Available online at www.elixirpublishers.com (Elixir International Journal)

Agriculture

Elixir Agriculture 86 (2015) 35117-35124

ISSN: 2229-712X

The gain lies in the details: Soil respiration-temperature-moisture relationships: Addition to global data bank

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ARTICLE INFO

Article history:

Received: 17 February 2015;
Received in revised form:
5 September 2015;
Accepted: 15 September 2015;

Keywords

Science and technologies,
Globalisation,
National and economic planning,
Global commodity,
Green house gases emissions holocaust,
Global warming,
Climate change,
National and economic planning,
Scientific and technological dangers,
Nuclear holocaust,
Territorial boundary,
Nature,
Soil respiration,
Temperature,
Moisture,
Data bank,
Accessible information and Data.

ABSTRACT

Sciences and technologies in the era of globalisation have gone extra mile in making non patented data and information accessible and most often free of charge to fellow scientists, technologists and the entire public. For civilised worlds they are vital for national and economic planning. In the era of internet, developed as world wide web; information and communication technologies have assisted researchers, scientists, publishers and consumers share on global commodity of the brain, mind and soul. It is on this note that this paper delves into detailed field and laboratory data generated on soil respiration-temperature-moisture relationships as an addition to global data bank. They are very crucial for comparative studies and for developing networking geared towards abating greenhouse gases emissions holocaust. The world is sitting on a keg of gunpowder that is neglected in pursuit of non-nuclear proliferation, nuclear accident and nuclear war. Already, there are global warming and climatic change wars raging all over the planet. Let us develop and share data and information that can warn the government and citizenry on scientific and technological dangers of the world that are similar to nuclear holocaust. It is a problem of developed and undeveloped worlds as nature knows no boundary akin to territory boundary protections.

Introduction

Soil respiration still remains the first, quickest, cheap and easiest way of assessing biogeophysico-chemical soil health. It is also a quick option for assessing potential carbon storage in the era of greenhouse gases emissions. Even in the extreme case of ocean seeding or fertigation with iron to sequester carbon, soil media as inevitable sink or receptors for all environmental pollutants remain an open, practicable and affordable option (Igboji, *et al*, 2015; Ogunseitan,2005;Ball and Drake, 1998).

It is no more controversial that soil respiration-temperature-moisture are highly dependent on one another (Igboji, *et al*, 2015; Singh and Gupta, 1977; Doran *et al*, 1988; Oberbauer et al, 1992; Raich and Schlesinger, 1992; Howard and Howard, 1993; Hanson *et al*, 1993; Raich and Potter, 1995, Davidson et al, 1998; Franzluebbers et al, 2002, Franzluebbers, 1999; Vanhala, 2002; Raich *et al*, 2002; Curiel-Yuste *et al*, 2003; Curiel-Yuste *et al*, 2004). But the debate is how are the data generated by researchers and scientists stored and shared to encourage global work on combating or mitigating global warming and climatic change. Data on soil respiration-temperature-moisture is the easiest, quickest and most affordable all over the world even to lay farmers. They can be generated and shared on hourly and daily basis to alert farmers, agriculturists, government and policy makers on the trade-offs arising from human civilization, agriculture, climate, climatic change, ozone layer depletion, global warming, melting of arctic ice, rise in sea level, tsunami and potential armageddon of our callous activities and neglect of the environment. The cleansing of our civilization mess must be a concern of everyone including the baby in the poo.

Igboji *et al* (2015) described diurnal and seasonal variations in soil respiration in parkland grassland by embarking on hourly, daily, monthly and seasonal measurements of soil respiration, temperature, moisture and added laboratory measurements to explain the effects of natural environmental parameters that militate accurate field estimations.

In view of world area of agricultural and non agricultural land that need to be covered and the drudgery associated with agriculture and soil sampling; there is a need for sharing of available data and information generated in all nooks and crannies of the world that are not only limited to fractions that are shared in journals, periodicals, magazines and books.

This may seem embarrassing and an arduous task in view of time and money invested by researchers and scientists. However, the selling of brain, mind and soul commodity free to the world irrespective of time and cost remains the option for everyone in this epileptic world. It may go a long way in saving impending disasters and catastrophes associated with greenhouse gases emissions, global warming and climatic change and their associate holocaust;

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Table 1. Field soil respiration (mmol m^{-2} h^{-1}) and temperature (°C) for various times of the day and seasons at Wivenhoe parkland grassland. Each value is mean ± standard error of 5 sites x 2 years

		Field soil respiration (mmol m^{-2} h^{-1})		Field soil temperature (°C)	
Season	**Time**	**Y1**	**Y2**	**Y1**	**Y2**
Winter	06 – 07 GMT	22.8±12.9	29.7±14.0	5.4±1.2	3.6±1.1
	12 – 13 GMT	26.0±10.4	27.5±9.3	4.7±1.2	3.2±0.8
	18 – 19 GMT	36.1±15.5	45.9±41.1	6.7±2.7	3.1±0.6
Spring	06 – 07 GMT	30.4±7.1	50.6±23.0	11.2±1.3	9.9±2.6
	12 – 13 GMT	33.3±12.7	38.7±10.7	11.9±1.5	6.8±1.6
	18 – 19 GMT	29.7±8.6	55.3±16.0	12.3±3.1	6.3±1.6
Summer	06 – 07 GMT	121.4±96.3	39.4±14.8	15.7±1.4	15.6±0.6
	12 – 13 GMT	178.3±104.4	86.2±59.7	19.6±2.7	16.7±2.7
	18 – 19 GMT	67.9±26.5	55.1±23.8	17.6±1.8	18.8±2.6
Autumn	06 – 07 GMT	39.1±8.9	37.0±9.6	12.2±0.4	14.4±5.5
	12 – 13 GMT	47.3±24.0	32.3±6.9	13.4±0.6	17.4±3.4
	18 – 19 GMT	60.9±21.6	27.7±7.6	12.1±0.8	16.0±3.2

Table 2. Field soil respiration (mmol m^{-2} h^{-1}) at various sites, times of the day and months at Wivenhoe parkland grassland. Each value is mean ± standard error of 4 replicates x 2 years

Period:		**Y1**			**Y2**		
		Times of the d (hours – Greenwich Mean Time):					
Month	**Site**	**06-07 GMT**	**12-13 GMT**	**18-19 GMT**	**06-07 GMT**	**12-13 GMT**	**18-19 GMT**
Jan.	1	5.7 ± 1.3	5.5 ± 1.4	7.3 ± 1.8	10.7 ± 3.8	30.3 ± 7.3	33.8 ± 8.0
	2	9.1 ± 1.6	10.5 ± 2.0	11.6 ± 4.9	11.7 ± 2.4	18.2 ± 4.4	49.9 ± 9.6
	3	20.6 ± 2.2	37.4 ± 9.5	26.2 ± 4.5	32.8 ± 5.0	25.8 ± 3.9	40.7 ± 15.1
	4	15.6 ± 2.1	14.8 ± 1.6	41.1 ± 1.7	31.2 ± 4.6	42.6 ± 4.6	39.6 ± 8.7
	5	13.5 ± 1.8	26.9 ± 2.7	24.4 ± 6.1	34.7 ± 3.2	39.0 ± 1.6	30.6 ± 8.7
Feb.	1	4.0 ± 0.8	7.6 ± 1.1	4.0 ± 1.0	21.5 ± 7.9	31.8 ± 9.2	47.8 ± 9.4
	2	2.2 ± 0.3	19.1 ± 2.4	10.7 ± 0.7	24.6 ± 3.3	18.2 ± 3.6	200.9 ± 114.9
	3	11.5 ± 1.4	21.6 ± 2.2	3.0 ± 0.7	20.7 ± 6.1	34.7 ± 6.0	57.3 ± 23.1
	4	10.4 ± 0.7	16.4 ± 1.6	11.5 ± 1.5	54.1 ± 6.3	41.2 ± 3.5	32.0 ± 11.2
	5	6.0 ± 0.5	19.2 ± 2.1	16.8 ± 1.0	38.3 ± 8.4	26.8 ± 4.6	36.4 ± 9.3
Mar.	1	27.4 ± 1.6	23.2 ± 2.2	39.9 ± 5.8	31.1 ± 8.0	40.4 ± 2.5	63.4 ± 4.8
	2	27.8 ± 4.3	16.3 ± 1.0	22.2 ± 1.5	54.2 ± 10.5	35.8 ± 10.4	44.9 ± 8.3
	3	30.6 ± 5.5	44.5 ± 7.8	36.4 ± 4.0	72.6 ± 18.6	37.1 ± 13.6	73.9 ± 14.3
	4	24.6 ± 5.3	32.6 ± 2.9	7.8 ± 1.2	49.5 ± 8.1	65.2 ± 5.5	92.1 ± 8.1
	5	32.1 ± 2.8	12.8 ± 1.1	26.9 ± 1.9	38.6 ± 7.8	41.1 ± 2.6	71.8 ± 21.2
Apr.	1	10.9 ± 1.6	15.3 ± 2.2	12.2 ± 1.0	25.5 ± 5.6	32.3 ± 9.4	47.1 ± 9.9
	2	37.4 ± 3.1	33.0 ± 3.3	33.2 ± 3.0	54.4 ± 11.1	34.9 ± 4.8	52.4 ± 11.5
	3	45.9 ± 9.3	35.6 ± 5.2	23.6 ± 8.9	75.3 ± 19.1	31.3 ± 5.9	35.3 ± 11.1
	4	21.1 ± 2.3	40.4 ± 4.8	23.5 ± 4.0	31.7 ± 4.6	46.2 ± 2.3	42.2 ± 9.1
	5	25.6 ± 2.1	34.5 ± 1.7	22.5 ± 3.1	45.4 ± 4.0	29.7 ± 1.2	56.5 ± 8.0
May	1	37.2 ± 4.0	35.4 ± 2.6	35.6 ± 2.1	35.2 ± 8.7	27.3 ± 4.9	46.8 ± 9.3
	2	40.4 ± 5.4	53.6 ± 9.5	32.7 ± 6.5	25.7 ± 4.8	40.1 ± 7.3	60.4 ± 23.7
	3	37.9 ± 2.3	40.5 ± 7.2	38.8 ± 7.7	74.5 ± 17.4	43.6 ± 7.2	52.4 ± 16.4
	4	26.7 ± 1.7	36.2 ± 1.8	36.1 ± 10.3	61.1 ± 13.1	40.6 ± 2.5	33.1 ± 6.7
	5	30.4 ± 1.4	26.4 ± 1.2	36.2 ± 5.3	76.8 ± 23.3	56.4 ± 3.9	54.2 ± 12.6
Jun.	1	24.9 ± 3.2	22.4 ± 3.9	25.2 ± 6.6	31.8 ± 5.3	90.5 ± 25.4	69.4 ± 24.0
	2	36.8 ± 1.3	47.2 ± 4.0	26.1 ± 4.0	54.8 ± 2.5	100.3 ± 47.9	135.7 ± 41.8
	3	43.1 ± 8.6	41.1 ± 5.5	21.7 ± 7.2	58.4 ± 11.2	91.5 ± 13.1	53.9 ± 9.2
	4	44.6 ± 5.8	29.3 ± 1.9	31.2 ± 4.6	44.7 ± 7.7	36.2 ± 6.2	74.6 ± 21.8
	5	11.7 ± 4.2	26.6 ± 0.8	20.9 ± 2.7	76.9 ± 17.9	64.6 ± 10.4	80.2 ± 18.0
Jul.	1	25.8 ± 6.4	23.7 ± 8.7	65.8 ± 26.8	40.7 ± 12.3	65.2 ± 30.5	39.8 ± 13.3
	2	63.1 ± 2.8	105.6 ± 55.2	84.9 ± 6.6	29.2 ± 6.5	56.6 ± 17.9	57.0 ± 22.3
	3	164.4 ± 23.8	217.3 ± 65.0	40.1 ± 4.5	30.6 ± 9.3	65.4 ± 19.5	48.8 ± 9.7
	4	190.9 ± 25.9	168.8 ± 48.2	67.4 ± 10.3	41.5 ± 15.1	42.2 ± 12.6	35.2 ± 10.2
	5	297.8 ± 85.9	268.6 ± 56.2	130.5 ± 36.1	34.2 ± 3.4	39.0 ± 2.1	24.4 ± 4.9
Aug.	1	52.1 ± 24.2	191.3 ± 26.2	178.8 ± 29.9	25.8 ± 5.6	29.8 ± 7.7	19.4 ± 7.7
	2	49.0 ± 19.3	228.6 ± 52.6	118.6 ± 27.4	20.8 ± 8.7	54.5 ± 8.9	51.7 ± 5.3
	3	349.2 ± 94.2	387.5 ± 125.9	67.3 ± 8.2	27.1 ± 5.0	44.1 ± 13.5	34.4 ± 11.6
	4	78.4 ± 32.5	136.1 ± 69.3	84.9 ± 17.2	16.8 ± 3.4	36.9 ± 6.7	21.6 ± 4.5
	5	398.9 ± 107.2	142.8 ± 12.1	59.6 ± 15.2	31.9 ± 7.1	42.2 ± 4.8	16.8 ± 3.5
Sep.	1	24.7 ± 5.4	71.9 ± 22.3	24.3 ± 5.4	15.1 ± 2.1	16.3 ± 0.3	20.8 ± 4.2
	2	27.1 ± 8.6	14.4 ± 5.2	27.7 ± 8.2	30.7 ± 3.6	28.4 ± 1.3	41.5 ± 5.6

	3	46.3 ± 6.6	45.8 ± 8.7	50.6 ± 39.3	42.6 ± 8.0	45.8 ± 7.8	33.0 ± 5.7
	4	85.3 ± 9.9	75.2 ± 6.2	39.8 ± 4.7	40.9 ± 6.1	56.2 ± 4.9	30.5 ± 7.8
	5	36.6 ± 1.4	43.2 ± 1.8	54.3 ± 7.4	20.7 ± 5.2	34.1 ± 5.6	23.6 ± 4.6
Oct.	1	39.2 ± 9.9	55.2 ± 8.7	60.0 ± 21.9	48.4 ± 8.4	34.6 ± 5.0	26.3 ± 6.5
	2	25.6 ± 4.2	38.9 ± 7.3	61.8 ± 6.4	24.4 ± 7.5	26.7 ± 3.8	24.9 ± 2.8
	3	14.4 ± 6.1	27.9 ± 11.4	29.1 ± 10.7	31.5 ± 7.5	34.5 ± 4.4	19.4 ± 5.0
	4	20.1 ± 2.3	28.6 ± 4.5	90.5 ± 13.0	53.6 ± 9.6	45.2 ± 5.5	29.1 ± 6.2
	5	30.0 ± 5.4	24.6 ± 1.9	84.7 ± 23.7	56.9 ± 6.6	51.2 ± 10.7	25.3 ± 6.7
Nov.	1	27.7 ± 6.6	29.3 ± 6.8	92.3 ± 25.3	38.3 ± 7.4	30.1 ± 4.0	32.9 ± 5.2
	2	65.5 ± 4.3	163.5 ± 70.2	53.1 ± 7.0	34.4 ± 5.0	26.9 ± 5.5	30.1 ± 6.3
	3	59.5 ± 5.1	45.9 ± 9.9	120.8 ± 37.8	41.0 ± 12.6	31.5 ± 4.0	30.5 ± 6.7
	4	39.7 ± 10.0	60.9 ± 6.1	80.9 ± 11.3	37.5 ± 4.8	62.3 ± 12.0	20.0 ± 4.1
	5	45.3 ± 4.2	64.6 ± 2.4	43.2 ± 8.4	39.1 ± 7.5	42.1 ± 6.6	27.5 ± 4.2
Dec.	1	27.3 ± 5.1	40.3 ± 10.2	72.6 ± 29.9	16.8 ± 3.3	25.2 ± 4.1	11.5 ± 2.7
	2	21.7 ± 7.3	40.8 ± 8.3	107.2 ± 24.5	25.9 ± 3.2	30.5 ± 7.7	29.9 ± 5.7
	3	65.2 ± 7.4	48.3 ± 5.9	60.7 ± 12.8	28.3 ± 7.2	30.4 ± 10.4	18.9 ± 5.9
	4	62.5 ± 24.9	65.1 ± 3.9	45.7 ± 10.2	40.5 ± 8.4	29.5 ± 6.9	27.5 ± 7.0
	5	66.6 ± 18.1	52.0 ± 2.6	98.6 ± 14.7	61.1 ± 11.5	53.8 ± 11.2	31.3 ± 8.8

Table 3. Statistical variables and critical values of significance at P≤0.01 for field soil respiration (mmol m^{-2} h^{-1}) at various months of the year. Degree of freedom of tested variable and experimental error (DoFs) as tested by 2 way analysis of variance (ANOVA), number of replicates (4), hours – Greenwich Mean Time (GMT) was 3 and number of sites (SITES) was 5

Period :		**Y1**			**Y2**		
		Statistical variables					
Months	**Critical values**	**GMT**	**SITES**	**GMT x SITES**	**GMT**	**SITES**	**GMT x SITES**
January	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	6.74	15.81	3.47	5.50	0.99	1.85
	P ≤ 1%	*	*	*	*	ns	ns
February	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	53.96	15.21	11.91	3.44	1.27	2.13
	P≤ 1%	*	*	*	*	ns	ns
March	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	0.86	11.74	3.69	8.98	1.53	1.51
	P ≤ 1%	ns	*	*	*	ns	ns
April	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	3.11	11.15	1.69	2.41	1.28	2.16
	P ≤ 1%	ns	*	ns	ns	ns	ns
May	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	1.12	3.57	2.40	1.68	2.44	1.25
	P ≤ 1%	ns	*	*	ns	ns	ns
June	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	8.39	8.65	1.89	8.09	3.81	2.82
	P≤ 1%	*	*	ns	*	*	*
July	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	10.34	8.72	2.77	2.99	6.07	0.46
	P ≤ 1%	*	*	*	ns	*	ns
August	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99

	F-cal.	7.11	4.60	3.37	3.34	2.95	1.16
	P ≤ 1%	*	*	*	*	*	ns
Sept.	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	0.39	2.23	2.69	3.35	8.25	2.40
	P ≤ 1%	ns	ns	*	*	*	*
October	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	16.92	2.74	1.97	9.98	2.57	1.46
	P≤ 1%	*	*	ns	*	ns	ns
November	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	2.46	2.16	2.90	5.22	0.70	0.50
	P ≤ 1%	ns	ns	*	*	ns	ns
December	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	5.83	0.85	1.83	3.65	3.29	2.64
	P ≤ 1%	*	ns	ns	*	*	*

Table 4. Field soil respiration (mmol m^{-2} h^{-1}) for various sites, times of day and seasons at Wivenhoe parkland grassland. Each value is mean ± standard error of 4 replicates.

Year:		**Y1**			**Y2**		
		Times of the day (hours – Greenwich Mean Time):					
Season	**Site**	**06-07 GMT**	**12-13 GMT**	**18-19 GMT**	**06-07 GMT**	**12-13 GMT**	**18-19 GMT**
Winter	1	12.4 ± 2.1	17.8 ± 3.7	28.0 ± 10.6	16.4 ± 4.2	29.1 ± 5.7	31.0 ± 6.5
	2	11.0 ± 2.4	23.5 ± 2.9	43.2 ± 9.4	20.8 ± 2.9	22.3 ± 4.7	93.6 ± 36.9
	3	32.4 ± 2.8	35.8 ± 1.3	29.9 ± 5.7	25.2 ± 4.3	30.3 ± 5.1	39.0 ± 14.0
	4	29.6 ± 8.5	20.2 ± 2.4	32.8 ± 3.9	41.3 ± 3.6	25.6 ± 3.2	33.0 ± 6.6
	5	28.7 ± 6.0	30.5 ± 5.6	46.6 ± 6.3	44.7 ± 6.4	31.4 ± 2.8	32.8 ± 8.5
Spring	1	25.2 ± 1.8	24.7 ± 1.2	29.2 ± 2.2	30.6 ± 6.5	33.4 ± 3.4	52.5 ± 7.8
	2	35.2 ± 2.0	34.3 ± 2.9	29.4 ± 1.7	44.8 ± 2.6	37.0 ± 5.2	52.6 ± 13.2
	3	38.1 ± 4.0	48.3 ± 9.4	33.0 ± 3.0	76.6 ± 15.8	38.2 ± 7.3	54.6 ± 6.6
	4	24.2 ± 2.5	36.2 ± 10.7	28.6 ± 9.7	47.3 ± 7.8	42.2 ± 6.1	55.8 ± 6.3
	5	29.3 ± 4.5	40.8 ± 6.9	28.6 ± 1.9	53.6 ± 10.0	36.6 ± 2.4	60.9 ± 8.3
Summer	1	34.3 ± 10.8	79.1 ± 8.9	89.9 ±19.0	32.8 ± 7.0	61.9 ± 19.8	42.9 ± 11.2
	2	48.0 ± 7.1	127.2 ± 27.2	76.5 ± 10.2	34.9 ± 5.6	70.5 ± 17.3	81.5 ± 16.2
	3	184.2 ± 29.8	203.7 ± 32.6	41.6 ± 1.8	38.7 ± 3.4	67.0 ± 12.2	56.2 ± 8.5
	4	104.6 ± 16.6	156.8 ± 26.8	61.2 ± 4.3	34.3 ± 6.5	69.8 ± 10.4	43.8 ± 4.0
	5	236.1 ± 57.0	298.5 ± 40.2	70.4 ± 13.8	56.5 ± 9.1	62.4 ± 9.8	51.0 ± 9.5
Autumn	1	30.5 ± 6.9	52.1 ± 6.1	58.8 ± 14.8	33.9 ± 5.6	27.0 ± 2.9	26.7 ± 2.4
	2	32.7 ± 6.6	41.3 ± 11.3	87.2 ± 38.6	29.8 ± 3.7	27.4 ± 1.1	32.2 ± 1.9
	3	35.1 ± 7.1	40.1 ± 8.0	64.0 ± 18.7	38.3 ± 5.0	37.3 ± 1.8	27.6 ± 5.2
	4	46.9 ± 3.6	34.2 ± 6.5	59.0 ± 14.6	44.0 ± 3.6	45.1 ± 2.4	26.5 ± 5.0
	5	38.4 ± 2.2	27.8 ± 4.6	57.4 ± 14.9	38.9 ± 5.2	36.9 ± 1.9	25.4 ± 4.5

Table 5. Statistical variables and critical values of significance at P≤0.01 for field soil respiration (mmol m^{-2} h^{-1}) at various seasons of the year. Degree of freedoms of tested variable and experimental error (DoFs), F-calculated (Fcal) as tested by 2 way analysis of variance (ANOVA), number of replicates (4), hours Greenwich Mean Time (GMT) was 3 and number of sites (SITES) was 5

Period:		Y1			Y2		
		Statistical variables					
Seasons	Critical values	GMT	SITES	GMT x SITES	GMT	SITES	GMT x SITES
Winter	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	6.88	2.86	1.71	3.94	1.28	2.85
	P ≤ 1%	*	*	ns	*	ns	*
Spring	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	1.02	5.79	1.21	5.56	2.39	1.30
	P≤ 1%	ns	*	ns	*	ns	ns
Summer	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	14.70	6.38	3.15	10.83	3.70	2.40
	P ≤ 1%	*	*	*	*	*	*
Autumn	DoFs	2 & 45	4 & 45	8 & 45	2 & 45	4 & 45	8 & 45
	5%	3.23	2.61	2.18	3.23	2.61	2.18
	1%	5.18	3.83	2.99	5.18	3.83	2.99
	F-cal.	6.47	0.28	0.58	7.09	1.76	1.21
	P ≤ 1%	*	ns	ns	*	ns	ns

Table 6. Laboratory soil respiration (mmol m^{-2} h^{-1}) for various times of the day and month at Wivenhoe parkland grassland. Each value is mean ± standard error of 5 sites x 4 replicates x 2 years

Period:	Y1			Y2		
	Times of the d (hours – Greenwich Mean Time):					
Month	06-07 GMT	12-13 GMT	18-19 GMT	06-07 GMT	12-13 GMT	18-19 GMT
Jan.	20.2 ± 17.0	23.6 ± 15.9	23.0 ± 5.5	25.6 ± 11.5	30.2 ± 9.6	25.3 ± 6.5
Feb.	23.4 ± 2.6	16.2 ± 4.8	15.3 ± 3.1	22.1 ± 4.1	14.9 ± 2.6	12.4 ± 2.9
Mar.	29.8 ± 7.2	24.2 ± 3.3	26.9 ± 15.2	45.3 ± 13.0	54.0 ± 20.4	43.0 ± 18.0
Apr.	40.7 ± 29.4	71.2 ± 16.9	43.7 ± 17.4	43.8 ± 12.4	78.2 ± 37.0	53.7 ± 37.5
May.	38.0 ± 10.5	25.6 ± 5.2	17.7 ± 10.8	18.6 ± 5.0	67.3 ± 32.0	71.6 ± 33.2
Jun.	60.2 ± 35.0	34.1 ± 13.0	25.0 ± 8.2	51.3 ± 10.7	49.5 ± 15.1	44.8 ± 11.8
Jul.	44.3 ± 15.9	101.4 ± 71.1	63.7 ± 23.1	77.7 ± 54.6	81.8 ± 71.4	75.4 ± 44.6
Aug.	34.9 ± 31.2	30.5 ± 8.3	31.1 ± 13.4	56.3 ± 31.1	63.5 ± 37.1	56.1 ± 22.6
Sep.	30.5 ± 27.1	12.7 ± 5.5	41.1 ± 16.9	57.2 ± 25.9	19.7 ± 31.0	10.9 ± 8.9
Oct.	7.1 ± 2.3	39.1 ± 31.5	31.1 ± 19.1	27.6 ± 18.5	26.7 ± 13.3	17.7 ± 9.6
Nov.	32.2 ± 26.2	48.6 ± 23.4	54.3 ± 27.3	40.1 ± 26.0	42.4 ± 8.7	37.1 ± 5.5
Dec.	25.6 ± 20.6	22.5 ± 12.8	31.6 ± 16.5	17.8 ± 13.8	41.2 ± 30.1	27.5 ± 14.5

Table 7. Statistical variables and critical values of significance at P≤0.01 for laboratory soil respiration (mmol m^{-2} h^{-1}) at various months of the year. Degree of freedoms of tested variable and experimental error (DoFs), F-calculated (Fcal) as tested by 2 way analysis of variance (ANOVA), number of replicates (4), hours Greenwich Mean Time (GMT) was 3 and number of sites (SITES) was 5

Period:		Y1		Y2	
		Statistical variables			
Months	Critical values	GMT	SITES	GMT	SITES
January	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	0.08	0.62	0.32	0.17
	P ≤ 1%	ns	ns	ns	ns
February	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	4.25	0.70	11.93	0.94

	P ≤ 1%	ns	ns	*	ns
March	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	0.57	2.30	2.17	9.63
	P ≤ 1%	ns	ns	ns	*
April	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	2.20	0.27	2.59	2.83
	P ≤ 1%	ns	ns	ns	ns
May	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	5.34	0.58	7.97	1.96
	P ≤ 1%	*	ns	*	ns
June	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	2.78	0.44	0.38	1.28
	P ≤ 1%	ns	ns	ns	ns
July	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	1.99	0.75	0.02	1.26
	P ≤ 1%	ns	ns	ns	ns
August	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	0.08	1.45	0.18	3.67
	P ≤ 1%	ns	ns	ns	ns
September	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	2.44	0.48	4.13	0.34
	P ≤ 1%	ns	ns	ns	ns
October	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	2.72	0.67	0.82	1.33
	P ≤ 1%	ns	ns	ns	ns
November	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	1.22	1.68	0.16	1.54
	P ≤ 1%	ns	ns	ns	ns
December	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	0.84	4.78	2.60	2.93
	P ≤ 1%	ns	*	ns	ns

Table 8. Laboratory soil respiration (mmol m^{-2} h^{-1}) and water filled pore spaces (m3 m-3) at constant temperature (25°C) for various times of the day and seasons at Wivenhoe parkland grassland. Each value is mean ± standard error of 5 sites x 2 years, Time is Greenwich Mean Time (GMT)

		Laboratory soil respiration (mmol m^{-2} h^{-1})		Water filled pore spaces (WFPS) – m^3 m^3	
Season	**Time**	**Y1**	**Y2**	**Y1**	**Y2**
Winter	06-07 GMT	23.0 ± 4.8	21.8 ± 5.6	0.58 ± 0.16	0.56 ± 0.14
	12-13 GMT	20.7 ± 7.5	28.8 ± 11.6	0.53 ± 0.16	0.53 ± 0.19
	18-19 GMT	23.3 ± 6.1	21.7 ± 6.4	0.54 ± 0.12	0.51 ± 0.17
Spring	06-07 GMT	36.2 ± 5.2	35.9 ± 7.5	0.69 ± 0.15	0.69 ± 0.09
	12-13 GMT	40.3 ± 4.5	66.5 ± 10.6	0.67 ± 0.10	0.64 ± 0.11
	18-19 GMT	29.4 ± 12.6	56.1 ± 14.1	0.62 ± 0.14	0.65 ± 0.11
Summer	06-07 GMT	46.5 ± 14.5	61.8 ± 28.0	0.40 ± 0.15	0.42 ± 0.15
	12-13 GMT	55.3 ± 23.6	64.9 ± 30.4	0.38 ± 0.12	0.54 ± 0.15
	18-19 GMT	40.0 ± 8.1	58.8 ± 20.0	0.40 ± 0.14	0.42 ± 0.14
Autumn	06-07 GMT	23.3 ± 11.9	41.6 ± 16.2	0.49 ± 0.13	0.52 ± 0.12
	12-13 GMT	33.5 ± 16.0	29.6 ± 16.6	0.49 ± 0.14	0.50 ± 0.20
	18-19 GMT	42.2 ± 15.0	21.9 ± 7.1	0.47 ± 0.14	0.49 ± 0.13

Table 9. Statistical variables and critical values of significance at P≤0.01 for laboratory soil respiration (mmol m^{-2} h^{-1}) at various seasons of the year. Degree of freedoms of tested variable and experimental error (DoFs), F-calculated (Fcal) as tested by 2 way analysis of variance (ANOVA), number of replicates (4), hours Greenwich Mean Time (GMT) was 3 and number of sites (SITES) was 5

Period:		**Y1**		**Y2**	
		Statistical variables			
Seasons	**Critical values**	**GMT**	**SITES**	**GMT**	**SITES**
Winter	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	0.39	2.63	1.77	2.45
	P ≤ 1%	ns	ns	ns	ns
Spring	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	2.27	1.08	25.2	5.63
	P ≤ 1%	ns	ns	*	*
Summer	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	0.91	0.53	0.08	1.52
	P ≤ 1%	ns	ns	ns	ns
Autumn	DoFs	2 & 8	4 & 8	2 & 8	4 & 8
	5%	4.46	3.84	4.46	3.84
	1%	8.65	7.01	8.65	7.01
	F-cal.	2.58	1.59	2.15	0.58
	P ≤ 1%	ns	ns	ns	ns

Instead of narrowing attention to terrorism, nuclear proliferation, nuclear accident and nuclear war as the end point of the world. These our orchestrated end point may be triggered automatically by climate change instead of terrorist and world super powers.

The University of Essex, England Wivenhoe parkland grassland was monitored on hourly, daily, monthly and seasonal basis for two years. The data generated is hereby presented to the scientific and general public for perusal and necessary action.

Materials and Methods

Site description

Have been fully described in Igboji *et al*, (2015)

Laboratory methods and protocols

Remains as described in Igboji *et al* (2015)

Statistical and data analysis

Remains as described in Igboji *et al* (2015)

Results and Discussions

Remains as detailed in Igboji *et al* (2015)

Data bank (Tables 1 – 11)

Table 1: Field soil respiration (mmol m-2 h-1) and temperature (°C) for various times of the day and season at Wivenhoe parkland grassland. Each value is mean ± standard error of 5 sites x 2 yrs.

Conclusion

The above data bank explains more the work of Igboji *et al*.(2015). Similar data when made available by researchers and scientists will help the science and art of quantifying C-fluxes in diverse ecosystem and land management practices and if done on sustainable and continuous basis all over the world will proffer solutions to issues of sustainable agriculture, taming land and nature, global warming and climatic change.

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