



INFRASTRUCTURE FOR MEASUREMENTS  
OF THE EUROPEAN CARBON CYCLE



Project no. 026188

**IMECC**

## **Infrastructure for Measurement of the European Carbon Cycle**

Instrument: Integrated Infrastructure Initiative (I3)

Thematic Priority: Research infrastructures

**Deliverable D\_JRA1.1**

*“Inventory of capabilities and requirements for real-time  
transmission”*

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Organisation name of lead contractor for this deliverable:  
LSCE /CEA, Michel Ramonet

# **SIXTH FRAMEWORK PROGRAMME**

Structuring the European Research Area Specific Programme

## **RESEARCH INFRASTRUCTURES ACTION**

Contract for an

### **INTEGRATING ACTIVITY**

implemented as

### **INTEGRATED INFRASTRUCTURE INITIATIVE (I3)**

Deliverable D\_JRA1.1 - *“Inventory of capabilities and requirements for real-time transmission”*

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Project acronym: IMECC

Project full title: Infrastructure for Measurement of the European Carbon Cycle

## Introduction

### **Context**

In the context of the **JRA1** activity “Real-time transmission and processing of atmospheric CO2 data” of the IMECC project, the objectives are twofold:

- Implementation of a (near) real-time (NRT) data processing system at CEA to deliver in situ CO2 records (task 1).
- Implementation a (near) real-time (NRT) system at CEA for the processing and reporting of ancillary atmospheric data for interpretation of these records (task 2).

### **Description of work**

The first task of the **JRA1** is defined as followed:

#### **JRA1.T1: Real-time data transmission and generation of intermediate quality CO2 concentration products**

CEA will implement on the Atmospheric Network a real-time data transmission and processing channel that will be additional to the normal data acquisition channel by each PI. Raw CO2 data will be automatically processed into concentration products of intermediate quality, with a target precision of  $\pm 1$  ppm. Such an intermediate precision remains well adapted to detect changes in CO2 related to sources and sinks and transport (typical daily variability of 10 ppm) The processing will be carried out by an engineer based at CEA.

In the context of the **JRA1.T1** task, this present progress report deals with the deliverable no D\_JRA1.1 “*Inventory of capabilities and requirements for real-time transmission*”.

## Completed work

### ***Inventory of CO2 measurements capabilities***

Each CO2 instrumental facility mentioned in Table 1 is unique. Though, a preliminary questionnaire have been prepared in order to have a better idea of the CO2 instruments installed in the stations, and which information could be used for the data quality control. This questionnaire was twofold:

1. inventory of data transmission facility,
2. inventory calibration strategy.

Sent in early march 2007, the deadline for answers to questionnaire was 15th March, in order to discuss issues with concerned in-situ PIs during the IMECC kick-off meeting, in Paris 3-4th April 2007.

Answers to this first questionnaire are compiled in

Annex 1. A summary concerning technique of CO<sub>2</sub> measurement, expected file size/format to be transferred and CO<sub>2</sub> sampling rate is presented in Table 2.

During the IMECC kick-off meeting, it has been decided that

- LSCE will act as the IMECC data centre in the frame of the JRA1 activity,
- each in situ-site will provide the IMECC data centre by its own means, i.e. each stations will daily upload their CO<sub>2</sub> (and meteo/instrumental, if available) data file to take into account individual transmission constraint,
- a secured FTP will be installed and maintained by the IMECC data centre to provide a volume storage for each in-situ site.

Answer to questionnaire indicates that each station is able to provide without enormous effort a daily file of raw/processed CO<sub>2</sub> data file. Concerning signal calibration issues, it appears that most stations already apply a preliminary quality check filter on their raw data. Depending on various CO<sub>2</sub> sampling rate, the final quality data check at IMECC data centre will have to adapt and include/merge this quality check with the final NRT product.

	Site	Station	Technique	File size	Format	CO <sub>2</sub> sampling rate
1	Saclay	GIF	GC	2 ko/5min	ASCII	
2	Trainou	TRN	NDIR Licor 6252	2 Mo	ASCII	5 sec
3	Puy-de-Dôme	PUY	NDIR Licor 6252	500 ko	ASCII	1min mean
4	Pallas	PAL	NDIR Licor 7000	300 ko	ASCII	1-Hour mean@1min + std
5	Lampedusa	LMP	NDIR	150 ko	ASCII	10 min @ ?
6	Angus	TTA	IRGA & GC	100 ko	ASCII	10 s
7	Ochsenkopf					
8	Bialystok	BIK	NDIR	2 Mo	ASCII	?
9	Hegyhatsal	HUN	GC	<1Mo	ASCII	8 min @ 5 sec
10	Jungfrauhoeh	JFJ	NDIR Sick-Maihak s700	32Mo	ASCII	4 min each 12 min @ 1s
11	Lutjewad	LUT	GC	150 ko	ASCII	?
12	Kasprowy		GC			
13	Cabauw	CBW	NDIR	5ko/day	ASCII	2/hr @
14	Egham	EGH	NDIR Licor 6252	75 ko	ASCII	5 min @ ?
15	Mace Head	MHD	NDIR Licor 6252	500 ko	ASCII	1min mean
16	La Muela	LMU	NDIR Licor 7000	?	ASCII	1 s

Table 1 : CO<sub>2</sub> measurement capabilities for all IMECC in-situ sites implied in CO<sub>2</sub> monitoring. When available, the raw data sampling rate is also indicated.

### **Status of real-time transmission possibilities and NRT CO<sub>2</sub> data production**

During first part of 2007, all stations were supposed to develop/improve the production of CO<sub>2</sub> NRT data file and to install appropriate communication capabilities to assure daily transmission of their product to the IMECC data centre.

So, in late august 2007, all participants were emailed by the IMECC data centre to know the current status for each station. Two short questions were asked:

1. Is daily raw/processed CO<sub>2</sub> data file ready to be uploaded?

## 2. Is net/telecommunication infrastructure operational to daily upload these CO2 data?

Answers to these questions are summarized in Table 2. More than half of the in-situ sites can produce a daily CO2 data file and a third of them are ready to make the daily data transmission on the data server at the IMECC data centre.

Concerning the IMECC data centre, a secured ftp on <ftp.ceea.fr> server is operational since early September. First raw data from GIF, TRN, MHD and PUY stations are already daily uploaded.

	Site	Country	Institute	CO2 file availability	Working net infrastructure
1	Saclay	France	LSCE	✓	✓
2	Trainou	France	LSCE	✓	✓
3	Puy de Dôme	France	LSCE	✓	✓
4	Pallas	Finland	FMI		
5	Lampedusa	Italy	ENEA	✓	✗
6	Angus	UK	UEDIN		
7	Ochsenkopf	Germany	MPS		
8	Bialystok	Poland	MPS	✓	✗
9	Hegyhatsal	Hungary	ELU	✓	✓
10	Jungfrau hoch	Switzerland	UBERN		
11	Lutjewad	Netherlands	CIO-RUG		
12	Kasprowy	Poland	AGH	✗	By the end of Sept.
13	Cabauw	Netherlands	ECN		
14	Egham	UK	RHUL		
15	Mace Head	Ireland	LSCE	✓	✓
16	La Muela	Spain	PCB_LRC		
<b>Total</b>				7	5

Table 2 : CO2 data file availability and data transmission infrastructure status for all IMECC in-situ sites implied in CO2 monitoring. A non filled cell corresponds to awaited answer, red cross stands for non available / non working net infrastructure, and green sign is for daily CO2 file/infrastructure ok.

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## **Annex 1**

In this annex are presented the answer to the preliminary questionnaire sent to each in-situ PI in order to take inventory of CO<sub>2</sub> measurement capabilities of the future NRT IMECC network.



## Saclay

### Laboratory or Institution information

Name Laboratoire des Sciences du Climat et de l'Environnement (LSCE)  
 Department CEA/CNRS/UVSQ  
 Address CE Saclay - Orme des Merisiers  
 Town/city Gif sur Yvette  
 Postal code 91191  
 Country France

### Contact information

First Name Martina  
 Name Schmidt  
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 Email Martina.Schmidt@cea.fr

### Measurement Site information

Instrument name Gas chromatograph  
 Station name, country Gif-sur-Yvette (France)  
 Station site code Gif-sur-Yvette (France)  
 Latitude 48° 42'  
 Longitude 2° 08'  
 Altitude asl 160

### Measurement information

Species CO<sub>2</sub>, CH<sub>4</sub>  
 Measurement technique Gaschromatography (FID)  
 Air drying system Cryo cooler with glas water traps  
 Average file creation frequency 1 file per 5 minutes  
 Estimated file size 2.1 ko  
 File format ASCII  
 Example data file or URL report.txt

### Data information

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1			
2			
3			
4			
5			
6			

Comments

## Trainou

<b>Laboratory or Institution information</b>			
Name	Laboratoire des Sciences du Climat et de l'Environnement (LSCE)		
Department	CEA/CNRS/UVSQ		
Address	CE Saclay - Orme des Merisiers		
Town/city	Gif sur Yvette		
Postal code	91191		
Country	France		
<b>Contact information</b>			
First Name	Royer		
Name	Anne		
Phone (work)	+33 1 69 08 19 63		
Email	anne.royer@cea.fr		
<b>Measurement Site information</b>			
Instrument name	CARIBOU		
Station name, country	Trainou, France		
Station site code			
Latitude			
Longitude			
Altitude asl			
<b>Measurement information</b>			
Species	CO2		
Measurement technique	NDIR (Licor 6252)		
Air drying system	Refrigerator + Cryocool with alcohol bath		
Average file creation frequency	1 file /day		
Estimated file size	2Mb / day		
File format	ASCII		
Example data file or URL	20070306_001552.acq		
<b>Data information</b>			
# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 Raw CO2	mV	5 sec. mean	
2 CO2_NRT	ppm	5 sec. mean	Near real time [CO2] calc. from prev cal.
3 Sample cell pressure	mbar	5 sec. mean	
4 Reference cell pressure	mbar	5 sec. mean	
5 Sample cell flowrate	cc/sec	5 sec. mean	
6 Reference cell flowrate	cc/sec	5 sec. mean	
7 Analyser temperature	°C	5 sec. mean	
8 Room temperature	°C	5 sec. mean	
9 Atmospheric pressure	mbar	1 mn mean	
10 Wind direction	°	1 mn mean	Separate ascii file (meteo)
11 Wind speed	m/sec	1 mn mean	Separate ascii file (meteo)
12 Atmospheric temperature	°C	1 mn mean	Separate ascii file (meteo)
13 Relative humidity	%	1 mn mean	Separate ascii file (meteo)
<b>Comments</b>			

## **Puy de Dôme**

### **Laboratory or Institution information**

Name Laboratoire des Sciences du Climat et de l'Environnement (LSCE)  
 Department CEA/CNRS/UVSQ  
 Address CE Saclay - Orme des Merisiers  
 Town/city Gif sur Yvette  
 Postal code 91191  
 Country France

### **Contact information**

First Name Michel  
 Name Ramonet  
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### **Measurement Site information**

Instrument name  
 Station name, country Puy de Dôme  
 Station site code PUY  
 Latitude 45°45'N  
 Longitude 3°00'E  
 Altitude asl 1467

### **Measurement information**

Species CO2  
 Measurement technique NDIR (Licor 6252)  
 Air drying system Cryocool with alcohol bath  
 Average file creation frequency 1 file /4 day  
 Estimated file size 546ko  
 File format ASCII  
 Example data file or URL 19JAN07.puy

### **Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 Raw CO2	mV	1 min mean	
2 Sample cell pressure	mbar	1 mn mean	
3 Sample cell flowrate	cc/sec	1 mn mean	
4 Analyser temperature	°C	1 mn mean	
5 Sample cell flowrate	cc/sec	1 mn mean	
6 Cryocool temperature	°C	1 mn mean	

### **Comments**

**Pallas****Laboratory or Institution information**

Name Finnish Meteorological Institute  
 Department Climate and Global Change  
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 Postal code FI-00560  
 Country Finland

**Contact information**

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 Name Hatakka  
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**Measurement Site information**

Instrument name SammalCO2  
 Station name, country Pallas/Sammaltunturi, Finland  
 Station site code PAL  
 Latitude 67°58'N  
 Longitude 24°07'E  
 Altitude asl 565 m

**Measurement information**

Species CO2  
 Measurement technique NDIR (LiCor 7000)  
 Air drying system Cryocool (-30°C) + chemical desiccant (Mg(ClO4)2)  
 Average file creation frequency 1 file / day  
 Estimated file size 300 kB /day  
 File format ASCII  
 Example data file or URL N/A (see Comments)

**Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 CO2 hourly mean value	ppm	1-min	Raw data collected as 1-min means
2 CO2 hourly mean value deviation	ppm		
3 + whatever is wanted/required as hourly (or half hourly) means			
4			
5			
6			

**Comments**

The raw data files from CO2 and other systems are downloaded and processed (data flagging, calibration, hourly mean calculation) at FMI once a day automatically to get the preliminary results. The files are reprocessed later on to get the "final" results. CO2 raw data file is insufficient as itself to flag and calculate results.

## Lampedusa

### Laboratory or Institution information

Name Ente per le Nuove Tecnologie, l'Energia e l'Ambiente (ENEA)  
 Department Ambiente, Cambiamenti globali e Sviluppo sostenibile (ACS)  
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### Contact information

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### Measurement Site information

Instrument name Siemens Ultramat 5 E  
 Station name, country Lampedusa, Italy  
 Station site code LMP  
 Latitude 35°31' N  
 Longitude 12°37' E  
 Altitude asl 40 m

### Measurement information

Species CO2  
 Measurement technique Non-dispersive IR absorption  
 Air drying system cryocool  
 Average file creation frequency 1 file/month  
 Estimated file size 150 kB  
 File format ASCII  
 Example data file or URL 2007oct.out

### Data information

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 CO2	ppm	10 min mean	Near real time [CO2] calc. from prev. cal.
2 Wind direction	°	10 min mean	Separate ascii file (meteo)
3 Wind speed	m/sec	10 min mean	Separate ascii file (meteo)
4 Atmospheric pressure	mbar	10 min mean	Separate ascii file (meteo)
5 Atmospheric temperature	°C	10 min mean	Separate ascii file (meteo)
6 Relative humidity	%	10 min mean	Separate ascii file (meteo)

### Comments

A new acquisition program is being written. Additional information will be sent as soon as the new program will be activated.

**Angus****Laboratory or Institution information**

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 Town/city Edinburgh  
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 Country UK

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**Measurement Site information**

Instrument name  
 Station name, country Angus, UK  
 Station site code TTA  
 Latitude 56° 33.3' N  
 Longitude 2° 59.2' W  
 Altitude asl 535 m

**Measurement information**

Species CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, Rn222, CO, H<sub>2</sub>  
 Measurement technique IRGA and GC (FID, ECD), ANSTO Radon detector  
 Air drying system Cryocooler to -93 Celcius  
 Average file creation frequency Once per day  
 Estimated file size 100 kb  
 File format ASCII  
 Example data file or URL

**Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 Cell temperature	oC	once per 10 seconds	
2 Cell pressure	hPA	once per 10 seconds	
3 Room temperature	oC	once per 10 seconds	Separate data file for Meteo data
4 Wind speed	m.s-1	once per 10 seconds	
5 Wind Direction	o	once per 10 seconds	
6 CO <sub>2</sub>	ppm	once per 10 seconds	

**Comments**

## ***Ochsenkopf***

**Bialystok****Laboratory or Institution information**

Name MPI-BGC  
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 Postal code 07745  
 Country Germany

**Contact information**

First Name Popa  
 Name Elena  
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**Measurement Site information**

Instrument name LiCor 7000  
 Station name, country Bialystok, Poland  
 Station site code BIK  
 Latitude 53.23  
 Longitude 23.01  
 Altitude asl 180

**Measurement information**

Species CO2  
 Measurement technique NDIR  
 Air drying system cryocool with alcohol bath (~ -80C)  
 Average file creation frequency 1 file / month, updated daily  
 Estimated file size 2 Mb/month  
 File format ASCII  
 Example data file or URL

**Data information**

#	Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1				
2				
3				
4				
5				
6				

**Comments**



**Hegyhatsal****Laboratory or Institution information**

Name Eötvös Loránd University  
 Department Dep. of Meteorology  
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 Country Hungary

**Contact information**

First Name Zoltán  
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**Measurement Site information**

Instrument name GC  
 Station name, country Hegyhátsál, Hungary  
 Station site code HUN  
 Latitude 46°57'N  
 Longitude 16°39'E  
 Altitude asl 248+96 m

**Measurement information**

Species CH4&CO2  
 Measurement technique gas chromatograph  
 Air drying system Kinetics Thermal System: Vapor Trap Type VT490  
 Average file creation frequency 1 file continuously updated (additive  
 Estimated file size maximum 1 MB (whole year data)  
 File format ASCII  
 Example data file or URL GC\_data\_CH4\_HUN\_2007.dat

**Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 CH4-NRT	ppb	one sample in every 20 minutes	
2 CO2-NRT	ppm	8 min 1 min flushing + 1 min integration at each level, 5 sec internal sampling frequency	
3 wind speed	m/s	2 min 5 sec internal sampling frequency	
4 wind direction	degree	2 min 5 sec internal sampling frequency	
5 air temperature	oC	2 min 5 sec internal sampling frequency	
6 relative humidity	%	2 min 5 sec internal sampling frequency	
7 global solar radiation	W/m2	2 min 5 sec internal sampling frequency	
8 radiation balance	W/m2	2 min 5 sec internal sampling frequency	
9 soil temperature	oC	2 min 5 sec internal sampling frequency	
10 photo. active radiation	uE/m2/sec	2 min 5 sec internal sampling frequency	
11 soil heat flux	W/m2	2 min 5 sec internal sampling frequency	
12 volumetric soil water content	m3/m3	2 min 5 sec internal sampling frequency	

**Comments**

## Jungfrauoch

### Laboratory or Institution information

Name Climate and Environmental Physics, Physics Institute,  
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 Postal code 3012  
 Country Switzerland

### Contact information

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### Measurement Site information

Instrument name JFJ-CO2-02  
 Station name, country Jungfrauoch, Switzerland  
 Station site code JFJ  
 Latitude 46°32' 53''N  
 Longitude 7°59' 2''E  
 Altitude asl 3580

### Measurement information

Species CO2  
 Measurement technique NDIR (Sick-Maihak S700)  
 Air drying system Cryocool with silicon oil  
 Average file creation frequency 2 files / day  
 Estimated file size 32 Mb/ day  
 File format ASCII  
 Example data file or URL B\_25\_04\_05\_07\_02

### Data information

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 Date			
2 Time			
3 CO2 raw	mV	1 second	every 12 minutes for 4 min
4 CO2	ppm	1 second	every 12 minutes for 4 min
5 Pressure sample cell	mb	1 second	
6 Pressure reference cell	mb	1 second	
7 Temperature	°C	1 second	
8 Flow sample cell	ml/min	1 second	
9 Flow reference cell	ml/min	1 second	

### Comments

## Lutjewad

### Laboratory or Institution information

Name University of Groningen  
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 Town/city Groningen  
 Postal code 9747 AG  
 Country The Netherlands

### Contact information

First Name Rolf  
 Name Neubert  
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 Email R.E.M.Neubert@rug.nl

### Measurement Site information

Instrument name Agilent 6890 LutjeGC  
 Station name, country Lutjewad, The Netherlands  
 Station site code LUT  
 Latitude 53N24'18"  
 Longitude 6E21'13"  
 Altitude asl 1 m

### Measurement information

Species CO<sub>2</sub>, CH<sub>4</sub>, CO, N<sub>2</sub>O, SF<sub>6</sub>  
 Measurement technique GC  
 Air drying system Cryocooler, -50, will be changed to -70  
 Average file creation frequency 2 files/day  
 Estimated file size 150 kB  
 File format ASCII  
 Example data file or URL

### Data information

#	Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1				
2				
3				
4				
5				
6				

### Comments

Until now we do not calculate concentrations online, but insert all data in a database at the lab for the final (re-)calibration. So there is no dataformat specified yet. We will combine GC raw data (heights/areas) with meteo data into a text file per day.

***Kasprowy***

**Cabauw****Laboratory or Institution information**

Name ECN  
 Department Air Quality & Climate Change  
 Address Westerduinweg 3  
 Town/city Petten  
 Postal code 1755 LE  
 Country Nederland

**Contact information**

First Name Alex  
 Name Vermeulen  
 Phone (work) +31 224 56 4194  
 Email a.vermeulen@ecn.nl

**Measurement Site information**

Instrument name Licor 7000  
 Station name, country Cabauw, Nederland  
 Station site code CBW  
 Latitude "51°58'13"N"  
 Longitude "4°55'34"E"  
 Altitude asl 0

**Measurement information**

Species CO2  
 Measurement technique NDIR  
 Air drying system Permapure dryer at inlet, before Licor freeze trap in silicon oil bath, -60°C  
 Average file creation frequency 2/hr  
 Estimated file size 5 kByte/day  
 File format ASCII CSV  
 Example data file or URL

**Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 CO2 concentration	ppm	2/hr	for 4 measurement heights
2 CO2 concentration stdev	ppm	2/hr	idem
3 Residual of calibration	ppm	1/dy	
4 Target precision	ppm	2/hr	
5 Licor temperature	°C	2/hr	
6 Sample Flow	ml/min	2/hr	
7 Dewpoint	°C	2/hr	approximate

**Comments**

**Egham****Laboratory or Institution information**

Name Atmospheric Monitoring and Isotope Laboratory  
 Department RHUL - Department of Geology  
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 Name Nisbet  
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**Measurement Site information**

Instrument name Licor 6252  
 Station name, country Egham, United Kingdom  
 Station site code EGH  
 Latitude 51.33°  
 Longitude -0.58°  
 Altitude asl 60m

**Measurement information**

Species CO2  
 Measurement technique NDIR  
 Air drying system Nafion  
 Average file creation frequency 1 file / week  
 Estimated file size 75 kB  
 File format ASCII  
 Example data file or URL 01031405.co2

**Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 Timer	s	300 s (5 min)	
2 CO2	µmol/mol	300 s (5 min)	
3			
4			
5			
6			

**Comments**

**Mace Head****Laboratory or Institution information**

Name Laboratoire des Sciences du Climat et de l'Environnement (LSCE)  
 Department CEA/CNRS/UVSQ  
 Address CE Saclay - Orme des Merisiers  
 Town/city Gif sur Yvette  
 Postal code 9119  
 Country France

**Contact information**

First Name Michel  
 Name Ramonet  
 Phone (work) +33 1 69 08 40 14  
 Email michel.ramonet@cea.fr

**Measurement Site information**

Instrument name  
 Station name, country Mace Head  
 Station site code MHD  
 Latitude 53°19'N  
 Longitude 09°53'W  
 Altitude asl 20

**Measurement information**

Species CO2  
 Measurement technique NDIR (Licor 6262)  
 Air drying system Cryocool with alcohol bath  
 Average file creation frequency 1 file per week  
 Estimated file size 567kbytes  
 File format ASCII  
 Example data file or URL 03JAN06.mhd

**Data information**

# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 Raw CO2	mV	1 mn mean	
2 Cryocool temperature	°C	1 mn mean	
3 Wind direction	°	1 mn mean	
4 Wind speed	m/sec	1 mn mean	
5 Atmospheric pressure	mbar	1 mn mean	
6			

**Comments**

**La Muela**

<b>Laboratory or Institution information</b>			
Name	Climate Research Laboratory		
Department	LRC-PCB (Scientific Park of Barcelona) / UB		
Address	Baldiri Reixach 4-6 Torre D		
Town/city	Barcelona		
Postal code	08028		
Country	Spain		
<b>Contact information</b>			
First Name	Josep-Anton		
Name	Morguí		
Phone (work)	+34934034524		
Email	jamorgui@pcb.ub.es		
<b>Measurement Site information</b>			
Instrument name	LICOR-LA MUELA		
Station name, country	LA MUELA, Spain		
Station site code	LMU		
Latitude	41°35.7' N		
Longitude	1°5.9' W		
Altitude asl	"3 LEVELS: (570 + 79); (570 + 57); (570 + 41) masl"		
<b>Measurement information</b>			
Species	CO2		
Measurement technique	NDIR (Licor 7000)		
Air drying system	"Two steps: Precooling by a Fridge at 0° ; Cryocooler at -40° (alcohol bath)"		
Average file creation frequency	see comments 1		
Estimated file size	see comments 1		
File format	ASCII		
Example data file or URL			
<b>Data information</b>			
# Data/Parameter name	Unit	Sampling rate	Auxiliary informations
1 see comments 2			
2			
3			
4			
5			
6			
<b>Comments</b>			
1.- We are going to capture (April 2007) in real time by the PCs of our lab the data supplied in situ by the Licor. We can adapt the calculations to the needs of IMECC. Now data are taken biweekly.			
2. Meteo data / wind speed, wind direction, temperature, pressure and humidity / at raw 1 Hz. Licor parameters also at 1 Hz.			