4.2.5. LABORATORY TESTING OF ECC OZONESONDES

It is important to conduct regular testing to evaluate the precision and accuracy of ECC ozonesondes, as the tests provide assurance that the best possible data are obtained from ozonesondes used in the wide variety of projects. The testing conducted in 1998 and 1999 always included ECC sondes from Science Pump Corporation and ENSCI Corporation, the two manufacturers and suppliers of ECC ozonesondes. Comparisons were also done using two different cathode sensing solution recipes, 1% KI buffered and 2% KI unbuffered. The ingredients for these solutions are listed in Table 4.7. CMDL switched from the 1% KI buffered to the 2% KI unbuffered solution after tests confirmed that the buffers were producing a side reaction that resulted in high ozone measurements [*Hofmann et al.*, 1998]. The dates for the switch to 2% KI unbuffered solutions are given in Table 4.8. CMDL testing in 1998 and 1999 included surface ozone comparisons in Boulder and triple ozonesonde flights at SPO.

Eleven surface ozone comparisons were done with ozonesondes and a TEI model 49C UV ozone analyzer in July and August 1999. The sondes were run for 4 to 7 hours. Both 6A and 2Z models were used in the tests. Figure 4.18 shows a typical comparison between the ozonesondes and the TEI ozone analyzer. The ozonesonde using a 2% KI unbuffered cathode solution was consistently about 1% to 2% higher than the TEI. The sonde containing the 1% KI buffered cathode solution was 7 to 10% higher than the TEI. These results confirmed previous laboratory tests showing the better agreement of the 2% KI unbuffered solution with UV instruments at surface pressures.

TABLE 4.7. Cathode Solution Recipes Used by CMDL ECC Ozonesondes*

Ingredients:	1% KI Buffered	2% KI Unbuffered
KI (potassium iodide)	10 g	20 g
KBr (potassium bromide)	25 g	0 g
Sodium phosphate buffers:		
$NaH_2PO_4 \cdot H_2O$	1.25 g	0 g
$Na_2HPO_4 \cdot 12H_2O$	5.00 g	0 g

*1 L of solution made with distilled, deionized water

TABLE 4.8. Dates when 2% KI Unbuffered Solution Replaced 1% KI Buffered Solution

Location	Date	Flight Number
Boulder, Colorado	Aug. 21, 1997	BL413
MLO	April 15, 1998	HI321
SPO	March 4, 1998	AS557
Tahiti	May 6, 1998	TA119
Fiji	April 30, 1998	FJ045
SMO	April 17, 1998	SA138
Trinidad Head, California	Aug. 21, 1997	TH001 (TH002 and TH003 used 1% buffered)

All field campaigns and new sites used 2% KI unbuffered solutions after January 1, 1998.

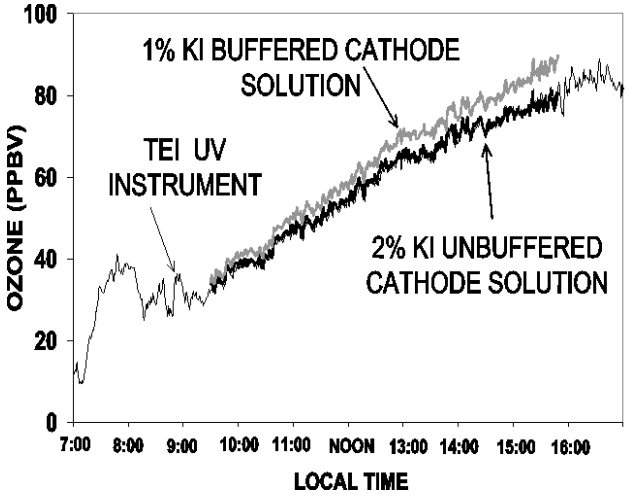

Fig. 4.18. Surface ozone measurements at Boulder, Colorado, using ozonesondes (with 1% KI buffered and 2% KI unbuffered solutions) and a TEI 49C UV ozone instrument.