WHOLE DATA SET

DataSetName: Chlorine monoxide profiles over:

McMurdo Station, Antarctica; August, September and October, 1997

McMurdo Station, Antarctica; September 1998

DataSource: Stony Brook ground-based mm-wave spectrometer

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SourceCharacteristics: Stratospheric ClO between 17 and 50 km.

InvestigationObjectives:Measurement of the variations in the vertical profiles of chlorine monoxide in the stratosphere over McMurdo Station, Antarctica.

InstrumentAttributes: Ground-based mm-wave heterodyne receiver/spectrometer using a superconducting (SIS) niobium tunnel junction mixer. Pressure broadened emission spectra from molecular rotation lines are measured. Data is acquired alternately from the zenith (the reference) and from approximately ten degrees above the horizon (the signal). The difference spectrum, [signal-reference]/reference, is used to isolate stratospheric emissions. Data is recorded in fifteen minute scans that are combined into two hour time bins during data analysis. See reference 1.

MeasuredParameters: Mixing ratio of chlorine monoxide as a function of altitude. Resolution approximately six km.

DataSetQuality: Spectral line intensity calibrated against black-body sources of known temperature several times per day. Estimated calibration errors +/- 10%; estimated vertical profile retrieval errors given separately with data files.

DataProcessingOverview: Input data are pressure broadened emission spectra with a bandwidth of 600 MHz at 2 MHz resolution. Output data are mixing ratios as functions of altitude, extracted from the input lineshapes by numerical deconvolution. Vertical resolution is approximately 6 km, but smoothly interpolated mixing ratios are given at 1 km intervals.

DataUsage: Expected uses are to show diurnal variation and secular change of the chlorine monoxide vertical profile, and to correlate these data with similar measurements taken by the Microwave Limb Sounder instrument aboard UARS.

FileClassRelationships: One file class for chlorine monoxide.

LitReferences: 1) A. Parrish, R.L. de Zafra, P.M. Solomon, and J.W. Barrett, Radio Science, 23, 106-118, 1988.
2) S. Twomey, B. Herman, R. Rabinoff, Journal of the Atmospheric Sciences, 34, 1085-1090, 1977.

FILE CLASS

FileClassName: Chlorine monoxide
RecordTypeNames: Vertical profile
Algorithms: Reference 2
FileClassSyntax: Chronological
FileClassFieldRelationships: McMurdo 1997 and 1998 contain the fields altitude, pressure, mixing ratio, and one nominal standard deviation in mixing ratio.

RECORD

RecordName: Vertical profile
RecordStructure: Variable
RecordLength: 34 data points
RecordFieldNames: Altitude, pressure, mixing ratio, and one nominal standard deviation in mixing ratio.
RecordSyntax: Each line of data contains altitude, pressure, mixing ratio,and one nominal standard deviation in mixing ratio at that altitude. Altitude increases from beginning to end of file.

FIELDS

FieldName: Altitude
FieldMnemonic: z
FieldSyntax: One-dimensional array
FieldUnits: Meters
FieldResolution: 1000
FieldRange: 17000 to 50000
FieldDescription: Altitude above observing site
FieldRepresentation: Integer*4

FieldName: Pressure
FieldMnemonic: P
FieldSyntax: One-dimensional array
FieldUnits: mbar
FieldResolution: .01
FieldRange: 80 to .5
FieldDescription: Atmospheric pressure
FieldRepresentation: integer*4

FieldName:	Mixing ratio
FieldMnemonic:	MR
FieldSyntax:	One-dimensional array
FieldUnits:	Parts per million by volume (ppmv)
FieldResolution:	.000001
FieldRange:	.000001 to .002000
FieldDescription:	Mixing ratio of species
FieldRepresentation:	integer*4

FieldName:	One nominal standard deviation in mixing ratio
FieldMnemonic:	MRsigma
FieldSyntax:	One-dimensional array
FieldUnits:	Part per million by volume (ppmv)
FieldResolution:	.000001
FieldRange:	.000001 to .000300
Field Description:	See comments in individual datafiles
FieldRepresentation:	integer*4