1. TITLE

1.1 Data Set Identification

ISLSCP II GlobalView: Atmospheric CO_2 Concentrations

1.2 Database Table Name(s)

Not applicable to this data set.

1.3 File Name(s)

This GLOBALVIEW-CO_2 data set contains data files and original documentation provided by NOAA's Climate Monitoring and Diagnostics Laboratory (CMDL).

There are 92 data files with this data set, which includes 89 compressed *.zip files and 3 additional files described below:

0_gv_table_co2.csv: contains a table with site information for all sites used in this data set and measurement labs.

0_globalview_co2_sites.dat: contains the full names of the sites with the abbreviations, latitude, longitude, and temporal coverage for all sites used in this data set.

0_ref_mbl_mtx_co2.dat: a single reference marine boundary layer matrix file which contains CH_4 mixing ratios as a function of time and sine of latitude and is a by-product of the data extension procedure (see Masarie and Tans, 1995).

The user should check the following web site for the most up-to-date data and documentation: http://www.cmdl.noaa.gov/ccgg/globalview/.

The 89 .zip files are named after the sampling site and the country or location of the site.

For example:

hat-japan_co2.zip

pfa-alaska_co2.zip

When extrapolated, the file names in the 89 .zip files use the following format:

```
      1           2            3     4                    5      6
[site/prog][data group]_[lab#][sampling strategy][plat]_[qualifier]_co2.dat
```

1. [Sampling site/program]

- 3-character alphanumeric field specifying site or program code. See Section 6.2.1 below or section 9 of the **2_gv_co2_2003_doc.pdf** document for a complete list of the site abbreviations.

2. [Grouping of data within the file]

- If not specified then the sampling site is at a single fixed position. [brw_, prs_]
- If an aircraft then identifier is a 3-character numeric field with units of 10^2 meters (hm) above sea level. [car040_, aia005_]
- If a tower then identifier is a 3-character numeric field with units of meters (m) above sea level. [lef051_, hun048_]
- If a ship and binned by longitude then identifier is a 3-character numeric with units of degrees (000-360). [npo140_, nao350_]
- If a ship and binned by latitude, identifier is a 3-character alphanumeric field with units of degrees. (00-90). Bins in the northern and southern hemispheres are denoted as n## and s## respectively. The equatorial bin is denoted as 000. [pocs25_, poc000_, scsn03_]
- Note: A binned file requires further explanation regarding the bin width, e.g., car050 is a 1000m bin centered on 5km.

3. [Contributing laboratory]

Two-character numeric field identifies the measurement laboratory (00-99). .See section 2 of the **2_gv_co2_2003_doc.pdf** document.

4. [Sampling strategy]

Single alphanumeric character (0-9,a-z,A-Z) indicates the sampling strategy.

_??D	Discrete
_??C	Continuous/Quasi-continuous
_??E	Event
_??I	Integrated

5. [Sampling platform]

Single alphanumeric character (0-9,a-z,A-Z) indicates the sampling platform.

_???0	Single Fixed Position

_???1	Ship
_???2	Aircraft
_???3	Tower
_???4	Kite
_???5	Balloon
_???6	Firn/Ice Core

6. [Qualifier]

Multiple alphanumeric character field (0-9,a-z,A-Z) identifies the file's contents.

_????_ext	Extended Record
_????_wts	Extension Weights
_????_var	Average Atmospheric Variability
_????_seas	Average Seasonal Cycle
_????_diu	Average Diurnal Cycle
_????_tod	Sampling Time-Of-Day Summary
_????_mtx	MBL Reference Matrix

There are 6 types of files that are included in GLOBALVIEW-CO2. Each type is distinguished by its file name qualifier (see above):

- **ext** qualifier: files contain extended records, i.e., records that contain synchronized smoothed values, and interpolated and extrapolated values derived using the latitude reference data extension method.
- **wts** qualifier: files contain weights that were applied by CMDL when fitting smooth curves to weekly distributions of CO_2 mole fraction as a function of latitude.
- **var** qualifier: files contain a statistical summary of atmospheric variability by month.
- **seas** qualifier: files contain a statistical summary of the average seasonal pattern by month.
- **diu** qualifier: files contain a statistical summary of average diurnal cycle patterns by month accumulated for all complete measurement years.
- **tod** qualifier: files accompany a subset of extended records derived from discrete measurements where sample collection times have been made available.

File Name Examples

cgo_02D0_ext_co2.dat	Extended CO_2 record derived from CSIRO discrete measurements at Cape Grim.
mlo_00D0_ext_co2.dat	Extended CO_2 record derived from CMDL discrete measurements at Mauna Loa.
pocn30_00D0_wts_co2.dat	Extension CO_2 weight file derived from CMDL discrete measurements from POC centered at 30° N.
poc000_00D1_wts_co2.dat	Extension CO_2 weight file derived from CMDL discrete measurements from POC centered at the equator.
orl035_11D2_seas_co2.dat	Average seasonal cycle of CO_2 derived from the LSCE discrete measurements from aircraft. Altitude bin is centered

	at 3.5 km.
orl035_11D2_var_co2.dat	Average atmospheric variability of CO_2 derived from the LSCE discrete measurements from aircraft. Altitude bin is centered at 3.5 km.
lef011_00C3_diu_co2.dat	Average diurnal cycle of CO_2 derived from CMDL continuous measurements from a tower. Sampling height is 11 m.

Files with the "ext", "wts", "var", and "seas" qualifier exist for all sites described in GLOBALVIEW-CO_2. Files with the "diu" qualifier accompany a subset of extended records derived from high-resolution measurement records where the diurnal cycle is a dominant feature of the observations. Files with the "tod" qualifier accompany a subset of extended records derived from discrete measurements where sample collection times have been made available.

1.4 Revision Date of this Document

August 17, 2012

2. INVESTIGATOR(S)

2.1 Investigator(s) Name and Title

Dr. Kenneth A. Masarie, Project Manager, GLOBALVIEW- CO_2, 2001, NOAA/CMDL. See Section 2 of the **2_gv_co2_2003_doc.pdf** document for a complete list of participants.

2.2 Title of Investigation

GLOBALVIEW- CO_2, 2001, Cooperative Atmospheric Data Integration Project

2.3 Contacts (For Data Production Information)

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2.4 Data Set Citation

ISLSCP II GlobalView: Atmospheric CO_2 Concentrations. 2012. In Hall, Forrest G., G. Collatz, B. Meeson, S. Los, E. Brown de Colstoun, and D. Landis (eds.). ISLSCP Initiative II Collection. Data set. Available on-line [http://daac.ornl.gov/] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC

2.5 Requested Form of Acknowledgment

Users of the International Satellite Land Surface Climatology (ISLSCP) Initiative II data collection are requested to cite the collection as a whole (Hall et al. 2006) as well as the individual data sets. Please cite the following publications when these data are used:

Hall, F.G., E. Brown de Colstoun, G. J. Collatz, D. Landis, P. Dirmeyer, A. Betts, G. Huffman, L. Bounoua, and B. Meeson, The ISLSCP Initiative II Global Data sets: Surface Boundary Conditions and Atmospheric Forcings for Land-Atmosphere Studies, *J. Geophys. Res.*, 111, doi:10.1029/2006JD007366, 2006.

Note that GLOBALVIEW data and documents are updated once per year and the most up-to-date references are available at http://www.cmdl.noaa.gov/ccgg/globalview/.

3. INTRODUCTION

3.1 Objective/Purpose

The objective of GLOBALVIEW- CO_2 is to acquire and archive atmospheric measurements of trace gas species that will facilitate a better understanding of the processes controlling their abundance. These and other measurements have been widely used to constrain atmospheric models that derive plausible source/sink scenarios. Serious obstacles to this approach are the paucity of sampling sites and the lack of temporal continuity among observations from different locations. Consequently, there is the potential for models to misinterpret these spatial and temporal gaps resulting in derived source/sink scenarios that are unduly influenced by the sampling distribution. GLOBALVIEW- CO_2 is an attempt to address these issues of temporal discontinuity and data sparseness and is a tool intended for use in carbon cycle modeling. GLOBALVIEW is a product of the Cooperative Atmospheric Data Integration Project and is coordinated and maintained by the NOAA CMDL Carbon Cycle Greenhouse Gases (CCGG) Group.

3.2 Summary of Parameters

The data product includes synchronized smoothed time series derived from continuous and discrete land-surface, ship, aircraft, and tower observations; weight files; summaries of seasonal patterns, diurnal patterns (where relevant), sampling time-of-day (where available), and atmospheric variability; the derived marine boundary layer (MBL) reference matrix used in the

data extension process; uncertainty estimates; and extensive documentation. The largest period of coverage is from 1979 to 2001 with other sites having less extended coverage.

3.3 Discussion

The GLOBALVIEW- CO_2 construct is derived from measurements but contains no actual data. To facilitate use with carbon cycle modeling studies, the measurements have been processed (smoothed, interpolated, and extrapolated) resulting in extended records that are evenly incremented in time. Be aware that information contained in the actual data may be lost in this process. Users are encouraged to review the actual data in the literature, in data archives (CDIAC, WDCGG), or by contacting the participating laboratories identified below. Smoothed, interpolated, and extrapolated values in the extended records are determined with varying degrees of confidence. We strongly encourage users to consider the relative weights assigned to these values when using this product.

GLOBALVIEW- CO_2 is subject to change as members of the Cooperative Atmospheric Data Integration Project reserve the right to adjust individual measurement records based on recalibrations of standard gases and instruments. The GLOBALVIEW- CO_2 data product continues to evolve. Extended records and statistical summaries may change as techniques are refined and new data are added. This data set included in the International Satellite Land Surface Climatology Project (ISLSCP) Initiative II data collection is the GLOBALVIEW- CO_2, 2001 data set. However, the data set is updated on a yearly basis with the most up-to-date data and documentation available at http://www.cmdl.noaa.gov/ccgg/globalview/ .

Each measurement record used to derive GLOBALVIEW- CO_2 has been carefully edited and selected by the organization or institution contributing the observations. The measurement records are accumulated at NOAA CMDL along with documentation and references. Wherever possible, NOAA CMDL attempts to reproduce the selected data set based on descriptions in the literature. Details of methodology and standard scale can often be obtained from the documentation and literature. Selected measurements are then compared to other measurement records that are nearby in latitude as an additional assessment of potential calibration or sampling problems. Occasionally, two or more organizations make observations at the same location providing an opportunity to directly compare independent measurement programs. Records are accumulated at NOAA CMDL along with documentation and references. Wherever possible, NOAA CMDL attempts to reproduce the selected data set based on descriptions in the literature. Details of methodology and standard scale can often be obtained from the documentation and literature. Selected measurements are then compared to other measurement records that are nearby in latitude as an additional assessment of potential calibration or sampling problems. Occasionally, two or more organizations make observations at the same location providing an opportunity to directly compare independent measurement programs.

4. THEORY OF ALGORITHM/MEASUREMENTS

See Masarie and Tans (1995) and http://www.cmdl.noaa.gov/ccgg/globalview/.

5. EQUIPMENT

5.1 Instrument Description

5.1.1 Platform (Satellite, Aircraft, Ground, Person)

Land-surface, ship, aircraft, and tower observations.

5.1.2 Mission Objectives

To measure atmospheric trace gas concentrations.

5.1.3 Key Variables

Atmospheric trace gas concentrations.

5.1.4 Principles of Operation

Several instruments are used. See http://www.cmdl.noaa.gov/ccgg/globalview/ for more information.

5.1.5 Instrument Measurement Geometry

Several instruments are used. See http://www.cmdl.noaa.gov/ccgg/globalview/ for more information.

5.1.6 Manufacturer of Instrument

Several instruments are used. See http://www.cmdl.noaa.gov/ccgg/globalview/ for more information.

5.2 Calibration

The majority of laboratories contributing to the GLOBALVIEW-CO_2 data product are members of the World Meteorological Organization (WMO) Global Atmospheric Watch (GAW) network. Data from the GAW network are reported relative to the WMO CO_2 mole fraction scale, which is maintained and propagated by the Central CO_2 Laboratory (CCL). GAW laboratories are required to maintain a direct link between their internal calibration scale and the CCL. A few laboratories contributing to the data product are not part of the WMO GAW program and thus provide data referenced to some other scale. See section 3 of the **2_gv_co2_2003_doc.pdf** document for a description of ongoing efforts to assess the comparability of calibration scales and atmospheric observations.

In an attempt to assess differences in standard scales among organizations making CO_2 measurements, all laboratories contributing to GLOBALVIEW- CO_2 have participated in recent laboratory comparisons or round robin (RR) experiments endorsed by the WMO. Based on results from the 1995/1996 comparison of standard gases, the majority of participating laboratories agreed to within 0.2 µmole/mol [Peterson et al., 1999, see Table 1]. Preliminary results from the most recent standard gas comparison (1998/1999) show similar levels of agreement Final results from the 1998/1999 round-robin are pending and will be posted to the GLOBALVIEW-CO_2 Web page when they are made available. Another round-robin experiment, begun in 2002, is underway.

Table 1. 1995-1996 Round Robin Results: Differences from NOAA CMDL (Laboratory minus CMDL) µmole/mol

LABORATORY [LAB #]	ANALYSIS DATE	CONCENTRATION DIFFERENCE FROM NOAA CMDL (µmole/mol) Tank Concentration Range		
		Low	**Medium**	**High**
CSIRO [02]	May 1996	-0.07	-0.02	-0.02
MSC [06]	Jun 1997	-0.04	0.00	-0.02
CAMS [33]	Dec 1995	-0.07	-0.01	-0.02
LSCE [11]	Jan 1996	0.10	0.08	0.16
IUP-HD [23]	Sep 1996	-0.15	-0.09	-0.09
HMS[1] [35]	Dec 1996	-1.22	-1.04	-0.80
ENEA [28]	Apr 1996	-0.29	-0.06	0.19
IMS [17]	Mar 1996	0.04	0.06	0.07
JMA [19]	Jan 1997	0.07	0.31	0.30
SNU [24]	Mar 1997	0.24	0.13	0.29
NIES [20]	Aug 1996	-0.02	0.09	0.12
NIWA [15]	Feb 1996	0.02	0.10	0.20
MISU[2] [31]	--	--	--	--
INM[2][27]	--	--	--	--
CESI[3] [21]	--	--	--	--
SAWS[3] [36]	--	--	--	--

1 Results from the analysis of RR cylinders against HMS standards used in the K-Putska measurement program. Based on these results, the K-Putska observations have been excluded from GLOBALVIEW. HMS [35] standards used in the Hegyhatsal tower program (filled and calibrated by the CCL) have been used for the 1998/1999 RR experiment.

2 Due to lengthy delays in the analysis and shipping of cylinders during the 1995/1996 RR experiment, MISU [31] and INM [27] were unable to analyze the RR cylinders.

3 Did not participate in the 1995/1996 RR experiment.

5.2.1 Specifications

5.2.1.1 Tolerance

The current WMO scale is based on routine absolute calibrations of CO_2 in dry air from a set of 15 primary standards using a high precision manometric system (Zhao et al., 1997) Absolute accuracy is estimated to be ~0.1 µmol mol^{-1}. Measurement precision is also on the order of 0.1 µmol mol^{-1} based on repeated manometric analyses.

5.2.2 Frequency of Calibration

See Table 2 on the next page.

5.2.3 Other Calibration Information

See section 3 of the **2_gv_co2_2003_doc.pdf** document. In 1995, the WMO designated NOAA CMDL as the Central CO_2 Laboratory (CCL) responsible for the maintenance of the absolute WMO mole fraction scale for carbon dioxide. Since 1995, standards calibrated by the CCL are referenced to the WMO mole fraction scale. The xYR designation (e.g., WMOx85, WMOx93, x97) is no longer used because differences

among scale revisions were minor and because there was no significant offset between the WMO mole fraction scale currently maintained by CMDL and the WMO scale maintained by the former CCL (Scripps Institution of Oceanography). The WMO mole fraction scale is based on routine absolute calibrations of CO_2 in dry air from a set of 15 primary standards using a high precision manometric system (Zhao et al., 1997).. Measurement precision is also on the order of 0.1µmole/molbased on repeated manometric analyses. The scale as defined by the primary standards (projected 30 year average lifetime) is subsequently propagated to a set of 9 secondary standards (3-4 year average lifetime) using relative nondispersive infrared (NDIR) measurement techniques. NDIR measurement precision is –0.02µmole/mol. Cylinders are calibrated for other laboratories against the secondary standards using the NDIR methodology. The use of a calibration hierarchy enables the CCL to occasionally re-assign the value of a primary or secondary standard and propagate the change, in a straightforward manner, to all dependent calibrations. Not all data contributed to the Cooperative Atmospheric Data Integration Project for CO_2 are directly traceable to the WMO mole fraction scale. A few laboratories have never had their standard gases calibrated by the CCL and report CO_2 measurements relative to some other scale (see Table 2). Measurements from these laboratories are not directly traceable to the WMO mole fraction scale. Several other laboratories have, at one time, had their standards calibrated by the CCL but have not maintained a routine recalibration schedule. Because the mole fraction of CO_2 contained in high-pressure cylinders can potentially change with time due to CO_2 adsorption or production within the cylinder or regulator, the WMO scale as well as a laboratory's internal scale may potentially change with time. Without routine recalibration by the CCL to reestablish direct traceability to the absolute scale, laboratories contribute CO_2 data that are no longer directly traceable to the WMO scale.

6. PROCEDURE

6.1 Data Acquisition Methods

Each measurement record used to derive GLOBALVIEW-CO_2 has been carefully edited and selected by the organization or institution contributing the observations. The measurement records are accumulated at NOAA CMDL along with documentation and references. Wherever possible, NOAA CMDL attempts to reproduce the selected data set based on descriptions in the literature. Details of methodology and standard scale can often be obtained from the documentation and literature. Selected measurements are then compared to other measurement records that are nearby in latitude as an additional assessment of potential calibration or sampling problems. Occasionally, two or more organizations make observations at the same location, providing an opportunity to directly compare independent measurement programs (Masarie et al., 2001).

Table 2. Traceability to the WMO CO_2 mole fraction scale based on calibration by the CCL.

Laboratory [Lab #]	Most Recent Calibration	# Of Cylinders	Calibration Scale
CSIRO [02]	Aug 1994	6	WMO[1]
MSC [06]	Mar 2000	9	WMO

CAMS [33]	Jan 1994	9	WMO[1]
LSCE [11]	Aug 1998	6	WMO
IUP-HD [23]	Oct 1998	2	WMO[2]
HMS [35]	Mar 2000	7	WMO
ENEA [28]	Aug 2000	8	WMO
IMS [17]	Oct 1998	5	WMO
JMA [19]	Mar 1999	13	WMO
SNU [24]	--	--	x97 SIO
NIES [20]	--	--	NIES 95
NIPR [09]	--	--	Tohoku University
NIWA [15]	Nov 1995	4	WMO[1]
SAWS [36]	Jun 1997	2	WMO[1,2]
MISU [31]	Jul 1996	10	WMO[1]
INM [27]	Jan 1997	4	WMO[1]
CESI [21]	Jul 1997	5	WMO[1]
CMDL [00]	Jan 2001	9	WMO

1 Traceability to the WMO mole fraction scale has lapsed. A recalibration schedule of every 3 years is thought to be the minimum frequency for maintaining traceability to the WMO scale.

2 Insufficient number of cylinders calibrated to properly link laboratory internal scale to WMO mole fraction scale. The minimum number of standards required to establish traceability to the WMO mole fraction scale is four. Every attempt has been made to ensure that the data sets used to derive the GLOBALVIEW- CO_2 data product are comparable to within 0.2 µmole/mol. At present, the Cooperative Atmospheric Data Integration Project for CO_2 has made no standard scale adjustments to any of the measurement records integrated into GLOBALVIEW- CO_2. Records that appear to be affected by a serious scale discrepancy have been omitted at this time.

6.2 Spatial Characteristics

6.2.1 Spatial Coverage

The GLOBALVIEW- CO_2 data set is made up of data acquired at sites throughout the world (see http://www.cmdl.noaa.gov/ccgg/globalview/images/gvco2_2003_map.pdf). Table 3 and the file **0_gv_table_co2.dat** provide general information on sampling locations for measurement records used to derive the GLOBALVIEW- CO_2 construct.

Table 3. GLOBALVIEW- CO_2 Station Information

Abbrev.	Site Location	Latitude, Longitude	Temporal Coverage
AIA	Bass Strait/Cape Grim, Australia	-40.53, 144.30	1992 05 – 2000 09
ALT	Alert, Nunavut, Canada	2.45, -62.52	1985 06 – 2001 12
AMS	Amsterdam Island, France	-37.95, 77.53	1980 05 – 2001 12
ASC	Ascension Island, U.K.	-7.92, -14.42	1979 08 – 2001 12
ASK	Assekrem, Algeria	23.18, 5.42	1995 09 – 2001 12
AVI	St. Croix, Virgin Islands, U.S.A.	17.75, -64.75	1979 02 – 1990 08
AZR	Terceira Island, Azores, Portugal	38.75, -27.08	1979 12 – 2001 12
BAL	Baltic Sea, Poland	55.50, 16.67	1992 09 – 2001 12
BHD	Baring Head Station, New Zealand	-41.41, 174.87	1970 11 – 2000 12

BME	St. David's Head, Bermuda, U.K.	32.37, -64.65	1989 02 – 2001 12
BMW	Southhampton, Bermuda, U.K.	32.27, -64.88	1989 05 – 2001 12
BRW	Barrow, Alaska, U.S.A.	71.32, -156.60	1973 07 – 2001 12
BSC	Black Sea, Constanta, Romania	44.17, 28.68	1994 10 – 2001 12
CAR030	Carr, Colorado, U.S.A.	40.90, -104.80	1992 11 – 2001 12
CAR040	Carr, Colorado, U.S.A.	40.90, -104.80	1992 11 – 2001 12
CAR050	Carr, Colorado, U.S.A.	40.90, -104.80	1992 11 – 2001 12
CAR060	Carr, Colorado, U.S.A.	40.90, -104.80	1995 06 – 2001 12
CAR070	Carr, Colorado, U.S.A.	40.90, -104.80	1995 06 – 2001 12
CAR080	Carr, Colorado, U.S.A.	40.90, -104.80	1995 06 – 2001 12
CBA	Cold Bay, Alaska, U.S.A.	55.20, -162.72	1978 08 – 2001 12
CFA	Cape Ferguson, Queensland, Australia	-19.28, 147.06	1991 06 – 2001 12
CGO	Cape Grim, Tasmania, Australia	-40.68, 144.68	1984 04 – 2001 12
CHR	Christmas Island, Kiribati	1.70, -157.17	1984 04 – 2001 12
CMN	Mt. Cimone Station, Italy	44.18, 10.70	1979 03 – 2000 12
CMO	Cape Meares, Oregon, U.S.A.	45.48, -123.97	1982 05 – 1998 03
COI	Cape Ochi-ishi, Japan	43.15, 145.50	1995 08 – 2001 12
CPT	Cape Point, South Africa	-34.35, 18.49	1983 09 – 2001 12
CRI	Cape Rama, India	15.08, 73.83	1993 02 – 2001 04
CRZ	Crozet, Indian Ocean, France	-46.45, 51.85	1991 03 – 2001 12
CSJ	Cape St. James, British Columbia, Canada	51.93, -131.02	1979 05 – 1992 07
DAA	Darwin (Charles Point), Northern Territory, Australia	-12.42, 130.57	1992 10 – 1998 12
EIC	Easter Island, Chile	-29.15, -109.43	1994 01 – 2001 12
ESP	Estevan Point, British Columbia, Canada	49.38, -126.53	1993 06 – 2001 10
GMI	Guam, Mariana Islands, U.S.A.	13.43, 144.78	1978 09 – 2001 12
GOZ	Dwejra Point, Gozo, Malta	36.05, 14.18	1993 10 – 1999 02
HAA	Molokai Island, Hawaii, U.S.A.	21.23, -158.95	1999 05 – 2001 12
HAT	Hateruma Island, Japan	24.05, 123.80	1993 10 – 2001 12
HBA	Halley Bay, Antarctica, U.K.	-75.67, -25.50	1983 01 – 2001 12
HUN	Hegyhatsal, Hungary	46.95, 16.65	1993 03 – 2001 12
ICE	Storhofdi, Heimaey, Vestmannaeyjar, Iceland	63.25, -20.15	1992 10 – 2001 12
ITN	Grifton, North Carolina, U.S.A.	35.35, -77.38	1992 07 – 1999 06
IZO	Tenerife, Canary Islands, Spain	28.30, -16.48	1984 06 – 2001 12
JBN	Jubany Station, Antarctica	-62.23, -58.82	1994 01 – 2001 12
KEY	Key Biscayne, Florida, U.S.A.	25.67, -80.20	1972 12 – 2001 12
KSN	Kosan, Republic of Korea	33.28, 126.15	1990 08 – 2000 12
KUM	Cape Kumukahi, Hawaii, U.S.A.	19.52, -154.82	1971 01 – 2001 12
KZD	Sary Taukum, Kazakstan	44.45, 77.57	1997 10 – 2001 12
KZM	Plateau Assy, Kazakstan	43.25, 77.88	1997 10 – 2001 12
LEF	Park Falls, Wisconsin, U.S.A.	45.93, -90.27	1994 11 – 2001 12
LMP	Lampedusa, Italy	35.52, 12.62	1996 01 – 2001 12
MAA	Mawson Station, Antarctica	-67.62, 62.87	1990 06 – 2001 12
MBC	Mould Bay, Nunavut, Canada	76.25, -119.35	1980 04 – 1997 05
MHD	Mace Head, County Galway, Ireland	53.33, -9.90	1991 06 – 2001 12
MHDCBC	Mace Head, County Galway, Ireland (Continental Baseline Condition)	53.33, -9.90	1992 07 – 2001 12
MHDRBC	Mace Head, Ireland (Restricted (Marine) Baseline Condition)	53.33, -9.90	1992 07 – 2001 12
MID	Sand Island, Midway, U.S.A.	28.22, -177.37	1985 05 – 2001 12
MLO	Mauna Loa, Hawaii, U.S.A.	19.53, -155.58	1969 08 – 2001 12
MNM	Minamitorishima, Japan	24.30, 153.97	1993 03 – 2001 12
MQA	Macquarie Island, South Pacific Ocean	-54.48, 158.97	1992 01 – 2001 11

NWR	Niwot Ridge, Colorado, U.S.A.	40.05, -105.58	1967 05 – 2001 12
OPW	Olympic Peninsula, Washington, U.S.A.	48.25, -124.42	1984 11 – 1990 05
ORL	Orleans, France	47.80, 2.50	1996 04 – 2001 12
PALCBC	Pallas-Sammaltunturi, GAW Station, Finland	67.97, 24.12	1999 01 – 2002 12
PALMBC	Pallas-Sammaltunturi, GAW Station, Finland	67.97, 24.12	1999 01 – 2002 12
PFA	Poker Flats, Alaska, U.S.A.	65.07, -147.29	1999 06 – 2001 12
POCN45	Pacific Ocean, North Latitude 45°	[42.50 .. 47.50], [-134.0 .. -128.0]a	1986 12 – 1996 08
POCN40	Pacific Ocean, North Latitude 40°	[37.50 .. 42.50], [-140.0 .. -132.0]a	1986 12 – 1996 08
POCN35	Pacific Ocean, North Latitude 35°	[32.50 .. 37.50], [-148.0 .. -126.0]a	1986 12 – 1996 08
POCN30	Pacific Ocean, North Latitude 30°	[27.50 .. 32.50], [-150.0 .. -120.0]a	1986 12 – 2000 07
POCN25	Pacific Ocean, North Latitude 25°	[22.50 .. 27.50], [-156.0 .. -122.0]a	1986 12 – 2000 07
POCN20	Pacific Ocean, North Latitude 20°	[17.50 .. 22.50], [-158.0 .. -124.0]a	1986 12 – 2000 07
POCN15	Pacific Ocean, North Latitude 15°	[12.50 .. 17.50], [-162.0 .. -128.0]a	1986 12 – 2000 07
POCN10	Pacific Ocean, North Latitude 10°	[7.50 .. 12.50], [-166.0 .. -132.0]a	1986 12 – 2000 07
POCN05	Pacific Ocean, North Latitude 5°	[2.50 .. 7.50], [-168.0 .. -134.0]a	1986 12 – 2000 07
POC000	Pacific Ocean, Equator	[-2.50 .. +2.50], [-172.0 .. -138.0]a	1986 12 – 2000 07
POCS05	Pacific Ocean, South Latitude 5°	[-7.50 .. -2.50], [-176.0 .. -142.0]a	1986 12 – 2000 07
POCS10	Pacific Ocean, South Latitude 10°	[-12.50 .. -7.50], [-178.0 .. -144.0]a	1986 12 – 2000 07
POCS15	Pacific Ocean, South Latitude 25°	[-17.50 .. -12.50], [178.0 .. -160.0]a	1986 12 – 2000 07
POCS20	Pacific Ocean, South Latitude 20°	[-22.50 .. -17.50], [176.0 .. -164.0]a	1986 12 – 2000 07
POCS25	Pacific Ocean, South Latitude 25°	[-27.50 .. -22.50], [178.0 .. -160.0]a	1986 12 – 2000 07
POCS30	Pacific Ocean, South Latitude 30°	[-32.50 .. -27.50], [176.0 .. -168.0]a	1986 12 – 2000 07
POCS35	Pacific Ocean, South Latitude 35°	[-37.50 .. -32.50], [160.0 .. -176.0]a	1986 12 – 2000 07
PRS	Plateau Rosa Station (CNR), Italy	45.93, 7.70	1993 04 – 2001 12
PSA	Palmer Station, Antarctica, U.S.A.	-64.92, -64.00	1978 01 – 2001 03
RPB	Ragged Point, St. Phillip's Parish, Barbados	13.17, -59.43	1987 11 – 2001 12
RYO	Ryori Atmospheric Environment Observatory, Japan	39.03, 141.83	1987 01 – 2001 12
SCH	Schauinsland, Germany	48.00, 8.00	1972 01 – 2000 12
SCSN21	South China Sea, North Latitude 21°	21, 117.00	1991 07 – 1998 10
SCSN18	South China Sea, North Latitude 18°	18, 115.00	1991 07 – 1998 10
SCSN15	South China Sea, North Latitude 15°	15, 113.00	1991 07 – 1998 10
SCSN12	South China Sea, North Latitude 12°	12, 111.00	1991 07 – 1998 10
SCSN09	South China Sea, North Latitude 9°	9, 109.00	1991 07 – 1998 10
SCSN06	South China Sea, North Latitude 6°	6, 107.00	1991 07 – 1998 10

SCSN03	South China Sea, North Latitude 3°	3, 105.00	1991 07 – 1998 10
SEY	Mahe Island, Seychelles	-4.67, 55.17	1980 01 – 2001 12
SHM	Shemya Island, Alaska, U.S.A.	52.72, 174.10	1985 09 – 2001 12
SIS	Shetland Islands, Scotland	60.17, -1.17	1992 11 – 2001 11
SMO	Tutuila, American Samoa, U.S.A.	-14.25, -170.57	1972 01 – 2001 12
SPO	South Pole, Antarctica, U.S.A.	-89.98, -24.80	1975 01 – 2001 12
STM	Atlantic Ocean (Polarfront), Norway	66.00, 2.00	1981 03 – 2001 12
STMEBC	Atlantic Ocean (Polarfront), Norway (Extended Baseline Conditions)	66.00, 2.00	1981 03 – 2001 12
STP	Pacific Ocean, Canada	50.00, -145.00	1969 05 - 1981 06
SYO	Syowa Station, Antarctica, Japan	-69.00, 39.58	1986 01 – 2001 12
TAP	Tae-ahn Peninsula, Korea	36.73, 126.13	1990 11 – 2001 12
TDF	Tierra Del Fuego, La Redonda Isla, Argentina	54.87, -68.48	1994 09 – 2001 12
UTA	Wendover, Utah, U.S.A.	9.90, -113.72	1995 05 – 2001 12
UUM	Ulaan Uul, Mongolia	44.45, 111.10	1992 01 – 2001 12
WES	Westerland, North Sea, Germany	55.00, 8.00	1972 11 – 2000 12
WIS	Sede Boker (Negev Desert), Israel	31.13, 34.88	1995 11 – 2001 12
WKT	Moody, Texas, U.S.A.	31.32, -97.33	2001 02 – 2003 06
WLG	Mt. Waliguan Baseline Observatory, Peoples Republic of China	36.27, 100.92	1990 08 – 2001 12
YON	Yonagunijima, Japan	4.47, 123.02	1997 01 – 2001 12
ZEP	Zeppelin Station, Ny-Alesund, Svalbard (Spitsbergen), Norway	78.90, 11.88	1994 02 – 2001 12

[a] Approximate position. Samples are collected in the range of positions.

The descriptive information includes:

- Sample location identification code (3-6 character fields, upper case). Note that in some instances the identification code indicate position.
- Location of the sampling site.
- Position of the sampling site where latitude is in degrees (000 is at the equator, north of the equator is positive (+), and south of the equator negative (-)), longitude is in degrees (east of Meridian of Greenwich is positive (+), and west of Meridian of Greenwich is negative (-)).

For additional site information see Section 9 of the **2_gv_co2_2003_doc.pdf** document.

6.2.2 Spatial Resolution

This is point data at various sites all around the world. See Table 3 immediately above for a list of stations.

6.3 Temporal Characteristics

6.3.1 Temporal Coverage

See Table 3 immediately above for each station. Note that the span of the measurements may extend beyond the synchronization period (1979-2001) defined for this release of GLOBALVIEW- CO_2. These more recent measurements have been used to better define the smooth curve, S(t), and will be included in a future release of GLOBALVIEW- CO_2.

6.3.2 Temporal Resolution

Varies with file types. Can be weekly, monthly or average seasonal/diurnal cycles. See Section 8.2 for more information.

7. OBSERVATIONS

7.1 Field Notes

None given.

8. DATA DESCRIPTION

8.1 Table Definition with Comments

Not applicable to this data set.

8.2 Type of Data

All file types (except for reference MBL matrix) have 16 lines of descriptive information that include

+ Extended record name
+ Measurement organization or institution
+ Type of measurement program
+ Type of sampling site
+ Name of organization collecting air
+ Position of sampling site
+ Conversion from Universal Coordinated Time (UTC) to Local Standard Time (LST)
+ Creation date of the file
+ Number of rows in the file following the column description
+ Column descriptions

There are no blank fields in any column. Missing values are denoted with a standard default value, -999.999. All units are in μmol mol^{-1} CO_2 unless otherwise specified.

Extended Record Files (ext)

Following the descriptive information detailed above, the four (4) columns in the extended record files are:

UTC: "Weekly" synchronized time steps in Universal Coordinated Time (UTC) as decimal dates, i.e., year plus fraction of the year. Each year has 48 "weekly" steps. "Synchronized" means that the synchronization period and the time steps are the same for all extended record files.

S(t): Smoothed values extracted from a curve fitted to measurement data that have been selected for conditions where the sampled air is thought to be representative of large well-mixed air parcels. Internal and external gaps in the measurement record are denoted as default values.

REF(t): The latitude reference time-series, based on marine boundary layer sites, constructed at the sine (latitude) of the measurement site. The latitude reference is defined at all time steps.

diff: The difference climatology describes how the site differs from marine boundary layer (MBL) sites that are nearby in latitude. The difference climatology is defined at all time steps.

Extension Weights Files (wts)

Any method used to fill spatial and temporal gaps in observational records is forced to make assumptions creating uncertainty in the resulting data product. Each extended record included in GLOBALVIEW-CO_2 has a corresponding weight file that suggests a relative significance for each value in the extended file. All smooth values (derived directly from the actual measurements) receive a relative weight (ranging from 2 to 10) that depends on sampling density and measurement variability. All filled values (interpolated and extrapolated) receive a fixed weight of 1. We strongly recommend that users of this data product consider the weight files, which provide an estimate of the relative significance of each value in the extended record. Following the descriptive information detailed above, the four (4) columns in the weight files are:

UTC: Synchronization year where the number of years is determined by the synchronization period.

rsd: Residual standard deviation (RSD) of the measurements about the smooth curve, S(t), with annual resolution. Years with fewer than six (6) measurements are assigned default values.

#: The number of residuals per year used in the RSD determination.

weight: Scaled weights determined using the relative weighting scheme described by Masarie and Tans, [1995]. Years where weights cannot be determined are assigned a default minimum weight of one (1).

The first row past the descriptive information specifies the residual standard deviation, number of residuals, and derived weight for all years, all observations.

Average Atmospheric Monthly Variability Files (var)

A statistical summary of average atmospheric variability is provided for each measurement record. A residual distribution is determined by fitting a smooth curve, S(t), to the observations, C(t), and computing residuals C(t)-S(t). The residuals for all Januarys, Februarys, etc are aggregated and statistics are determined with monthly resolution. The aggregated monthly statistics include within month and year-to-year variability. Information pertaining to the diurnal cycle is not considered here. Following the descriptive information detailed above, the six (6) columns in the "var" files are:

mo: Month (1-12) specification.

stdev: Standard deviation of the residual distribution computed monthly for all years.

50%ile: The 50th percentile or median of the residual distribution.

16%ile: The 16th percentile of the residual distribution.

84%ile: The 84th percentile of the residual distribution.

#: The number of aggregated monthly residual values used to compute the monthly statistics.

Average Seasonal Cycle Files (seas)

A statistical summary of the average seasonal cycle is provided for each measurement record. Monthly means are computed from a detrended smooth fit, S(t)–T(t), to the observations. The monthly means for all Januarys, Februarys, etc. are aggregated and statistics are determined with monthly resolution. The standard deviation of each aggregated monthly mean value is a measure of the year-to-year variability in the monthly mean values. The standard error of the aggregated monthly mean value is an estimate of the uncertainty in the aggregated monthly mean value. Following the descriptive information detailed above, the five (5) columns in the "seas" files are:

mo: Month (1-12) specification.
mean: Mean of the aggregated detrended monthly means for all years.
stdev: Standard deviation of the aggregated monthly mean distribution.
std err: Standard error of the aggregated monthly mean distribution.
#: The number of monthly mean values used to compute the aggregated monthly statistics.

Average Diurnal Cycle Files (diu)

A statistical summary of average diurnal cycles by month compiled using data from complete years is provided for each measurement record with hour resolution and where the diurnal cycle is a dominant feature in the observations. The residual distribution is determined by subtracting the 24-hour average mixing ratio for each day from every observation for that day. Note that for tall tower measurements, the 24-hour average is determined from measurements at the highest level. Following the descriptive information detailed above, the six (6) columns in the "diu" files are

mo: Month (1-12) specification.
hr: Hour (0-23) specification in UTC.
50%ile: The 50th percentile or median of the residual distribution computed monthly for all complete years.
16%ile: The 16th percentile of the residual distribution.
84%ile: The 84th percentile of the residual distribution.
#: The number of residual values from complete years used to compute the monthly statistics.

Sampling Time-Of-Day Summary Files (tod)

A summary of sample collection times (in LST) for discrete measurement records where sampling times have been made available. Following the descriptive information detailed above, the three (3) columns in the "tod" files are

hr(LST): Sample collection hour (0-23) specification.
fract: Fraction (of the total number of samples) collected within the hour.
#: Number of samples collected within the hour.

Marine Boundary Layer (MBL) Reference Matrix Files (mtx)

The reference marine boundary layer matrix contains CO_2 mixing ratios as a function of time and sine of latitude and is a by-product of the data extension procedure (see Masarie and Tans, [1995] and Appendix A of the **2_gv_co2_2003_doc.pdf** document for details). Be aware that significant information contained in the actual data may be lost in this matrix. In addition, the reference MBL matrix itself may give an unrealistic impression of the comprehensiveness of global atmospheric CO_2 measurements since it contains CO_2 values at locations and times when

no measurements exist. There is a single header line in the matrix file that specifies the format of the reference matrix.

+ Matrix format: FORMAT="(F12.6, 41(1X,F12.4))"

Following the single header line above, the 42 columns are

UTC:	"Weekly" synchronized time steps in Universal Coordinated Time (UTC) as decimal dates, i.e., year plus fraction of the year. Each year has 48 "weekly" steps. "Synchronized" means that the synchronization period and time steps in the matrix are identical to those in the extended record files.
sine of latitude:	[columns 2-42] There are 41 even intervals of 0.05 sine of latitude from 90 degrees S to 90 degrees N, i.e., column 2 represents a reference MBL value at –1.00 (90 degrees S), column 3 at –0.95 (71.8 degrees S), column 4 at –0.90 (64.2 degrees S), and so on.

8.3 Sample Data Record

A sample of the file "**aia005_02D2_ext_co2.dat**" is shown below:

```
aia005_02D2

Commonwealth Scientific and Industrial Research Organization (CSIRO),
Australia
Discrete Sampling

Aircraft site
Bass Strait/Cape Grim, Australia
CSIRO, Division of Atmospheric Research

         lat        long  elev(masl)     utc2lst
      -40.53      144.30         500          10

Creation Date:  Mon Aug 12 15:26:35 2002
# of rows after column header:         1105

         UTC        S(t)      REF(t)        diff
 1979.000000   -999.9990    333.5312      0.1156
 1979.020833   -999.9990    333.5731      0.1117
 1979.041667   -999.9990    333.6262      0.1018
 1979.062500   -999.9990    333.6756      0.0859
 1979.083333   -999.9990    333.7118      0.0642
 1979.104167   -999.9990    333.7334      0.0374
 1979.125000   -999.9990    333.7469      0.0065
 1979.145833   -999.9990    333.7571     -0.0273
 1979.166667   -999.9990    333.7706     -0.0624
 1979.187500   -999.9990    333.7902     -0.0973
 1979.208333   -999.9990    333.8167     -0.1303
 1979.229167   -999.9990    333.8510     -0.1599
```

8.4 Data Format

All of the files in the ISLSCP Initiative II data collection are in the ASCII, or text format. The data files in this data set contain multiple header lines which contain the site name, the

location, and the date of the data collection (see above). The actual data follows in a series of columns with fixed width. Following the header information detailed above, the format (width) of each type of file is as follows:

Extended	"ext"	F12.6, 3(F12.4)
Weight	"wts"	F12.6, 3(F12.4)
Atmospheric Variability	"var"	I5, 4(F12.4), I6
Seasonal Cycle	"seas"	I5, 3(F12.4), I6
Diurnal Cycle	"diu"	2(I5), 3(F9.4), I6
Sample Collection Times	"tod"	I10, F10.2, I10
Reference Matrix	"mtx"	F12.6, 41(1X,F12.4)

The original documentation file **2_gv_co2_2003_doc.pdf** is in Portable Document Format (PDF).

8.5 Related Data Sets

The GLOBALVIEW-CH_4 is also included in the ISLSCP II data collection available from the Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) http://daac.ornl.gov/ISLSCP_II/islscpii.html. Users may be interested in the FLUXNET data sets also included in this collection. ISLSCP II project information and other data sets can also be obtained from the ORNL DAAC http://daac.ornl.gov/ISLSCP_II/islscpii.html .

9. DATA MANIPULATIONS

9.1 Formulas

9.1.1 Derivation Techniques/Algorithms

See Masarie and Tans (1995) and Appendix A of the **2_gv_co2_2003_doc.pdf** document.

9.2 Data Processing Sequence

9.2.1 Processing Steps and Data Sets

See Masarie and Tans (1995) and Appendix A of the **2_gv_co2_2003_doc.pdf** document.

9.2.2 Processing Changes

See Appendix A of the **2_gv_co2_2003_doc.pdf** document.
ftp://daac.ornl.gov/data/islscp_ii/carbon/globalview_co2_point/comp/

9.2.3 Additional Processing by the ISLSCP Staff

None.

9.3 Calculations

9.3.1 Special Corrections/Adjustments

The data extension approach used to prepare the GLOBALVIEW product extends measurement time series by filling periods of missing data for a specific site with values based on knowledge gained from measurements at the site itself and from measurements from marine boundary layer (MBL) sites at comparable latitude. This "latitude reference" method has been improved upon over that described in Masarie and Tans, [1995] (hereafter MT95). In GLOBALVIEW-CO_2, 1999 we improved the technique used to construct reference MBL time series to reduce their sensitivity to changes in the distribution of sites and to minimize discontinuities in these reference curves resulting from periods of sporadic or interrupted sampling with existing MBL records. In GLOBALVIEW- CO_2, 2001, we have made a minor change to the construction of the difference climatology to minimize discontinuities between smooth values and interpolated and extrapolated values. See Masarie and Tans (1995) and Appendix A of the **2_gv_co2_2003_doc.pdf** document for more information. Please consult the latest GLOBALVIEW documentation at http://www.cmdl.noaa.gov/ccgg/globalview/ for the most up-to-date information.

9.4 Graphs and Plot

See Masarie and Tans (1995) and http://www.cmdl.noaa.gov/ccgg/globalview/ .

10. ERRORS

10.1 Sources of Error

Potential sources of uncertainty in the GLOBALVIEW- CO_2 data product arise from either the integration of atmospheric CO_2 data produced by independent laboratories or from the extension of individual data records. We have estimated the uncertainty of potential sources of error in GLOBALVIEW- CO_2 and summarize the results here (a complete analysis is in preparation).

10.2 Quality Assessment

10.2.1 Data Validation by Source

None given.

10.2.2 Confidence Level/Accuracy Judgment

Smooth values (derived directly from data) have an estimated uncertainty of 0.2 µmole/mol based on results from intercomparison experiments and analysis of curve fitting methods. We cannot assign an overall uncertainty to interpolated and extrapolated values because uncertainty varies in both time and space. The average uncertainty in "manufactured" values is estimated to be ~0.3 µmole/mol. Prior to 1992, the uncertainty in filled values at tropical and mid-northern latitudes showed significant seasonal variability ranging from 0-1.0 µmole/mol caused by sparse sampling at these latitudes. Since 1992, variability in the uncertainty of filled values at these latitudes has dramatically decreased and stabilized (0-0.4 µmole/mol) due to the significant increase in observations made by new or expanding measurement programs. Interpolated and extrapolated values derived from the data extension procedure capture large-scale patterns reasonably well. They do not capture synoptic-scale events. We strongly recommend that users of this data product consider the weight files, which provide an

estimate of the relative significance of each value in the extended record. Overall uncertainties in the GLOBALVIEW data product will be reduced as we 1) improve comparability among integrated measurement records, and 2) increase the number of MBL measurement records in the tropics and mid-northern latitudes.

10.2.3 Measurement Error for Parameters and Variables

See Section 3 of the **2_gv_co2_2003_doc.pdf** document.

10.2.4 Additional Quality Assessment Applied

None given.

11. NOTES

11.1 Known Problems with the Data

Consult Appendix A of the **2_gv_co2_2003_doc.pdf** document and GLOBALVIEW Release Notes at http://www.cmdl.noaa.gov/ccgg/globalview/ for the latest information.

11.2 Usage Guidance

The extended records (files with an "ext" qualifier) are comprised of smoothed values, and interpolated and extrapolated values defined at each time step of the synchronization period. Those who wish to use extended records in their modeling application must simply add the reference MBL vector (COLUMN 3) to the difference climatology (COLUMN 4), i.e., extended record = REF + diff. Users will notice that S(t) = REF + diff wherever smoothed values (COLUMN 2) exist. You may also choose to use only the smoothed values (COLUMN 2) from the sites that are synchronized which will have assigned default values where there are no measurements.

PLEASE NOTE: Occasional discontinuities at the transition between smoothed values and extrapolated values may be significant in certain modeling applications. These occur when values derived from data extension techniques (based on average behavior) join actual measurements that depart from average behavior. Discontinuities may occur at either end of the smoothed measurement record.

PLEASE NOTE: Discontinuities within periods of interpolated or extrapolated values may occur when MBL measurement records begin, end, or are interrupted for long periods of time (See Appendix A (RELEASE NOTES) for details). Some discontinuities may be significant in certain modeling applications. Serious discontinuities are identified below.

Time step	Latitude[a]	Cause
1979.666667	10°S	CMDL sampling program at Ascension Island begins
1981.062500	35°S	LSCE sampling program at Amsterdam Island begins
1984.208333	5°N	CMDL sampling program at Christmas Island, Kiribati begins
1987.000000	25°S	CMDL shipboard sampling in Pacific Ocean begins
1991.229167	45°S	CMDL sampling program at Crozet begins
2000.812500	20°S	CMDL shipboard sampling in Pacific Ocean ends

[a]Specifies the 5° latitude band most strongly influenced by the change in the MBL measurement distribution

PLEASE NOTE: The data extension procedure requires at least 2 years of observations.

Relative weighting of each value in an extended record can be important because some points are better determined than others. Confidence in the smoothed values depends on the density of the data, the relative occurrence of rejected data, the "scatter" in the data, the type and number of corrections applied, and the length of the measurement period. *Masarie and Tans* [1995] describe in detail the relative weighting scheme and provide an example of how extended records and relative weights have been used in a 2-D modeling application. Users may choose to ignore our weighting scheme; sufficient information is included in the weight files so that users may devise their own weighting scheme.

11.3 Other Relevant Information

See http://www.cmdl.noaa.gov/ccgg/globalview/ .

12. REFERENCES

12.1 Satellite/Instrument/Data Processing Documentation

See Section 10 of the **2_gv_co2_2003_doc.pdf** for a comprehensive reference list.

12.2 Journal Articles and Study Reports

See Section 10 of the **2_gv_co2_2003_doc.pdf** for a comprehensive reference list.

Masarie, K.A., R.L. Langenfelds, C.E. Allison, T.J. Conway, E.J. Dlugokencky, R.J. Francey, P.C. Novelli, L.P. Steele, P.P. Tans, B. Vaughn, and J.W.C. White, "The NOAA/CSIRO Flask-Air Intercomparison Program: A strategy for directly assessing consistency among atmospheric measurements derived from independent laboratories." *Journal of Geophysical Research*, Vol. 106, No. D17, p. 20445-20464, 2001.

Masarie, K.A. and P.P Tans, "Extension and Integration of Atmospheric Carbon Dioxide Data into a Globally Consistent Measurement Record*." Journal of Geophysical Research*,Vol. 100, No. D6, p. 11593-11610. June 1995.

Peterson, J., P. Tans, and D. Kitzis, "CO_2 Round-Robin Reference Gas Intercomparison" in *Report of the Ninth WMO Meeting of Experts on Carbon Dioxide Concentration and Related Tracer Measurement Techniques*, Aspendale, Vic. Australia, 1 - 4 September 1997, edited by R. Francey, World Meteorological Organization, Geneva, 1999.

Zhao, C.L., P.P Tans, and K.W. Thoning, A high precision manometric system for absolute calibrations of CO_2 in dry air, *J. Geophys. Res.*, 102, 5885-5894, 1997.

13. DATA ACCESS

13.1 Contacts for Archive/Data Access Information

The ISLSCP Initiative II data are available are archived and distributed through the Oak Ridge National Laboratory (ORNL) DAAC for Biogeochemical Dynamics at http://daac.ornl.gov.

13.2 Contacts for Archive

E-mail: uso@daac.ornl.gov
Telephone: +1 (865) 241-3952

13.3 Archive/Status/Plans

The ISLSCP Initiative II data are archived at the ORNL DAAC. There are no plans to update these data.

14. GLOSSARY OF ACRONYMS

CCGG	Carbon Cycle Greenhouse Gases Group
CCL	Central CO_2 Laboratory
CDIAC	Carbon Dioxide Information Analysis Center
CH_4	Methane
CMDL	Climate Monitoring and Diagnostics Laboratory
CO_2	Carbon Dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAAC	Distributed Active Archive Center
GAW	Global Atmospheric Watch
GMCC	Geophysical Monitoring for Climatic Change (NOAA)
GSFC	Goddard Space Flight Center (NASA)
ISLSCP	International Satellite Land Surface Climatology Project
LSCE	Laboratoire des Sciences, du Climat et de l'Environnement (France)
LST	Local Standard Time
MASL	Meters Above Sea Level
MBL	Marine Boundary Layer
NASA	National Aeronautics and Space Administration
NDIR	Non-Dispersive Infrared
NOAA	National Oceanic and Atmospheric Administration
ORNL	Oak Ridge National Laboratory
RR	Round-Robin
RSD	Residual Standard Deviation
UTC	Universal Coordinated Time
WDCGG	World Data Centre for Greenhouse Gases
WMO	World Meteorological Organization