Lead Scientist
Malcolm Elsworth	Calibration
Mick Meyer	Analysis
Ross Patterson	Processing

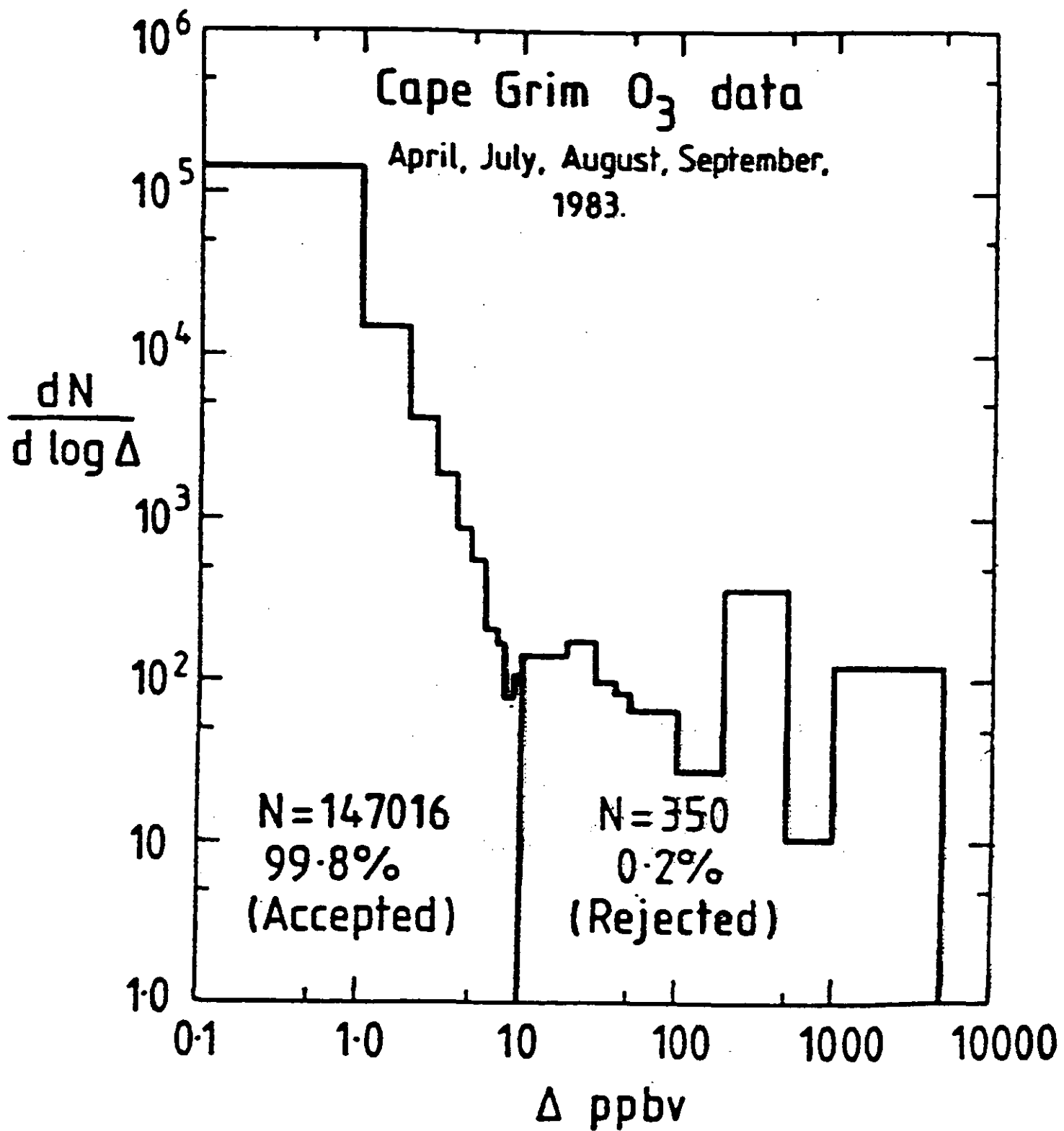
Cape Grim Staff	Operation
Michael Douglas	Programming
Arnold Bass (NBS)	US Calibration



DATA REDUCTION

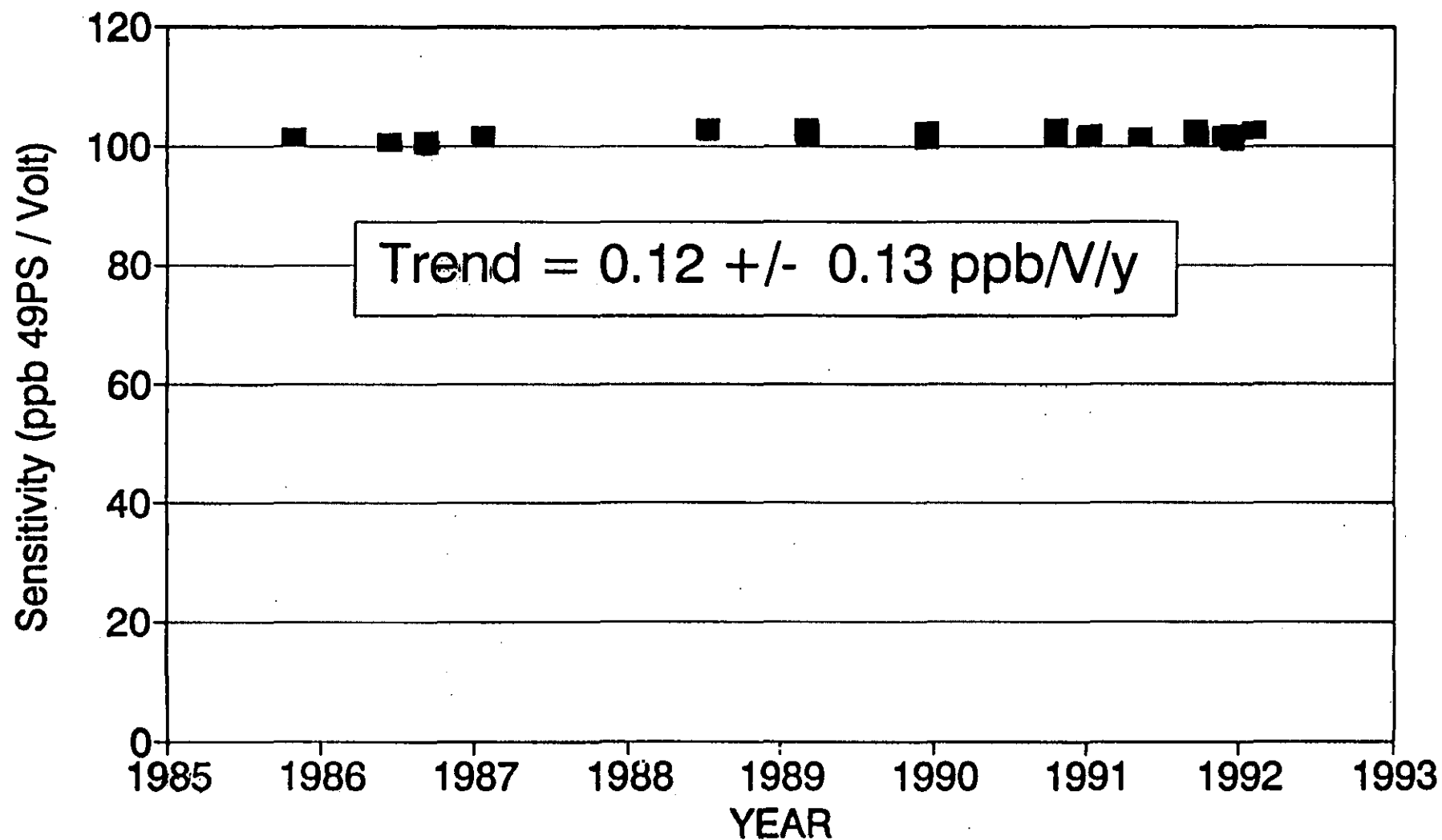
$$\text{O}_3 \text{ (ppbv)} = (\text{mVSignal} - \text{mV Zero})$$

- * Cal Factor
- * inlet Correction



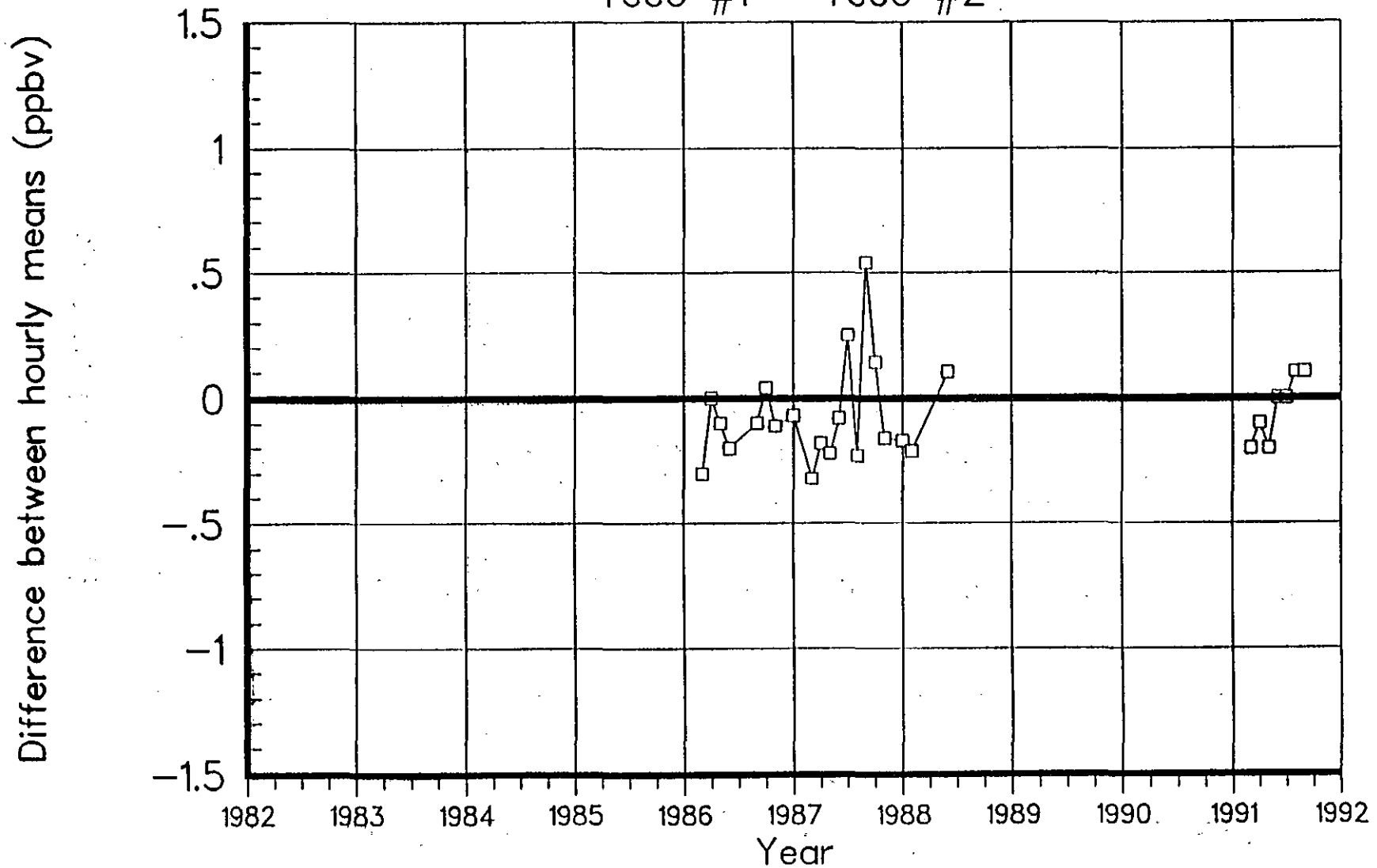
Cape Grim Ozone Calibrations

TECO 2



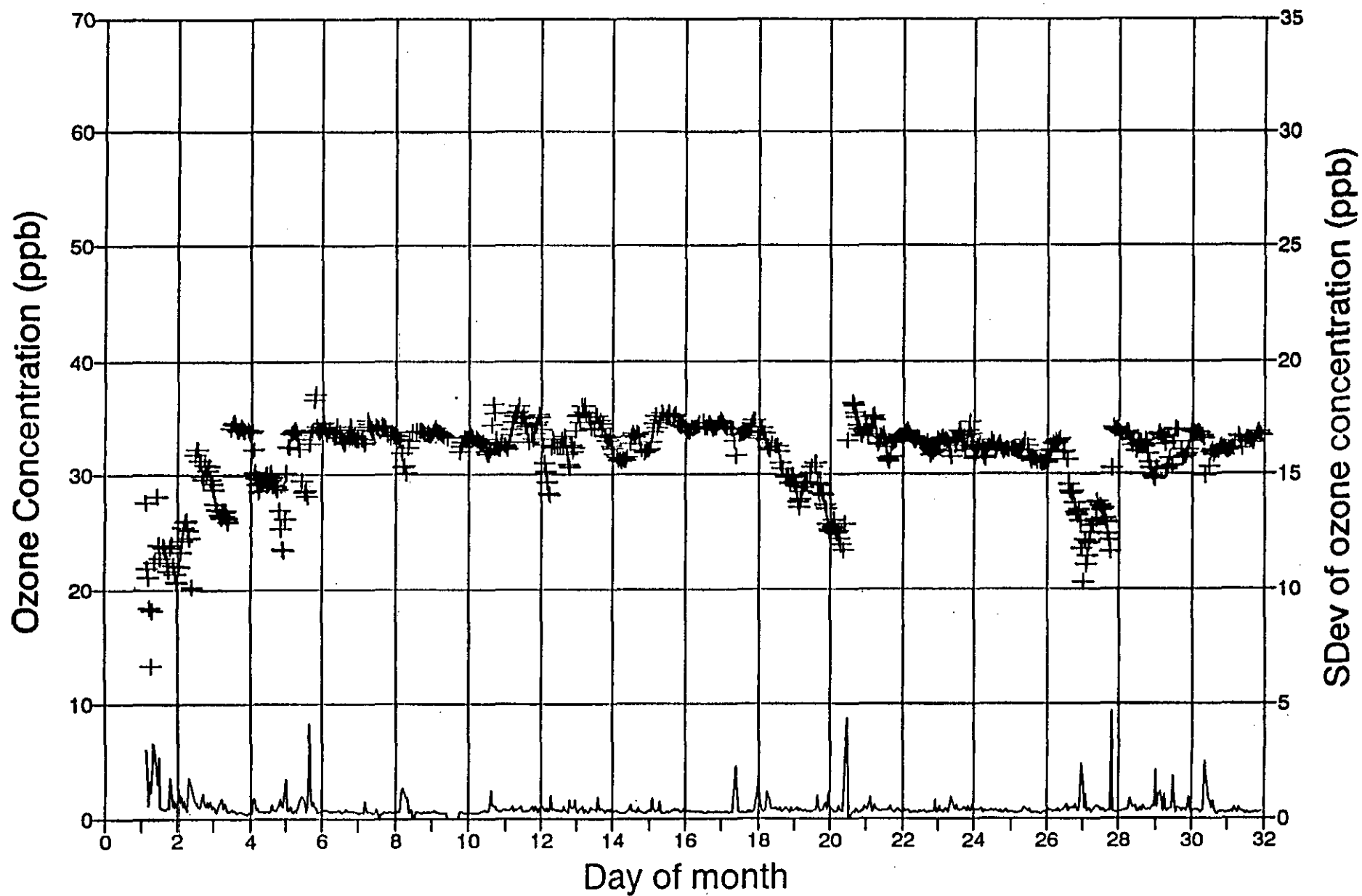
Ozone at Cape Grim Instrument Comparison

Teco #1 - 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

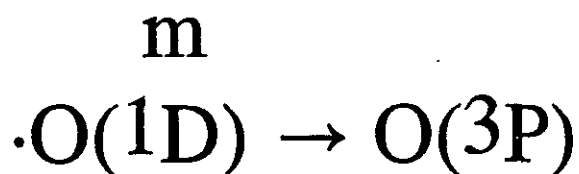
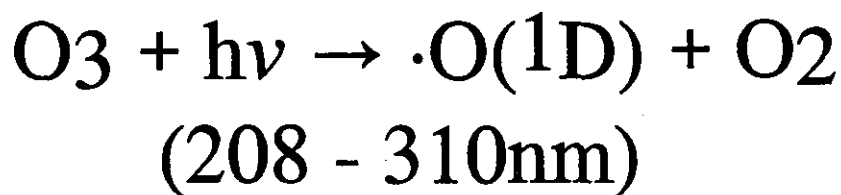
Mr. Brian Bandy University East Anglia, Norwich

Dr. Greg Ayers CSIRO, Atmospheric Research

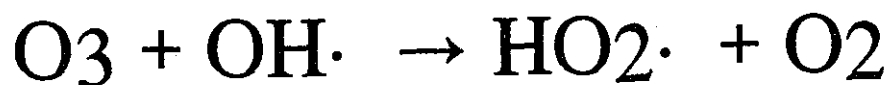
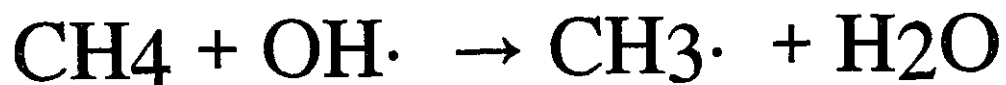
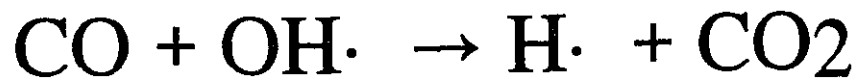
Mr. Rob Gillett CSIRO, Atmospheric Research

Mr. Paul Selleck CSIRO, Atmospheric Research

Hydroxyl production

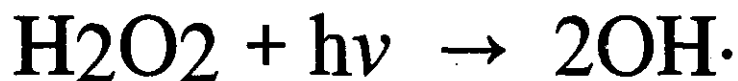
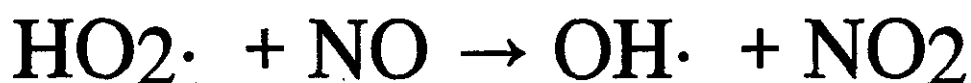
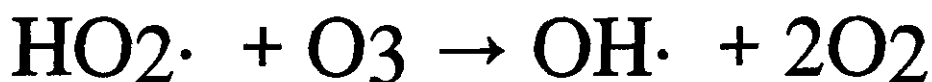


Hydroxyl destruction



Recycling of hydroxyl: production and removal of hydrogen peroxide

m



(<360nm)



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

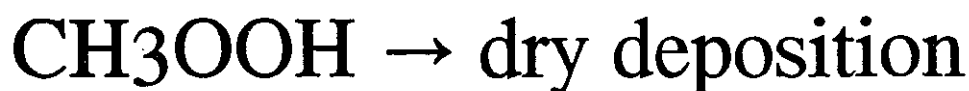
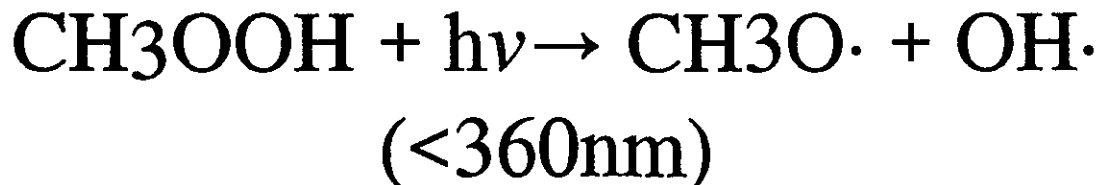
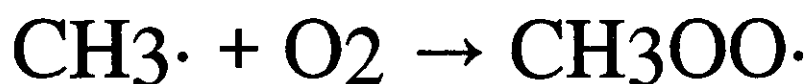
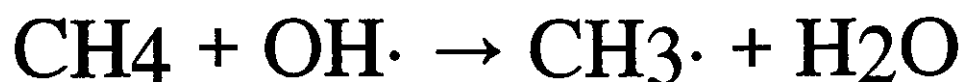
$\text{dry dep loss rate} = V * [\text{H}_2\text{O}_2] / H$

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

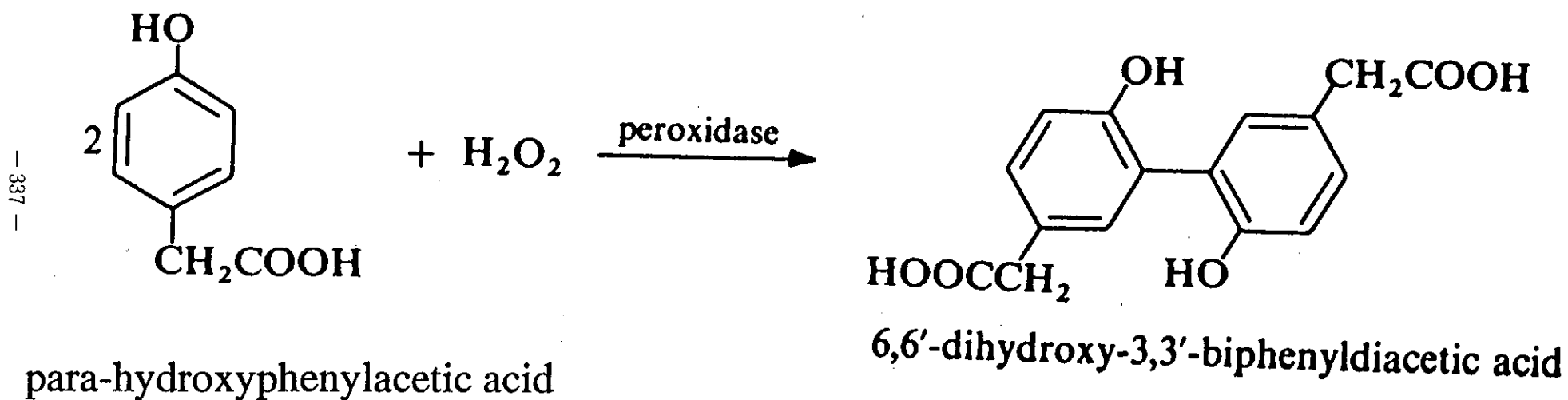
7. Reagents prepared every 6 weeks

8. Dual channel, hydrogen peroxide
measured by difference

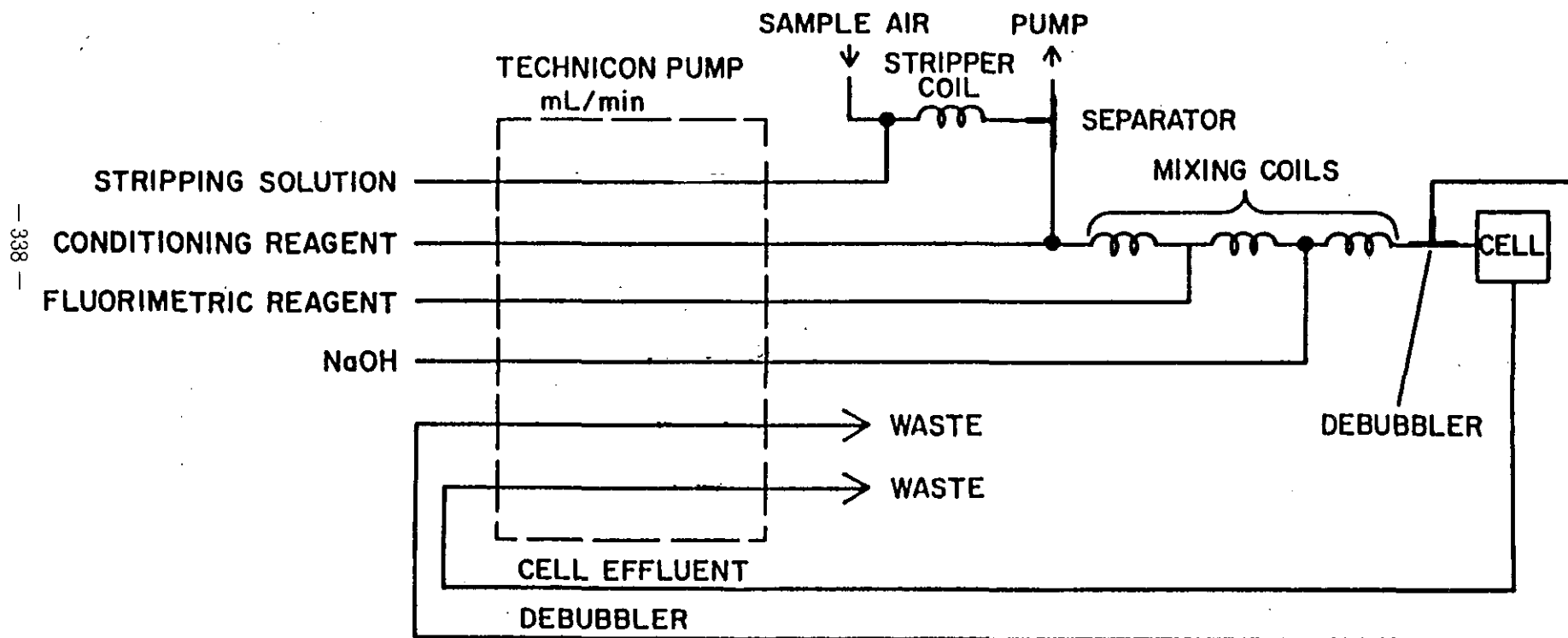


9. Fluorescence of the dimer which is
measured at 400nm is proportional to
peroxide concentration

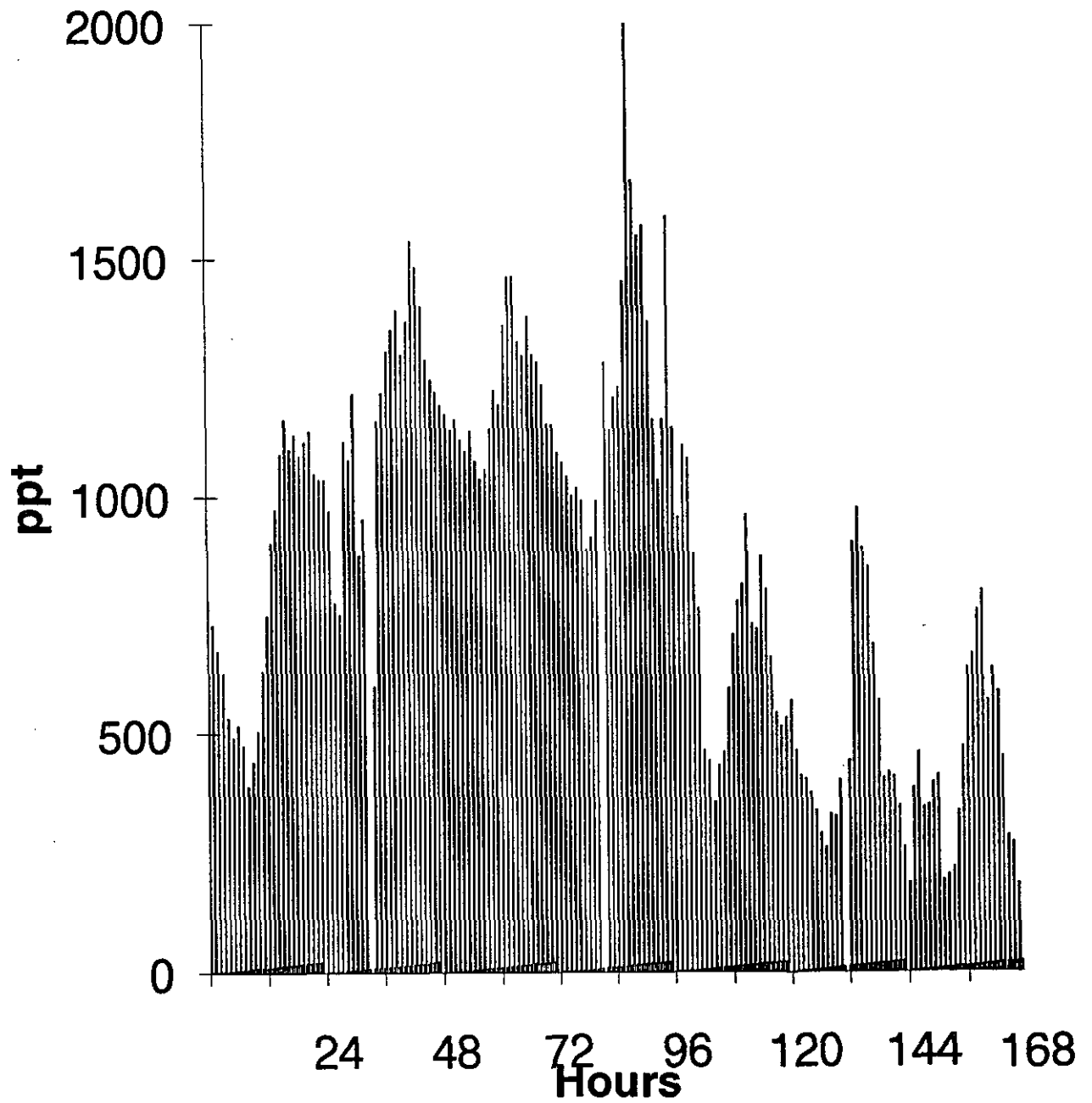
Measurement Technique



Glass Reaction Loom



Peroxide Concentration 10-16th February 1991



**peroxide concentration 7-13th April,
1991**

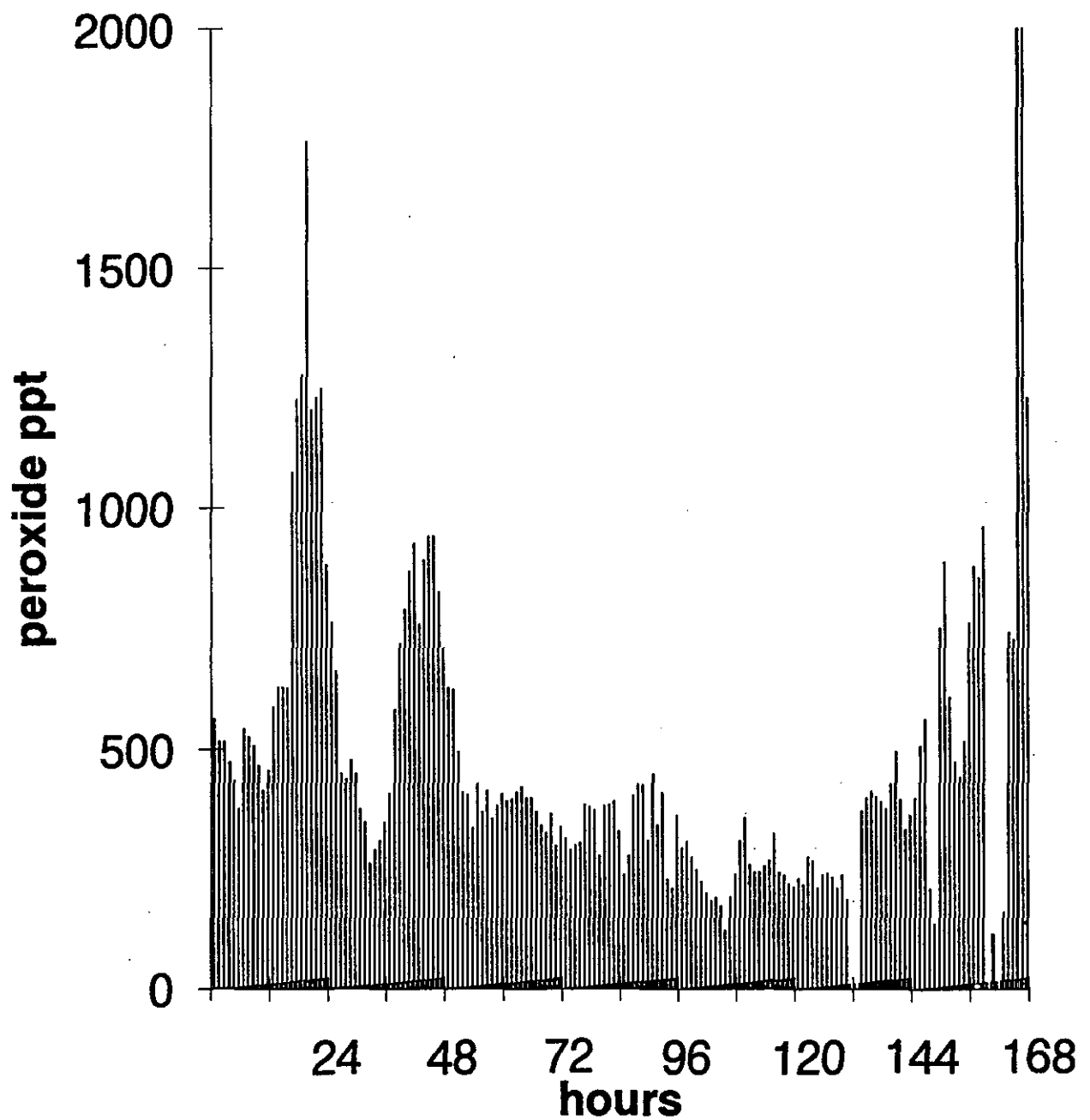


Figure 2. Model generated concentrations of H_2O_2 as a function of day of year and NO concentration. The plot consists of daily (24 hour) averages of hourly values.

