

Dynamics and Chemistry of the Summer Stratosphere (DCOTSS)

Measurements aboard the ER-2: instrument, sampling rate, precision, and accuracy.

Species	Instrument	Sampling Interval	Data Precision ± Accuracy
Very Short-Lived (VSL) tracers (<1 month lifetime)			
Non-methane Hydrocarbons	AWAS	25–150 sec. depending on altitude	<2-4 pptv ± 10%
Benzene, Toluene	AWAS	25–150 sec. depending on altitude	2 pptv ± 10%
Formaldehyde	CAFÉ	1 second	50 pptv ± 10%
C ₁ -C ₄ Alkyl Nitrates	AWAS	25–150 sec. depending on altitude	<1 pptv ± 20%
Chlorobenzene	AWAS	25–150 sec. depending on altitude	<0.1 pptv ± 20%
Methyl Iodide	AWAS	25–150 sec. depending on altitude	<0.1 pptv ± 20%
Short-Lived tracers (1 month to <1 year lifetime)			
1,2 dichloro ethane	AWAS	25–150 sec. depending on altitude	<1 pptv ± 10%
Methyl Halides	AWAS	25–150 sec. depending on altitude	<0.1 – 0.5 pptv ± 10%
Solvents	AWAS	25–150 sec. depending on altitude	<0.1 – 0.5 pptv ± 10%
CO	HUPCRS	10 second	2.8 ppbv ± 3.5 ppbv
Long-Lived tracers (> 1 year lifetime)			
O ₃	HOZ	10 second	10 ppbv ± 5%
	UCATS	2 second	5 ppb ± 5%
H ₂ O	HWV	1 second	0.10 ppmv ± 10%
	UCATS	1 second	0.25 ppmv ± 10%
	WI-ICOS	10 second	0.25 ppmv ± 10%
δD	WI-ICOS	10 second	~20 ‰ ± 40‰
CO ₂	HUPCRS	10 second	20 ppbv ± 100 ppbv
CH ₄	HUPCRS	10 second	0.2 ppbv ± 1 ppbv
N ₂ O	UCATS	70 second (3 sec width)	1 ppbv ± 1%
SF ₆	UCATS	70 second (3 sec width)	0.05 pptv ± 1%
CFC-11/12/113	AWAS	25–150 sec. depending on altitude	<0.1 – 0.5 pptv ± 2%
	UCATS	70 second (3 sec width)	1 pptv ± 1%
Halon 1211/2402	AWAS	25–150 sec. depending on altitude	<0.1 pptv ± 2%
	UCATS	70 second (3 sec width)	0.05 ppt ± 1%
HCFC-141b/22/142b	AWAS	25–150 sec. depending on altitude	<1 pptv ± 2%
CCl ₄	AWAS	25–150 sec. depending on altitude	0.5 pptv ± 2%
OCS	AWAS	25–150 sec. depending on altitude	3 pptv ± 5%
CH ₃ Cl	AWAS	25–150 sec. depending on altitude	3 pptv ± 5%
Reactive Species			
ClO	HAL	20 second	3 pptv ± 17%
BrO	HAL	20 second	2 pptv ± 20%
NO ₂	CANOE	1 second	40 pptv ± 10%
Particles			
Size Distribution	POPS	1 second	5% of diameter
Aerosol Composition	PALMS	up to 10 particles/sec.	NA
Meteorological data			
Pressure	MMS	1-20 Hz	0.003 mb ± 0.3 mb
Temperature	MMS	1-20 Hz	0.05 K ± 0.3 K
Horizontal Wind	MMS	1-20 Hz	0.1 m/s ± 1 m/s
Vertical Wind	MMS	1-20 Hz	0.05 m/s ± 0.3 m/s