BrOA
BRAZILIAN OCEAN ACIDIFICATION RESEARCH GROUP
Grupo Brasileiro de Pesquisa em Acidificação dos Oceanos

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W2- Saturday, March 21, 2015 14:40- talk 6. Abstract ID-10180

Seasonal and diel CO_2 fluxes variability at Rocas Atoll-RN

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DEPARTAMENTO DE OCEANOGRAFIA - UFPE -

LOQuim
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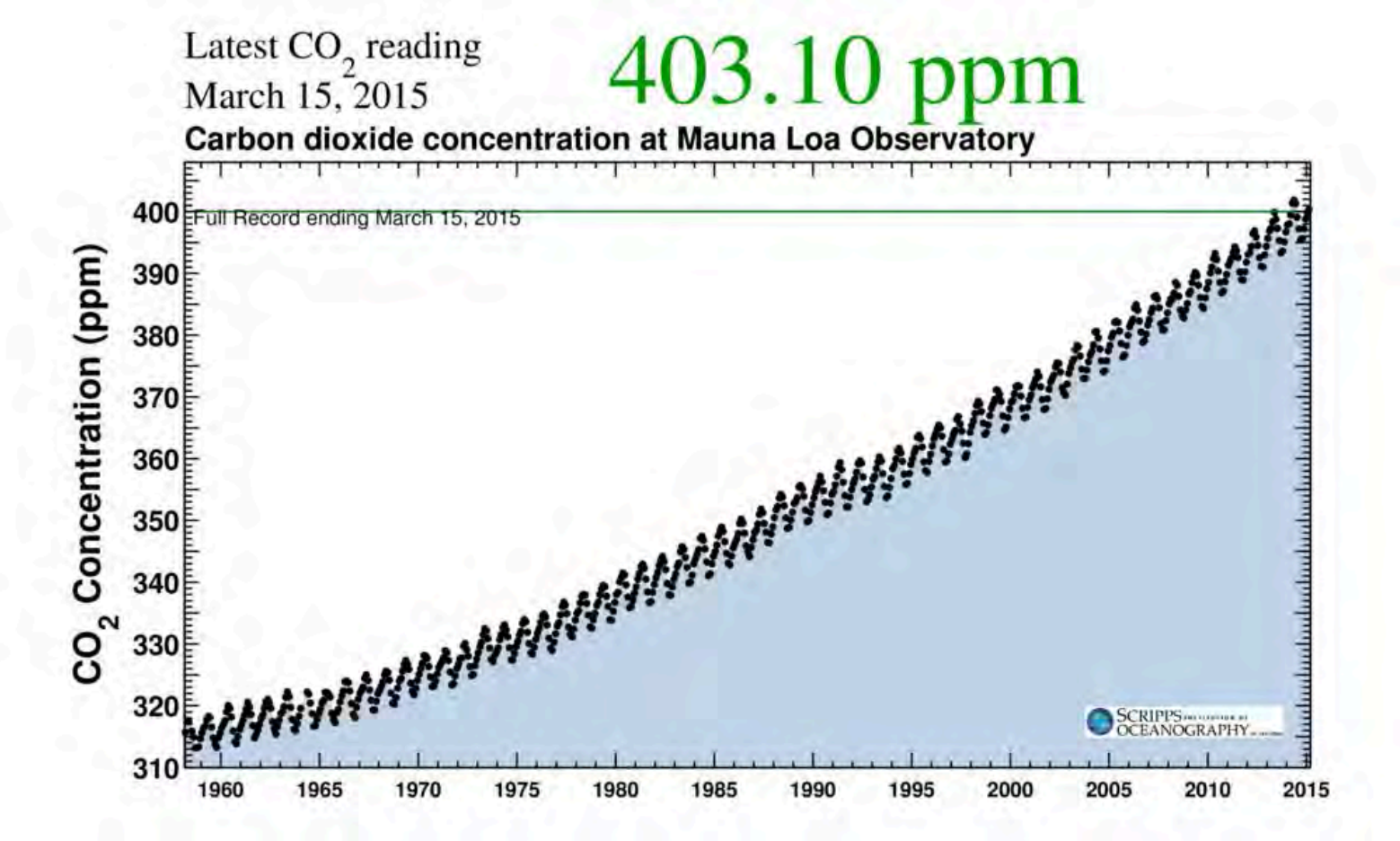
Atol das Rocas
RESERVA BIOLÓGICA
ICMBio - MMA

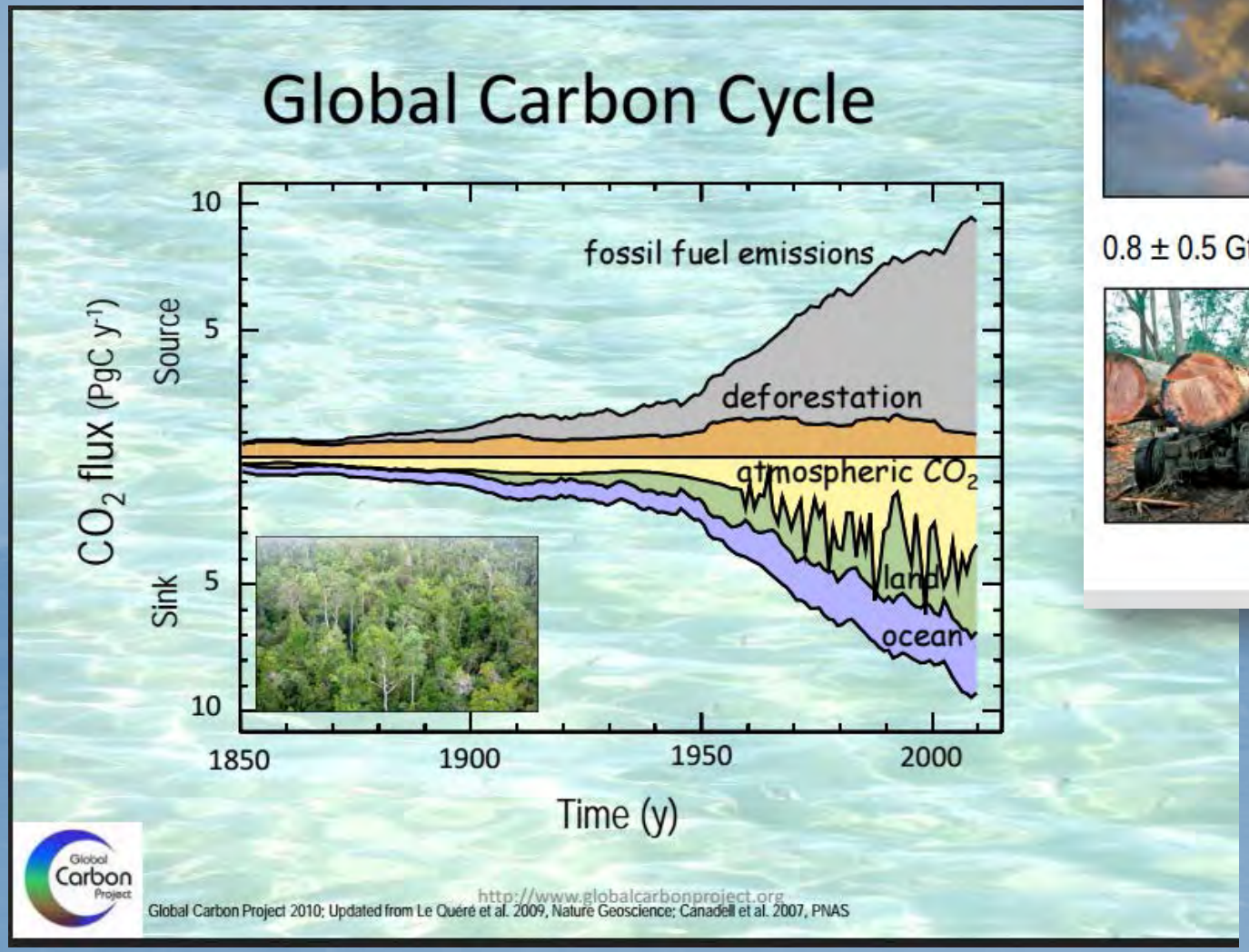
FUNDAÇÃO GRUPO BOTICÁRIO
DE PROTEÇÃO À NATUREZA

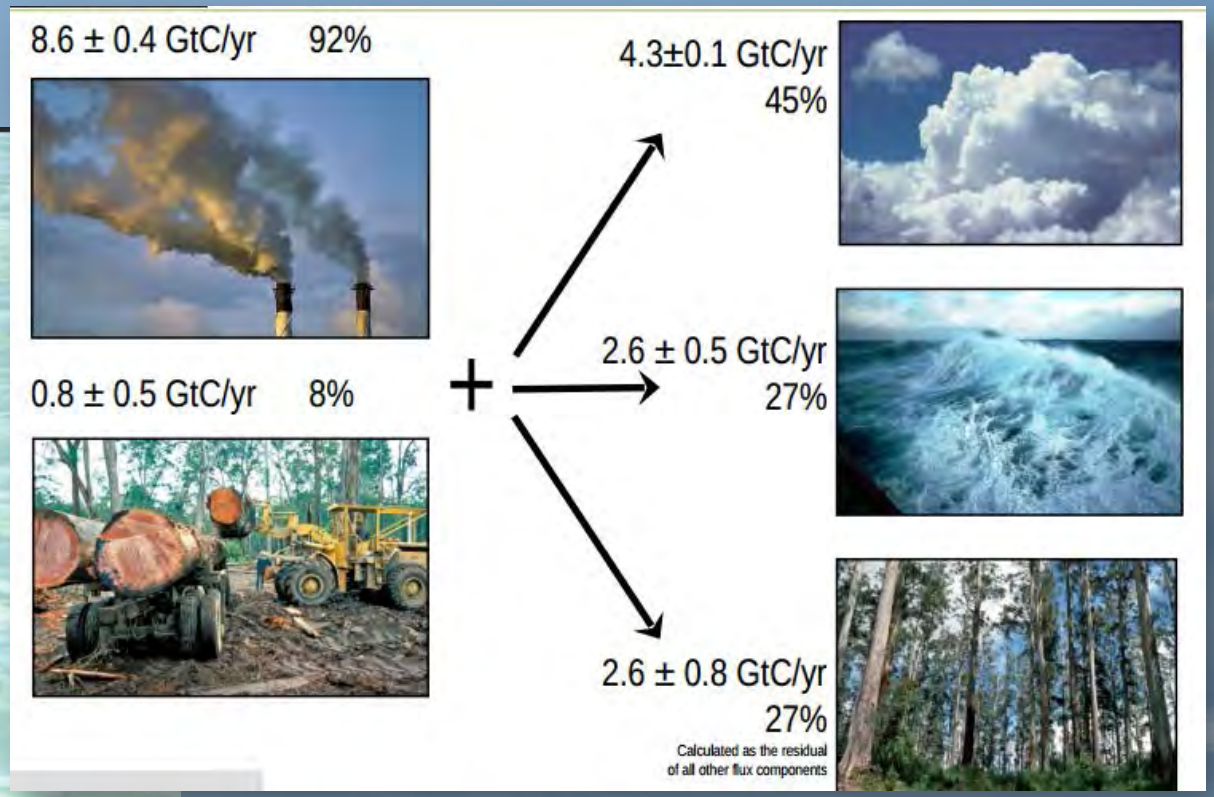
CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico

bioma brasil

The Problem

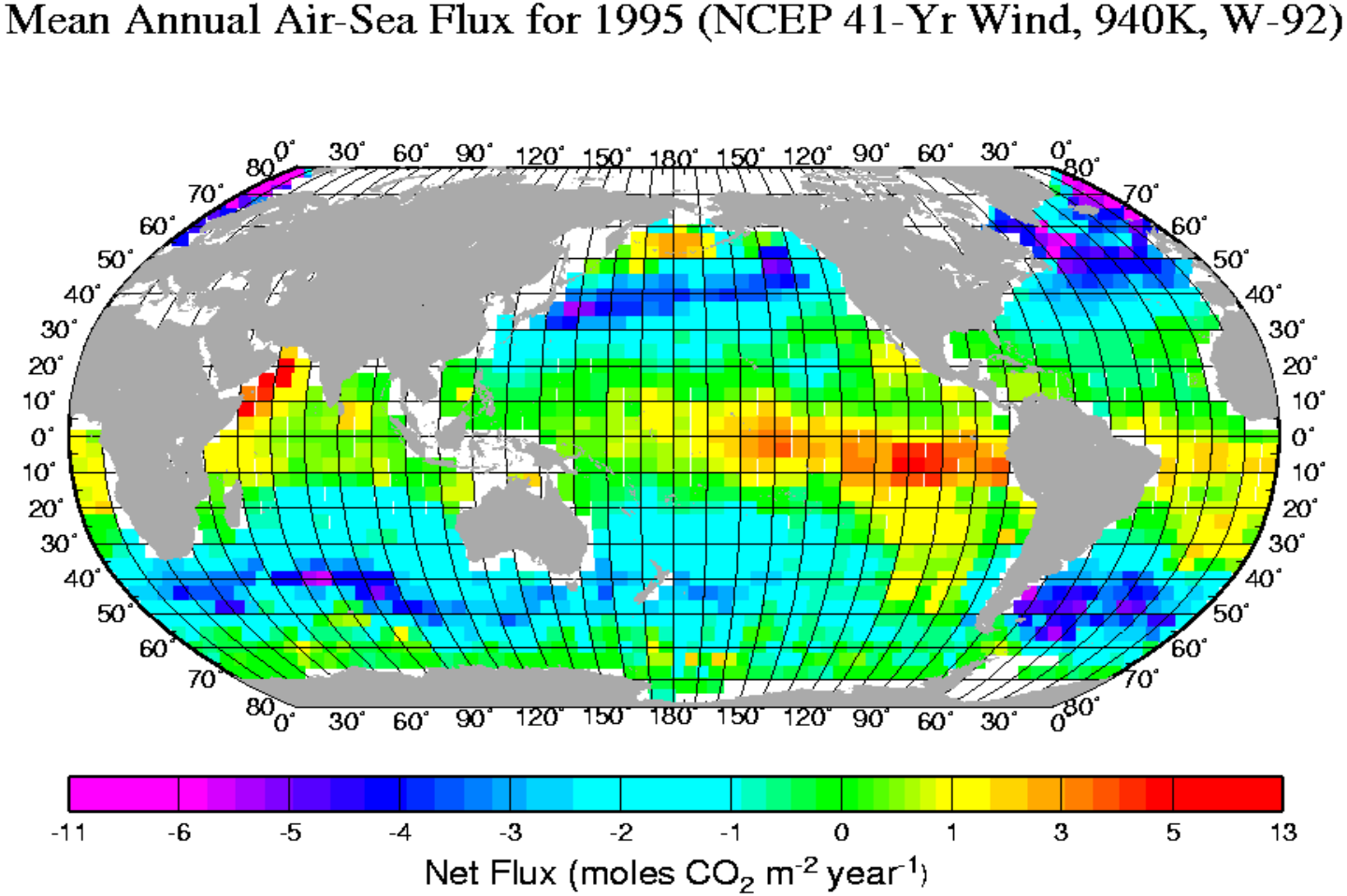

Latest CO_2 reading
March 15, 2015
403.10 ppm
Carbon dioxide concentration at Mauna Loa Observatory
Full Record ending March 15, 2015
CO_2 Concentration (ppm)
400
390
380
370
360
350
340
330
320
310
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
SCRIPPS OCEANOGRAPHY





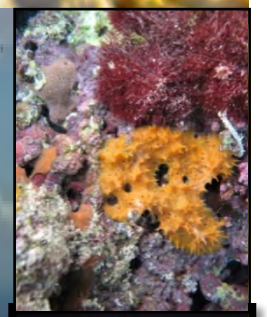
Average Data from 2003- 2012
Le Quéré et al 2013; CDIAC Data;
Global Carbon Project 2013
http://www.globalcarbonproject.org

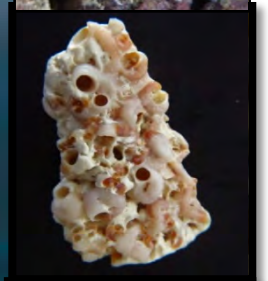
Global CO_2 flux




Rocas Atoll
Fortaleza
Natal
Recife
Brazil
Salvador
Fernando de Noronha
500 km

Rocas Atoll



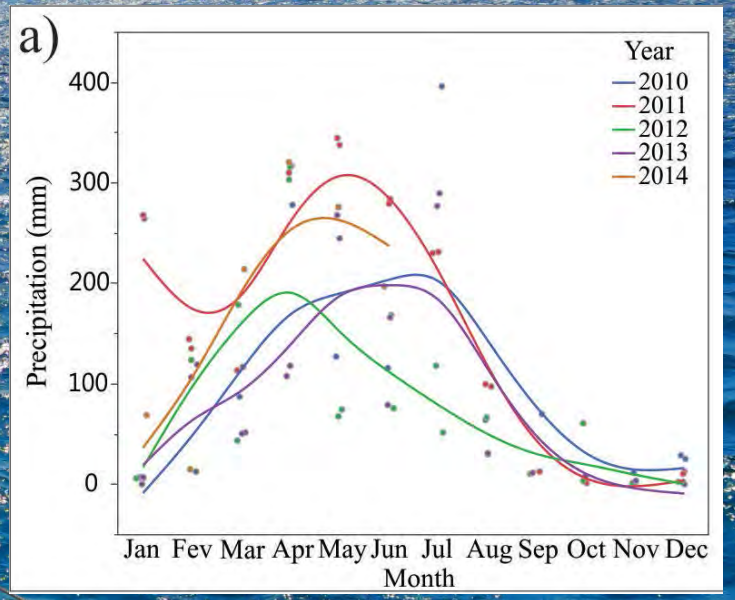


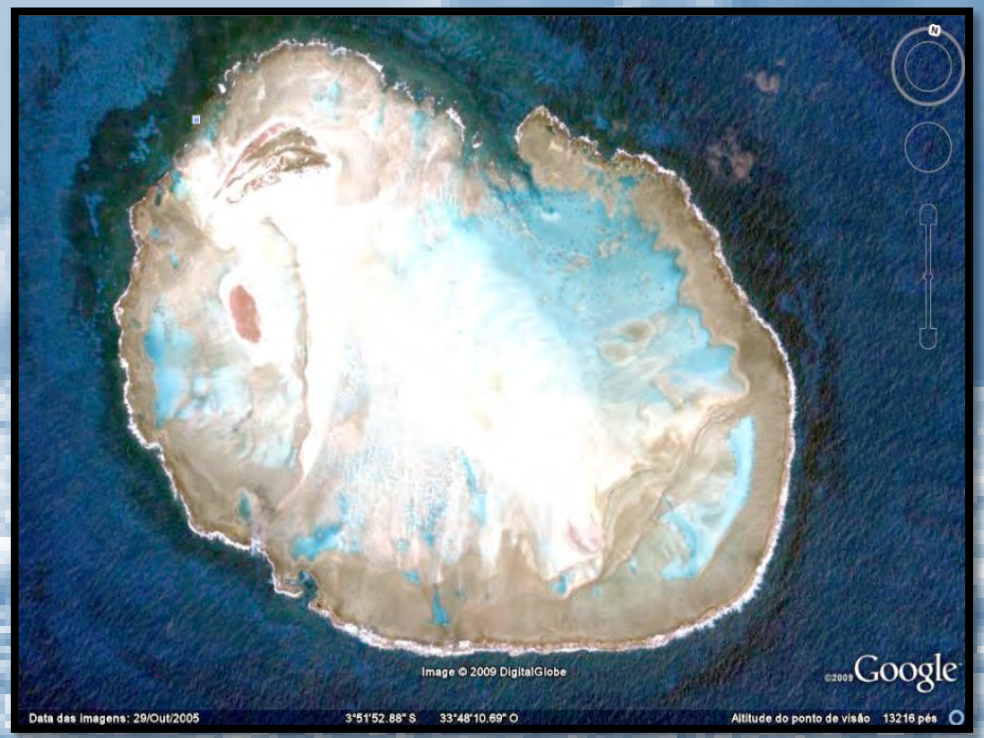
Four expeditions:

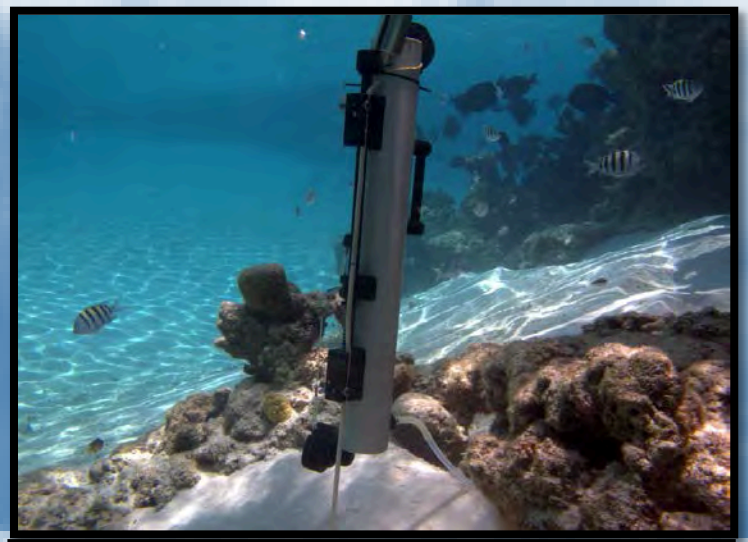
October 2013; Dez/2013- Jan 2014;
Feb-Mar/2014 - May/2014

Dry season: August 2013-
February 2014 average= 20.04
±23.66mm (total =140.3mm)

Rainy Season March till July
2014. average 226.26 ± 85.7 mm
(total= 1131.3 mm)







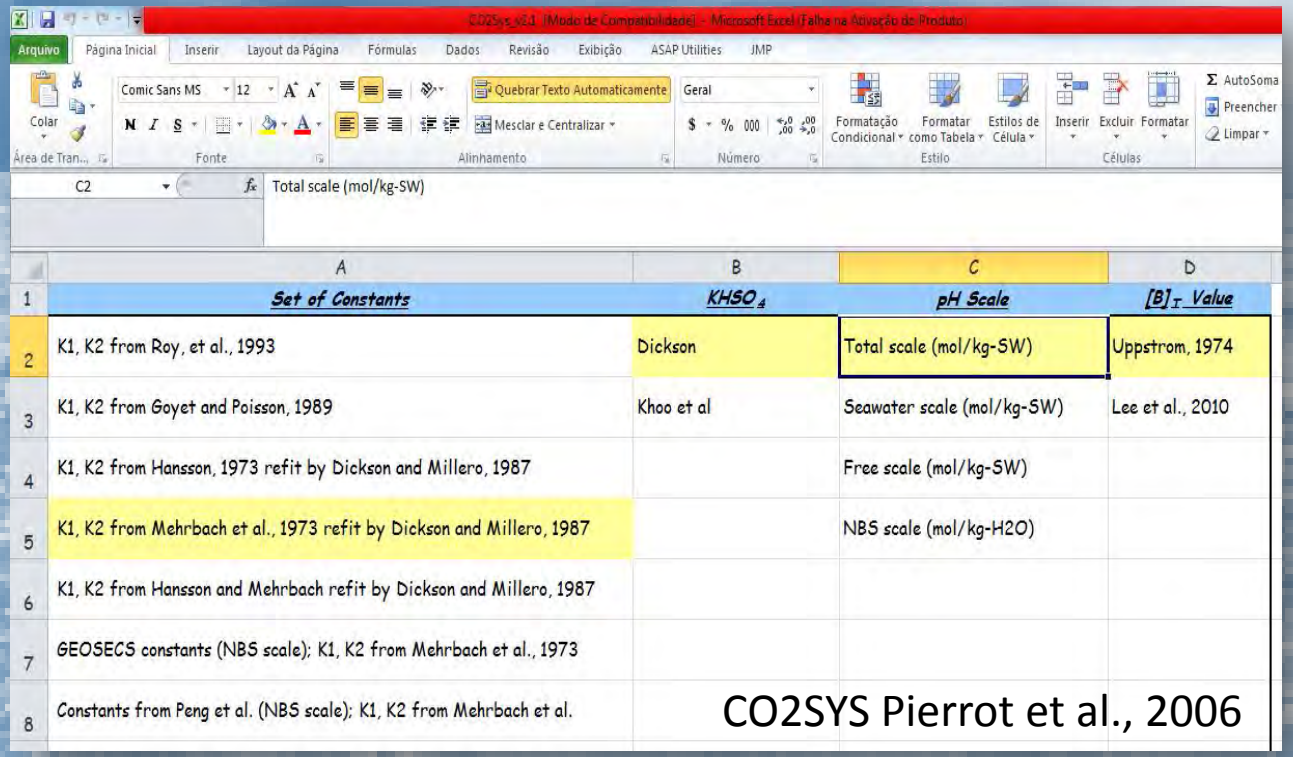
Temperature, conductivity and pH in situ

Water Samples fixed with $HgCl_2$

Total alkalinity -TA (µmol kg_{sw}^{-1}) Method Rounds (2012)

Com base nos dados de T, S, pH e TA, calculamos os seguintes parâmetros:

Carbono Inorgânico Dissolvido – DIC (µmol kg_{sw}^{-1});
Pressão parcial do CO_2 - pCO_2 (µatm);



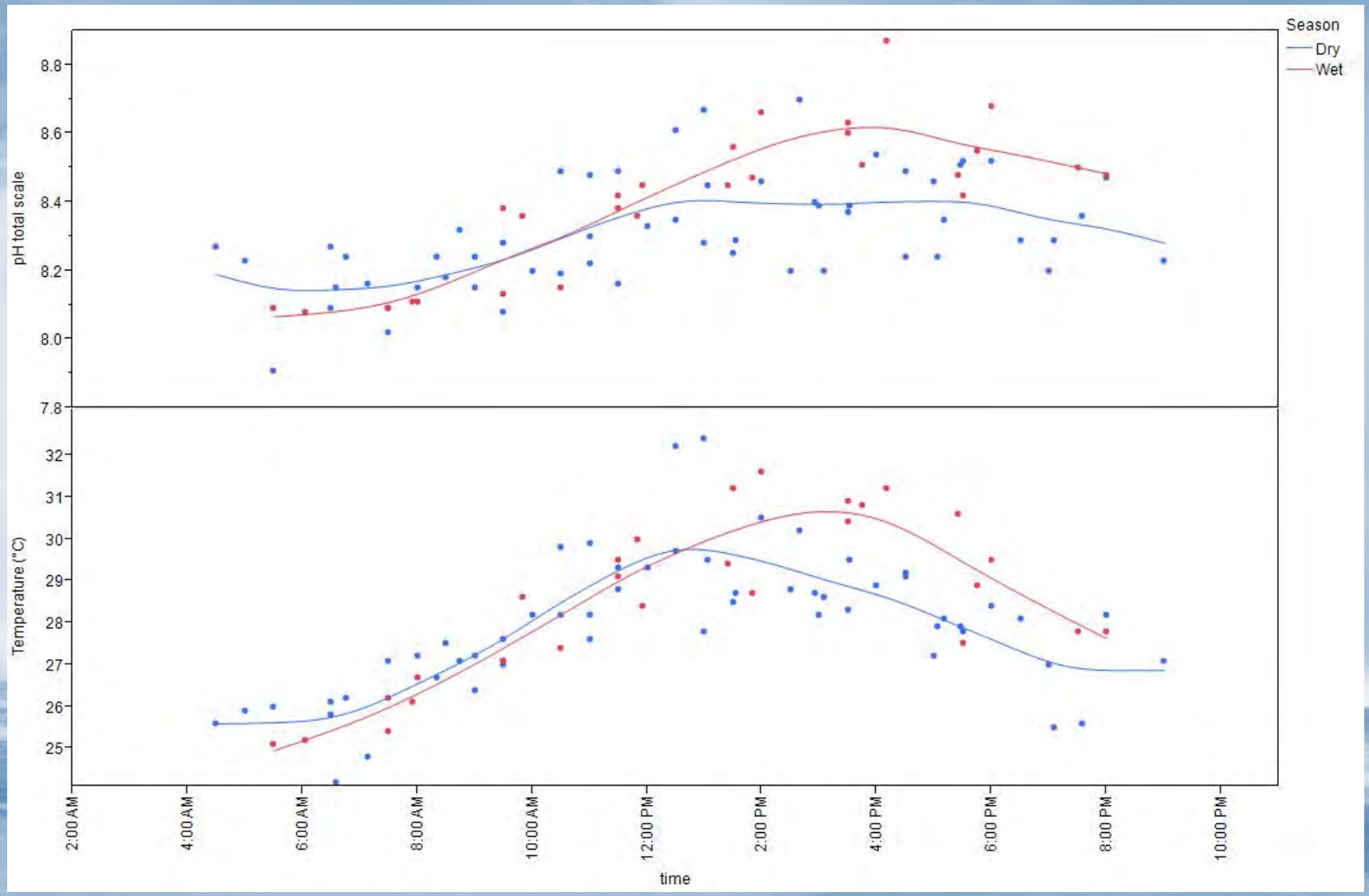
	A	B	C	D
1	***Set of Constants***	***$KHSO_4$***	***pH Scale***	***$[B]_T$ Value***
2	K1, K2 from Roy, et al., 1993	Dickson	Total scale (mol/kg-SW)	Uppstrom, 1974
3	K1, K2 from Goyet and Poisson, 1989	Khoo et al	Seawater scale (mol/kg-SW)	Lee et al., 2010
4	K1, K2 from Hansson, 1973 refit by Dickson and Millero, 1987		Free scale (mol/kg-SW)	
5	K1, K2 from Mehrbach et al., 1973 refit by Dickson and Millero, 1987		NBS scale (mol/kg-H2O)	
6	K1, K2 from Hansson and Mehrbach refit by Dickson and Millero, 1987			
7	GEOSECS constants (NBS scale); K1, K2 from Mehrbach et al., 1973			
8	Constants from Peng et al. (NBS scale); K1, K2 from Mehrbach et al.			

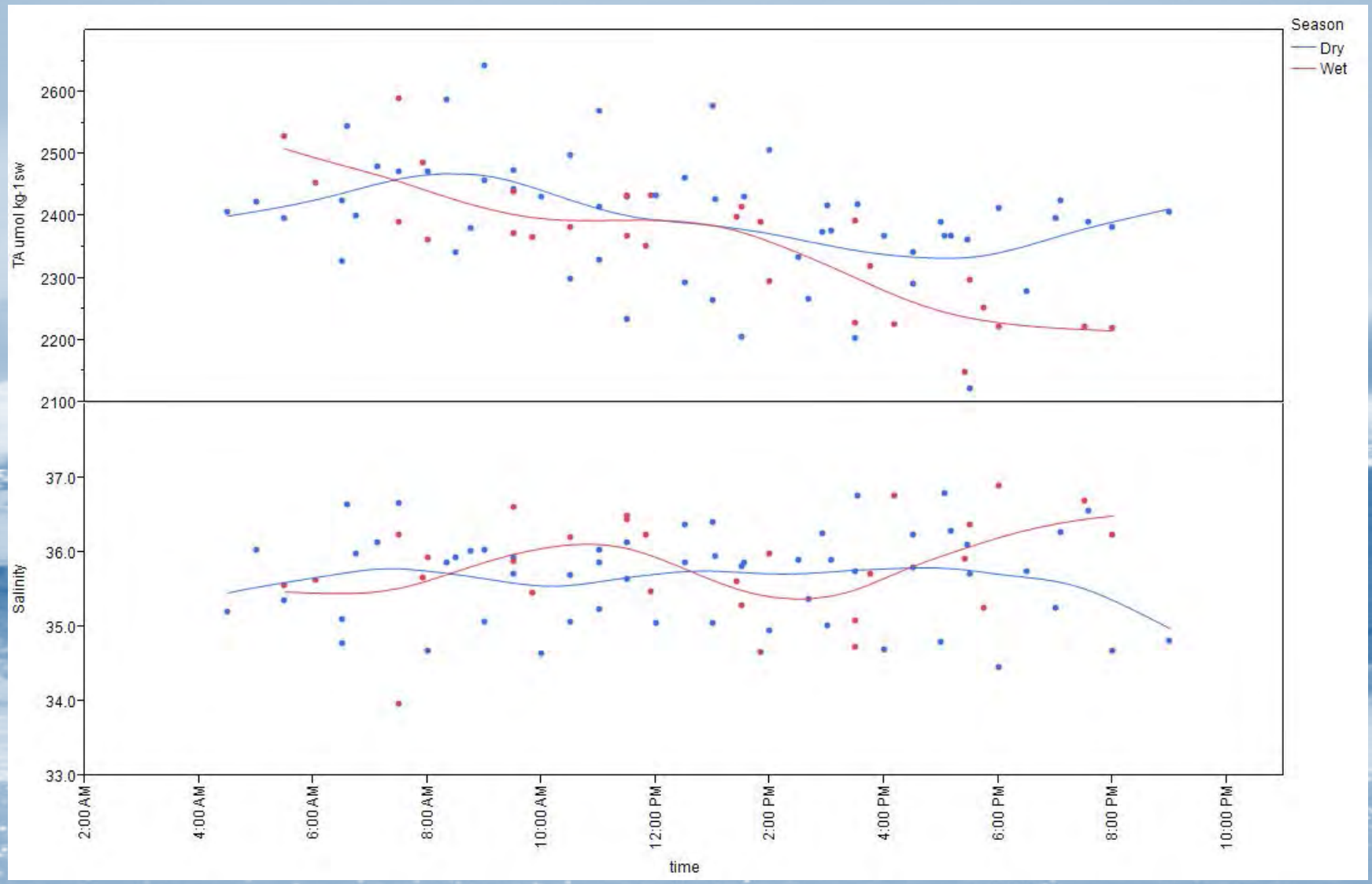
CO2SYS Pierrot et al., 2006

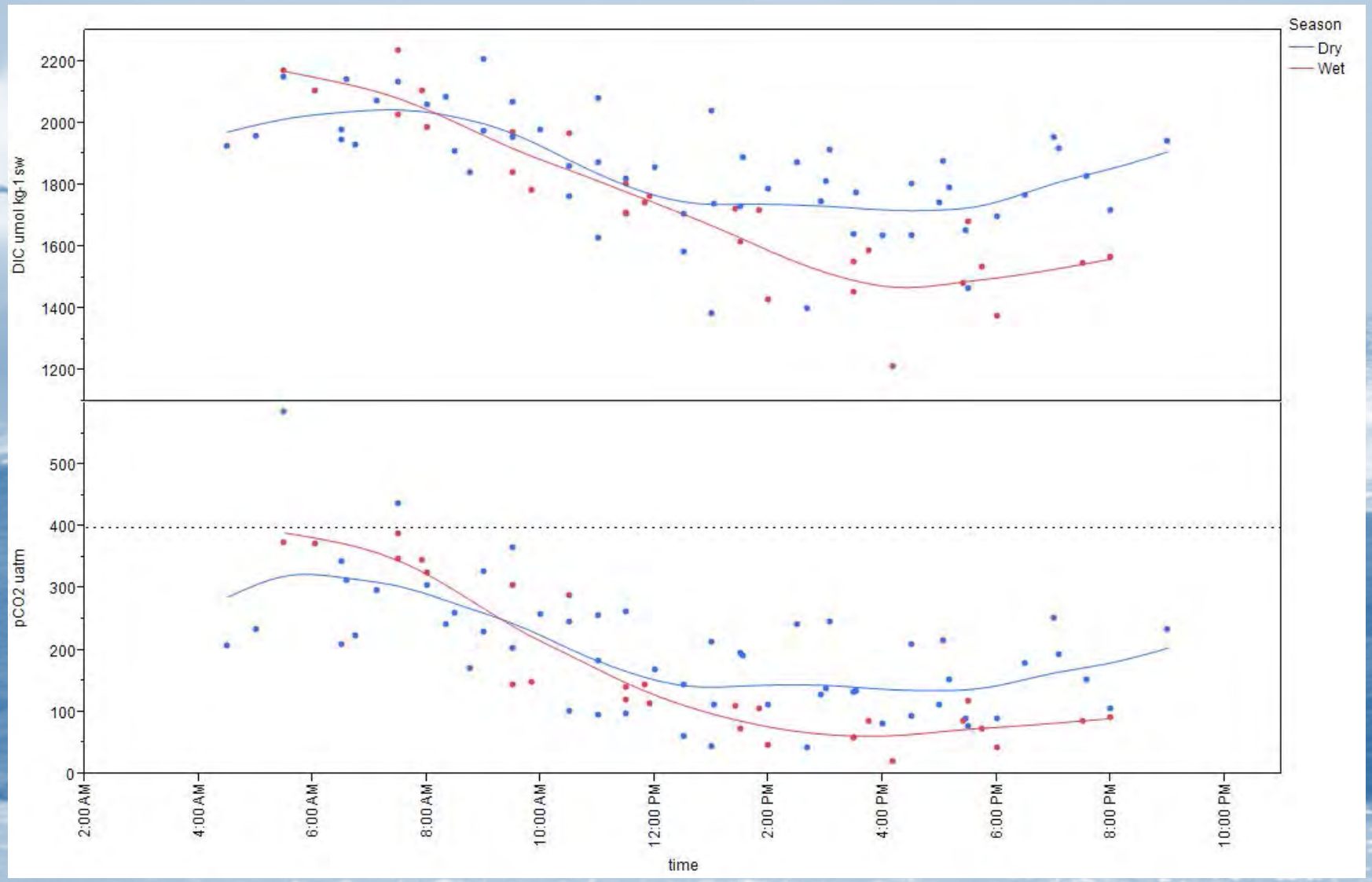
CO_2 Flux ($mmol.m^{-2}.d^{-1}$)

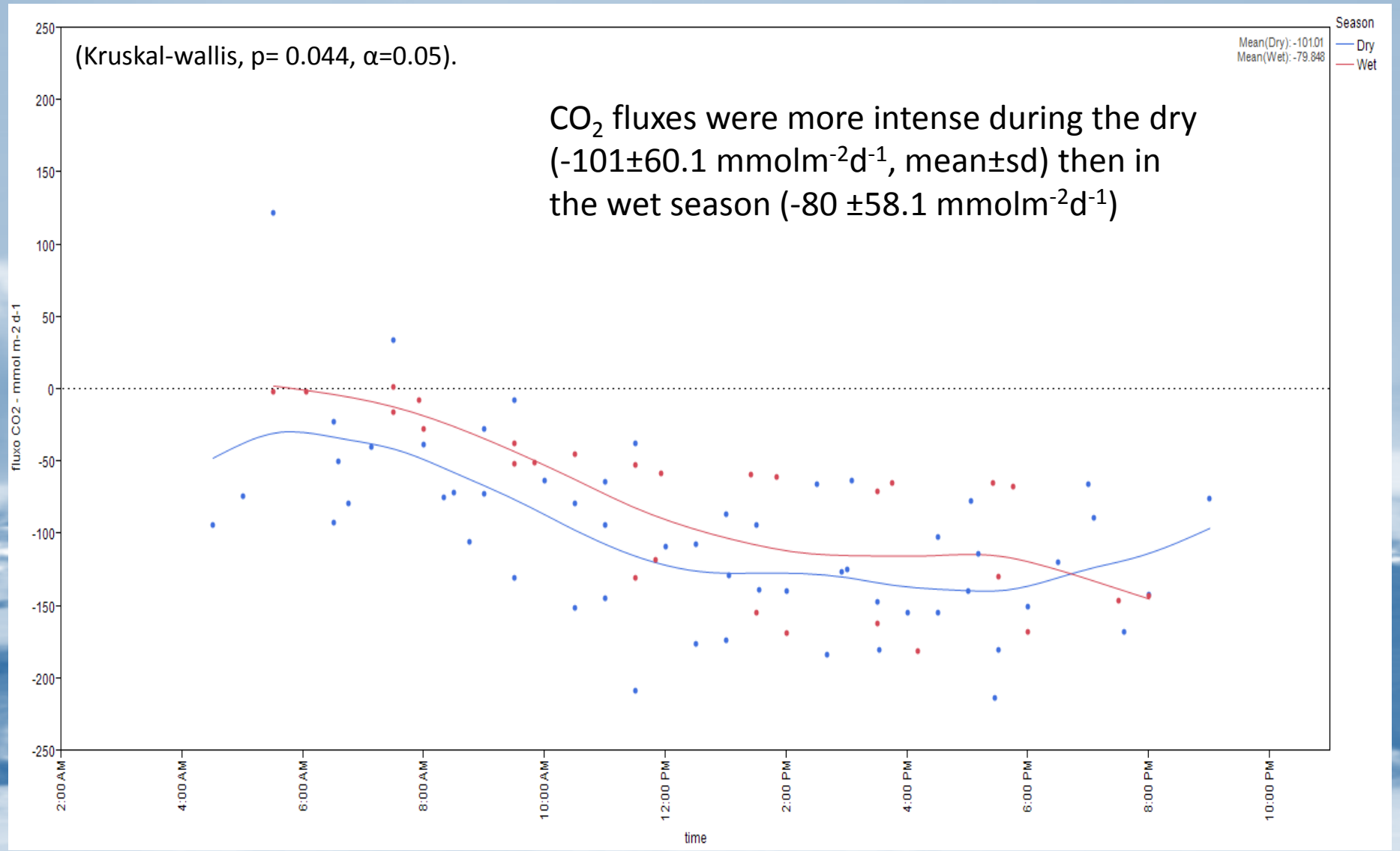
$F= K*K_0*(pCO_{2sw}- pCO_{2\ atm})$, where k is the gas transfer velocity (Sweeney et al, 2007) k_0 is the CO_2 solubility coefficient in sea water (Weiss, 1974).

The meteorological data was obtained from Fernando de Noronha at National institute of space research, INPE.


Season
Dry
Wet
pH total scale
8.8
8.6
8.4
8.2
8.0
7.8
Temperature (°C)
32
31
30
29
28
27
26
25
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
time

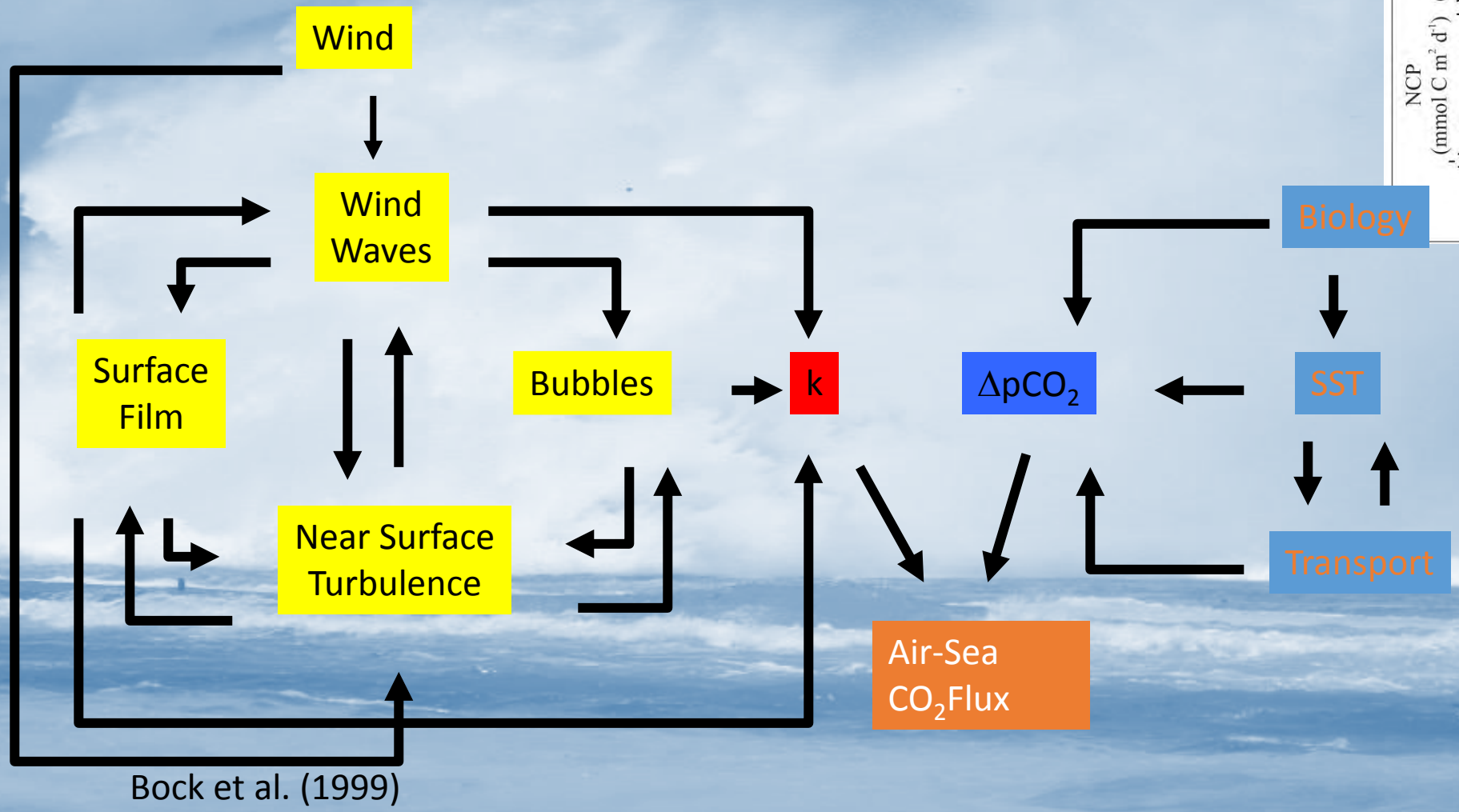

Season
Dry
Wet
TA umol kg-1sw
2600
2500
2400
2300
2200
2100
Salinity
37.0
36.0
35.0
34.0
33.0
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
time


Season
Dry
Wet
DIC umol kg-1 sw
2200
2000
1800
1600
1400
1200
pCO2 uatm
500
400
300
200
100
0
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
time

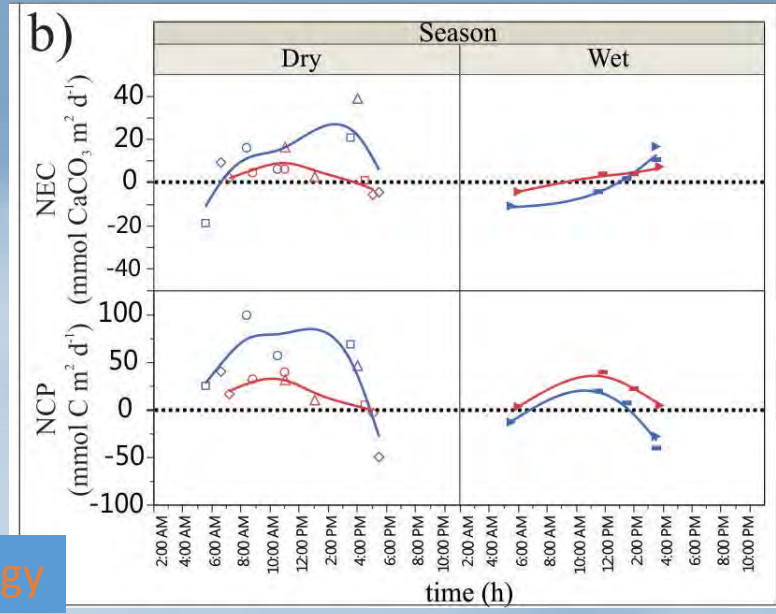


The fluxes variability were influenced by the lower values of temperature and higher wind velocity at the dry season

Factors influencing CO_2 flux estimates



Bock et al. (1999)



Net ecosystem calcification (NEC) and net community production (NCP) measured during dry and wet season at the Rocas Atoll (Pinheiro et al, submitted)

Aknowledgements

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CAPES
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