

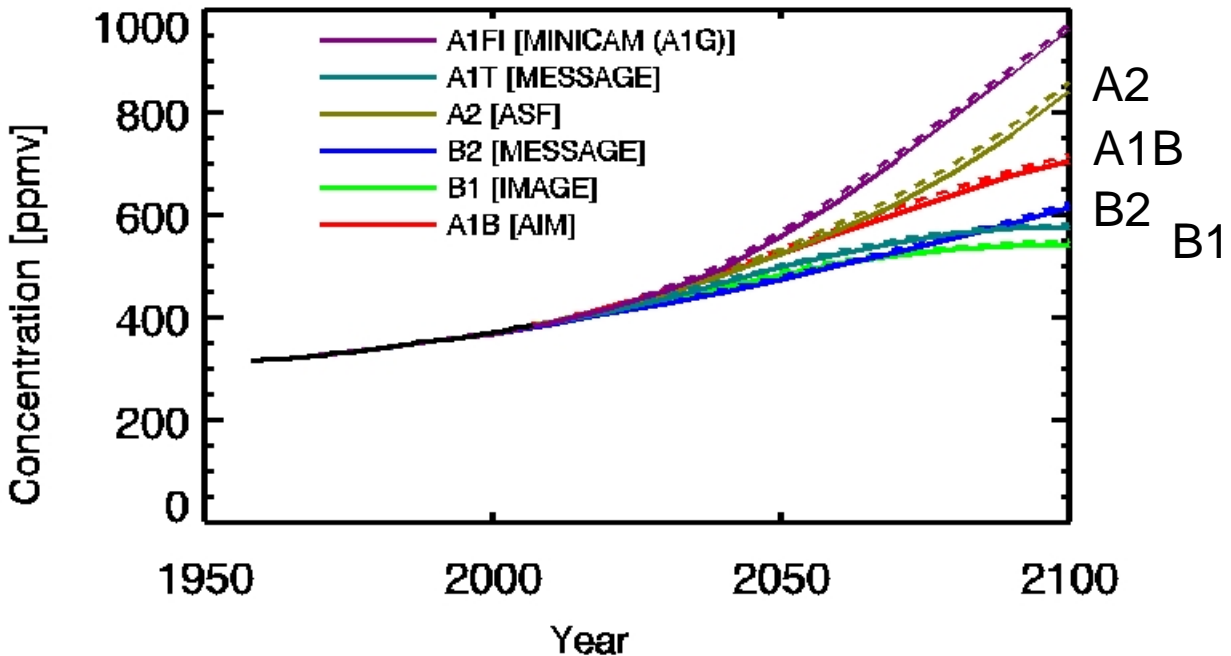
Scenarios (Climate Change & Acidification), Global Climate & Biogeochemical Simulations, Forcings, Initial Conditions, Boundary Conditions

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(LSCE/IPSL, Paris – LPO, Brest)

1. Scenarios

IPCC AR4 Scenarios

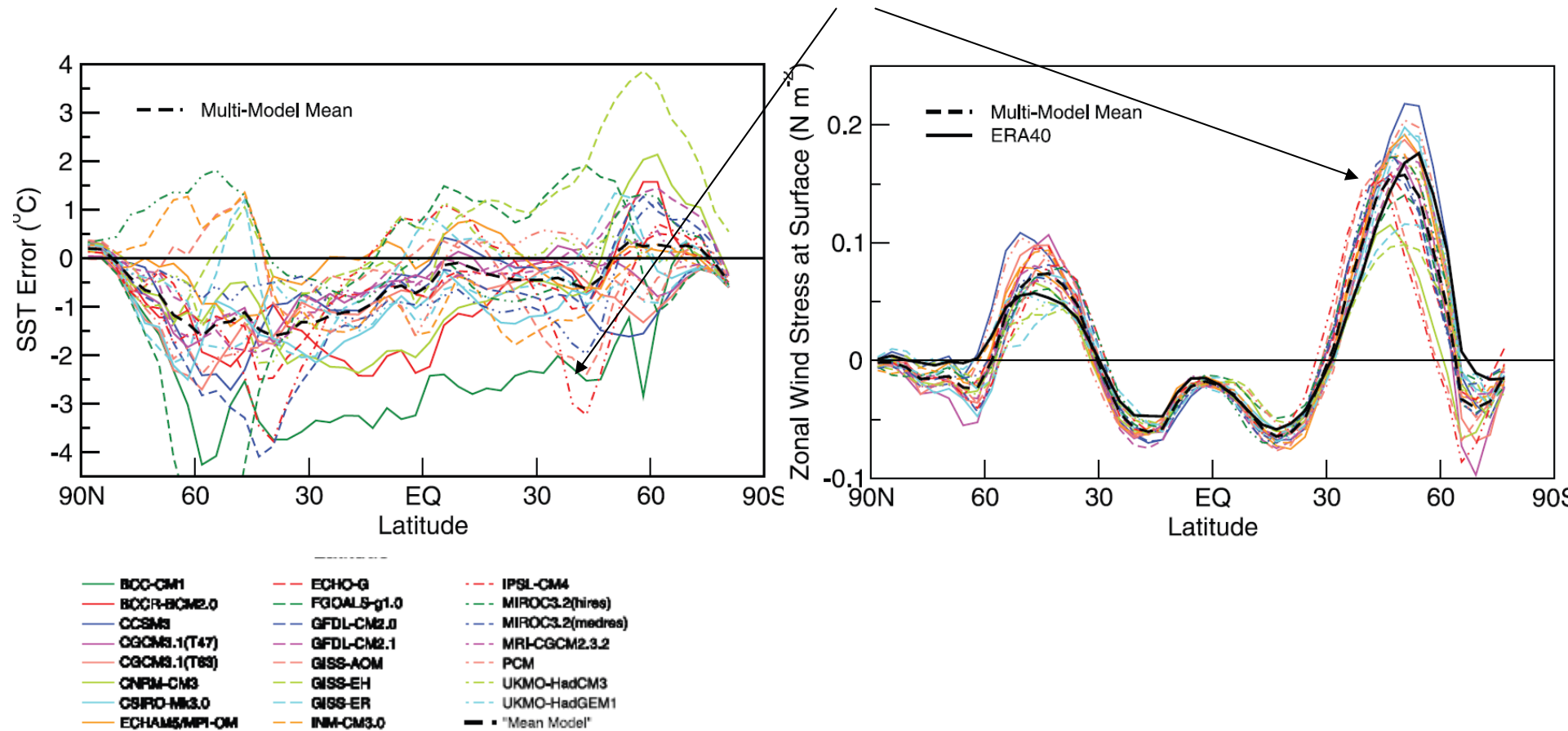


IPCC AR5 – RCPs (Representative Concentration Pathways) : about to be ready...

2. Climate Model & Simulations

... IPSL-CM4-v1 (LMDZ - OPA - LIM)

- Participation to IPCC- AR4 : simulations available at IPSL, at PCMDI
- Coarse resolution in the atmosphere : $4^\circ \times 2.5^\circ$
- Some identified biases



... **IPSL-CM4-v2** (LMDZ - OPA - LIM)

- Developed for **FP6-ENSEMBLE** project – Stream 2
- Same physics than previously, finer resolution in the atm. (2.5°x1.5°)
- Biases partly improved

Simulations Available :

- Historical Period (1860-2000) : Ensemble of 3 members
(LU20C1, LU20C2, LU20C3)

- Scenarios (2000-2100):

... A1B :

3 members (LUA1B1, LUA1B2, LUA1B3)

... E1 (Stabilisation à 450ppm)

3 members (LUE1R1, LUE1R2, LUE1R3)

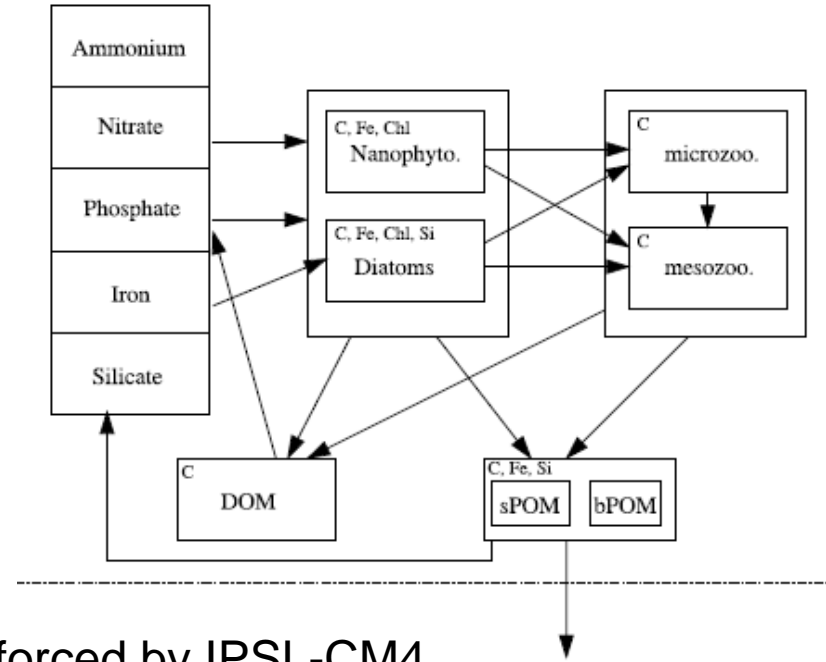
... A2 : Run specially for MEECE (1 member, LUA2R2)

... **IPSL-CM5-v1** : still under development, for AR5

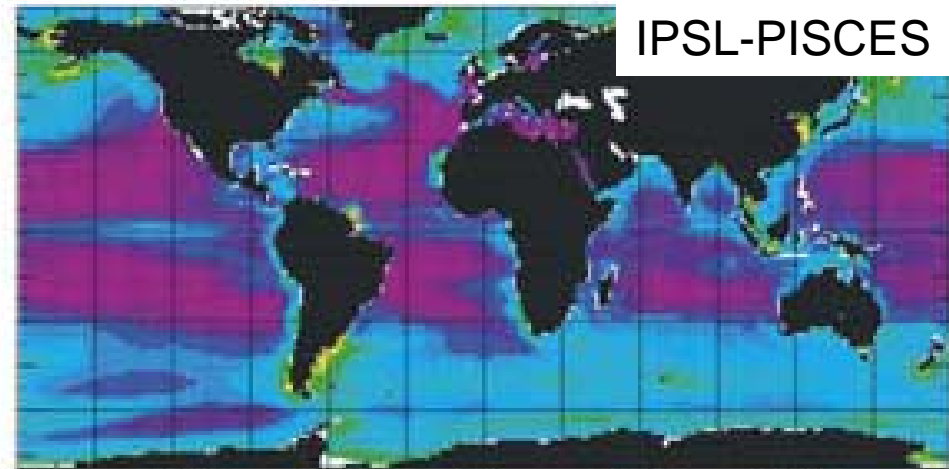
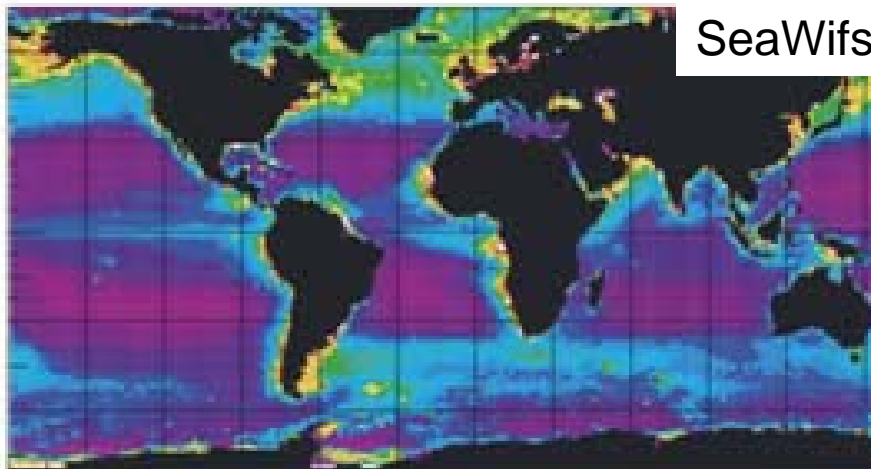
3. Biogeochemical Model and Simulations

-PISCES Model
(Aumont and Bopp, 2006 for a description)

Nutrients : NO₃, NH₄, PO₄, Fe, Si
Phytoplankton : Nano & Diatoms
Zooplankton : Micro- & Meso-
Dissolved Organic Matter
Particles : 2xOM, CaCO₃, BSi
Carbon, Oxygen, Alkalinity, pH,

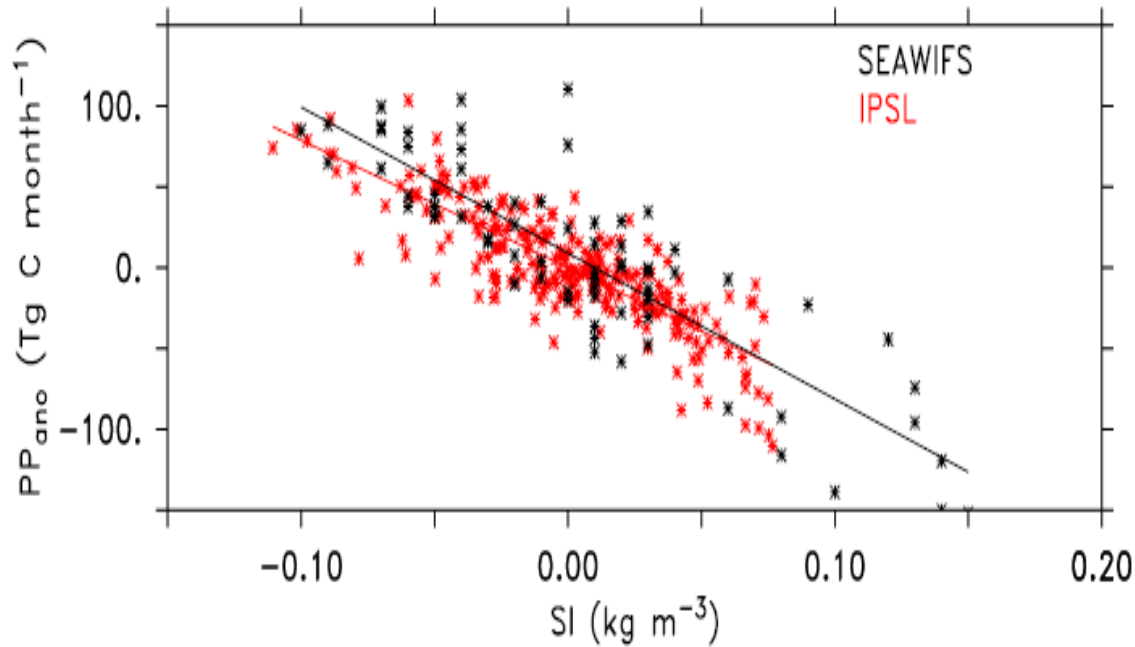


- Already used for climate scenarios and forced by IPSL-CM4



3. Biogeochemical Model and Simulations

- Interannual variability (Schneider et al. 2008):



3. Biogeochemical Model and Simulations

- Interannual variability (e.g. Schneider et al. 2008):
- Impact of Climate Change (e.g. Bopp et al. 2005)

Climate Change



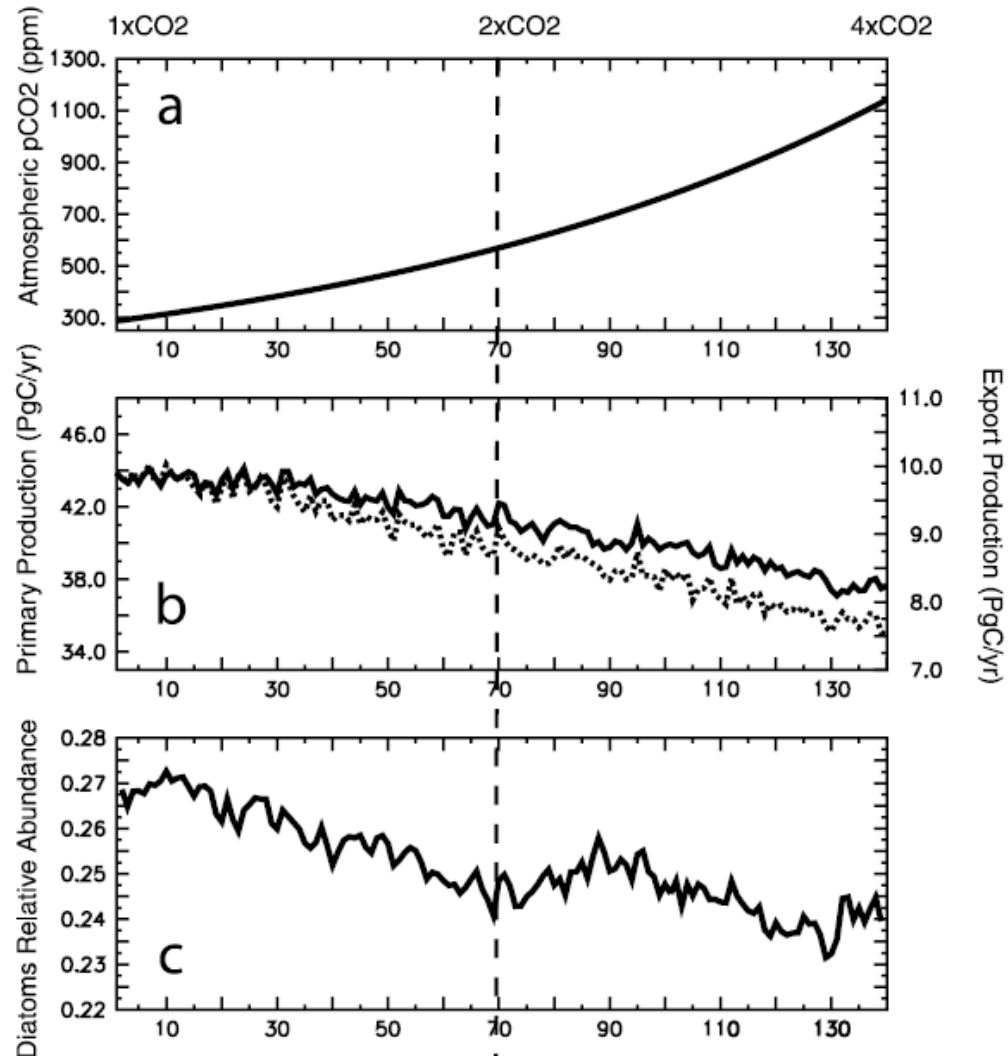
More Stratification



Less Nutrient,
but More light

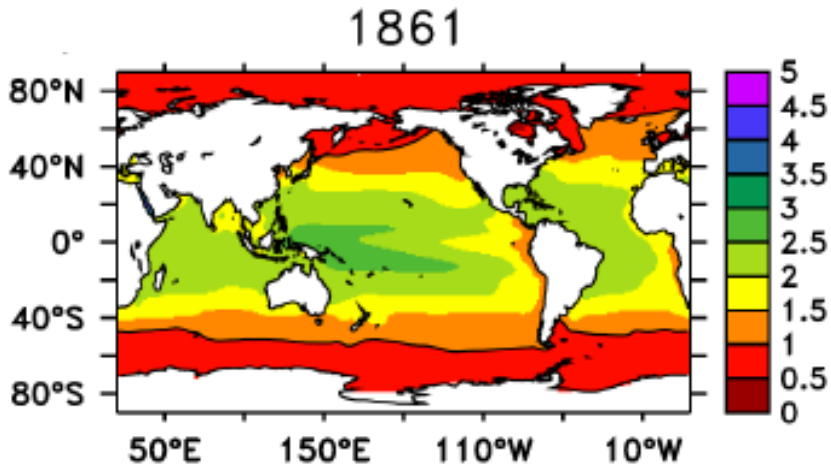
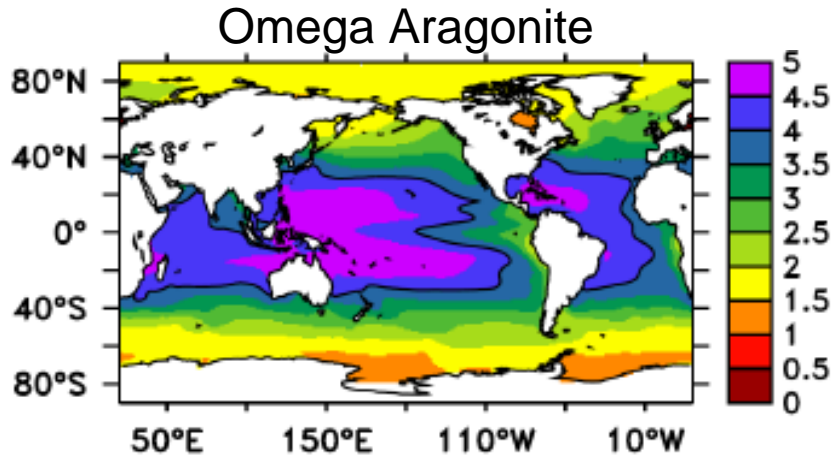


More Production at mid- and high-lat
Less Production in the tropics

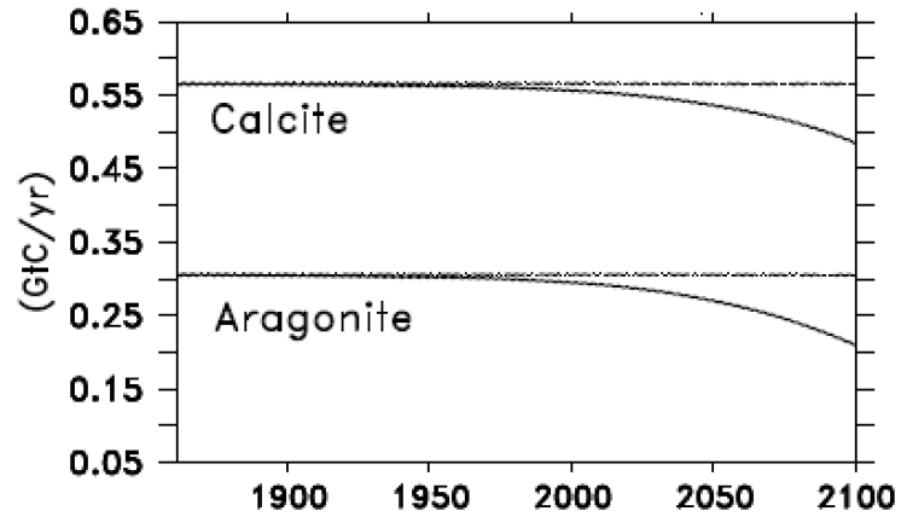


3. Biogeochemical Model and Simulations

- Interannual variability (e.g. Schneider et al. 2008):
- Impact of Climate Change (e.g. Bopp et al. 2005)
- Ocean Acidification (Gehlen et al. 2007, Gangsto et al. 2008)



Changes of Calcite & Aragonite Production



3. Biogeochemical Model and Simulations

-PISCES simulations run for MEECE

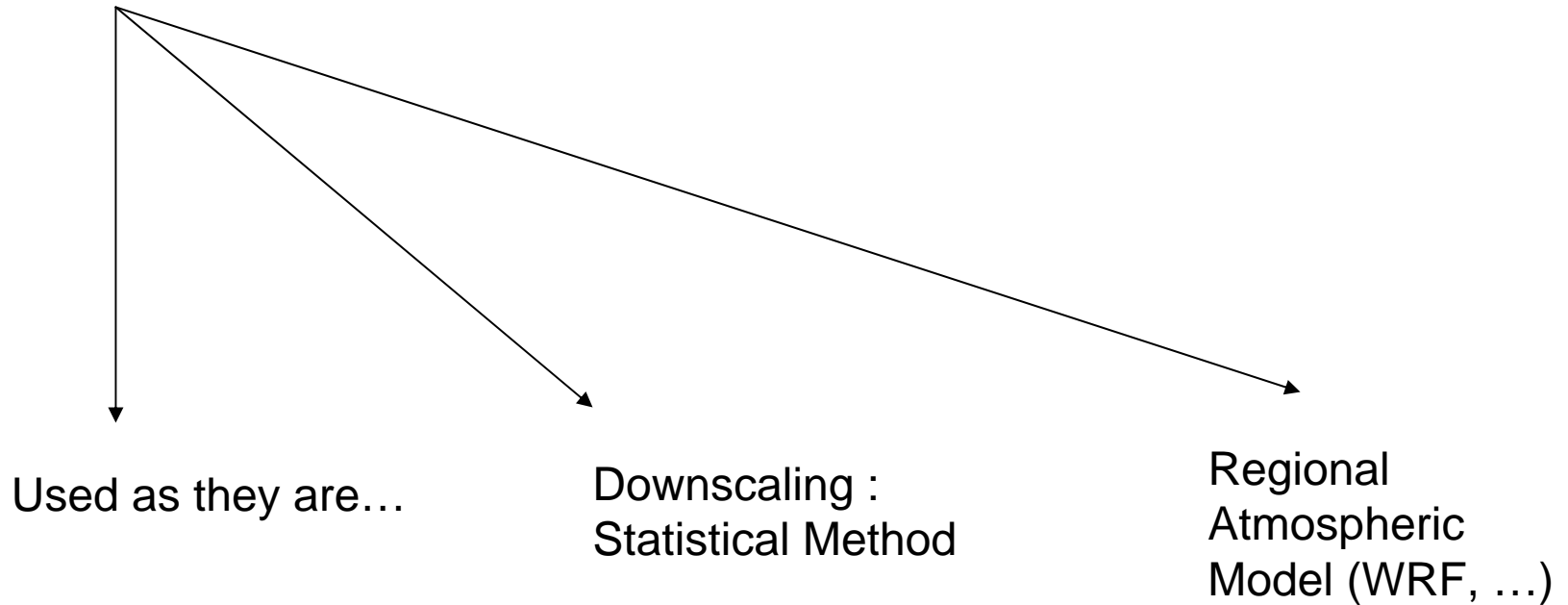
-Simulations Available (Transient from 1860-2100) forced by IPSL-CM4-v2:

- | | |
|---------------------|------------------|
| - Historical Period | : LU20C2, LU20C3 |
| - Scenarios : A1B | : LUA1B2, LUA1B3 |
| E1 | : LUE1R2 |
| A2 | : LUA2R2 |

-Currently under analysis but can be used for initial conditions
& boundary forcings

4. Forcings, Initial and Boundary Conditions

Global Simulations
(Winds, Air temperature, Precip.,)



4. Forcings, Initial and Boundary Conditions

Global Simulations
(Winds, Air temperature, Precip.,)

Historical Period : LU20C2

Simulation LU20C2. - Mozilla Firefox

http://mc2.ipsl.jussieu.fr/PHP/ensembles.php?exp=LU20C2

Sciences de l'environnement

INSTITUT PIERRE SIMON LAPLACE
DES SCIENCES DE L'ENVIRONNEMENT

MC2 HOMEPAGE SCÉNARIOS IPCC CLIMAT CARBONE ENSEMBLES EXTRÊMES SOFTWARE ANIMATIONS TEXTES LIENS

SCÉNARIIS VARIABLES LES DONNÉES

MONITORING, FILES AND ATLAS ACCESS :

[CDT5y2CT] [prologue] [PatchLU] [PatchPhy] [LUS20C1] [LUS20C2] [LUS20C3] [LU20C1] [LU20C2] [LU20C3] [NOLU20C1] [LUBASE1] [LUE1R1] [LUE1R2] [LUE1R3] [LUA1B1] [LUA1B2] [LUA1B3]

Monitoring, files and atlas access : simulation LU20C2 (1850 ---> 1999)

Simulation with IPSLCM4_v2 model. Resolution ORCA 2 × LMD 144×142×19 realized at IPSL.

- Monitoring ([1D plots](#))
- Time series

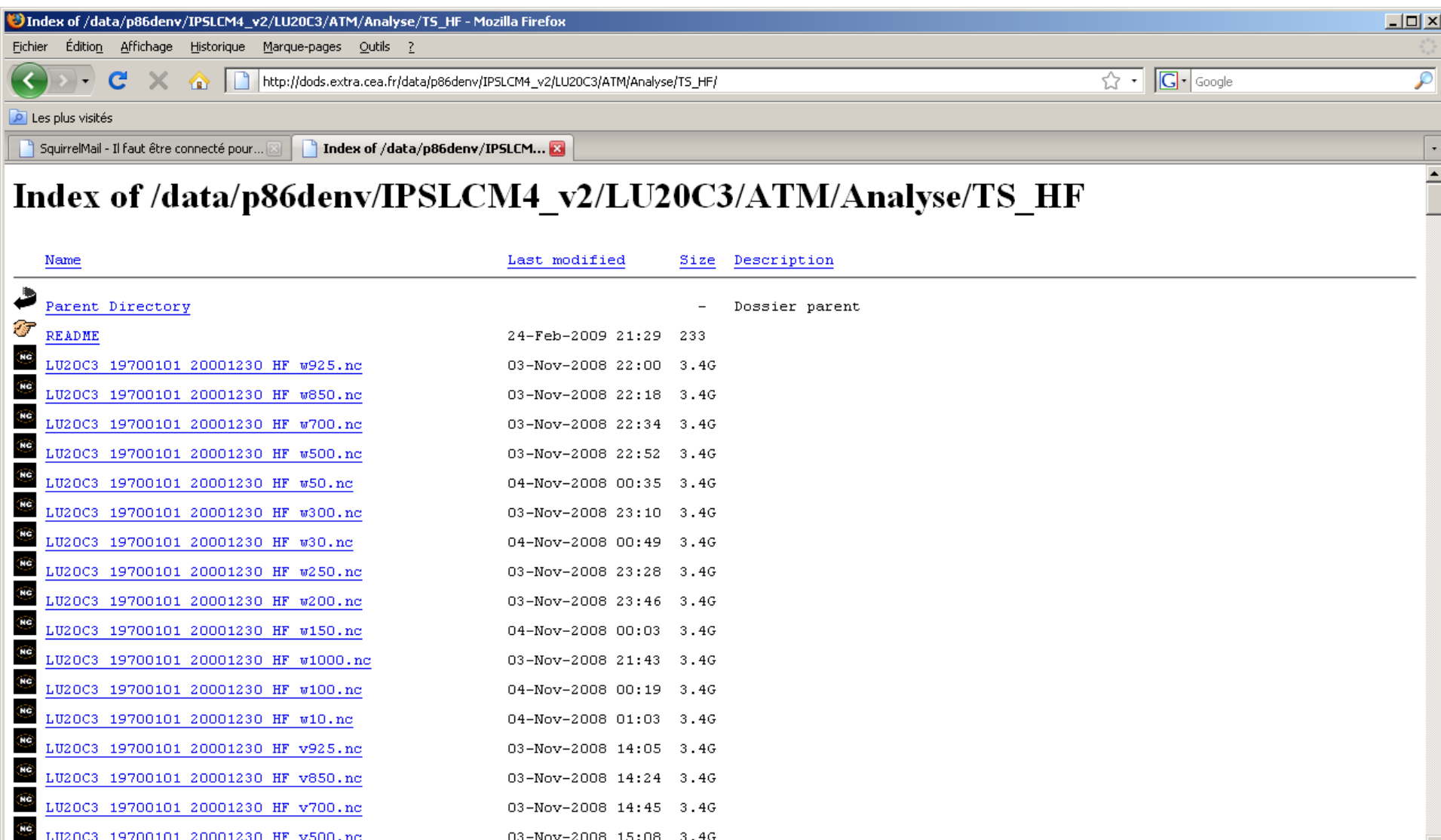
Time series	Components			
1xYearly	Atmosphere	Surface	Ocean	Ice
1xMonthly	Atmosphere	Surface	Ocean	Ice
1xDaily	Atmosphere	Surface	Ocean	Ice
4xDaily	Atmosphere	Surface	Ocean	Ice

Terminé

4. Forcings, Initial and Boundary Conditions

Global Simulations
(Winds, Air temperature, Precip.,)

Historical Period : LU20C3



The screenshot shows a Mozilla Firefox browser window with the address bar containing the URL: http://dods.extra.cea.fr/data/p86denv/IPSLCM4_v2/LU20C3/ATM/Analyse/TS_HF/. The browser's title bar reads "Index of /data/p86denv/IPSLCM4_v2/LU20C3/ATM/Analyse/TS_HF - Mozilla Firefox". The main content area displays a directory listing for "Index of /data/p86denv/IPSLCM4_v2/LU20C3/ATM/Analyse/TS_HF".

Name	Last modified	Size	Description
Parent Directory		-	Dossier parent
README	24-Feb-2009 21:29	233	
LU20C3_19700101_20001230_HF_w925.nc	03-Nov-2008 22:00	3.4G	
LU20C3_19700101_20001230_HF_w850.nc	03-Nov-2008 22:18	3.4G	
LU20C3_19700101_20001230_HF_w700.nc	03-Nov-2008 22:34	3.4G	
LU20C3_19700101_20001230_HF_w500.nc	03-Nov-2008 22:52	3.4G	
LU20C3_19700101_20001230_HF_w50.nc	04-Nov-2008 00:35	3.4G	
LU20C3_19700101_20001230_HF_w300.nc	03-Nov-2008 23:10	3.4G	
LU20C3_19700101_20001230_HF_w30.nc	04-Nov-2008 00:49	3.4G	
LU20C3_19700101_20001230_HF_w250.nc	03-Nov-2008 23:28	3.4G	
LU20C3_19700101_20001230_HF_w200.nc	03-Nov-2008 23:46	3.4G	
LU20C3_19700101_20001230_HF_w150.nc	04-Nov-2008 00:03	3.4G	
LU20C3_19700101_20001230_HF_w1000.nc	03-Nov-2008 21:43	3.4G	
LU20C3_19700101_20001230_HF_w100.nc	04-Nov-2008 00:19	3.4G	
LU20C3_19700101_20001230_HF_w10.nc	04-Nov-2008 01:03	3.4G	
LU20C3_19700101_20001230_HF_v925.nc	03-Nov-2008 14:05	3.4G	
LU20C3_19700101_20001230_HF_v850.nc	03-Nov-2008 14:24	3.4G	
LU20C3_19700101_20001230_HF_v700.nc	03-Nov-2008 14:45	3.4G	
LU20C3_19700101_20001230_HF_v500.nc	03-Nov-2008 15:08	3.4G	

4. Forcings, Initial and Boundary Conditions

Global Simulations
(Winds, Air temperature, Precip.,)

Historical Period : LU20C3

Index of /data/p86denv/IPSLCM4_v2/LU20C3/ATM/Analyse/TS_HF

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README	24-Feb-2009 21:29	233	
LU20C3_19700101_20001230_HF_w925.nc	03-Nov-2008 22:00	3.4G	
LU20C3_19700101_20001230_HF_w850.nc	03-Nov-2008 22:10	3.4G	
LU20C3_19700101_20001230_HF_w700.nc	03-Nov-2008 22:10	3.4G	
LU20C3_19700101_20001230_HF_w500.nc	03-Nov-2008 22:10	3.4G	
LU20C3_19700101_20001230_HF_w150.nc	04-Nov-2008 00:03	3.4G	
LU20C3_19700101_20001230_HF_w1000.nc	03-Nov-2008 21:43	3.4G	
LU20C3_19700101_20001230_HF_w100.nc	04-Nov-2008 00:19	3.4G	
LU20C3_19700101_20001230_HF_w10.nc	04-Nov-2008 01:03	3.4G	
LU20C3_19700101_20001230_HF_v925.nc	03-Nov-2008 14:05	3.4G	
LU20C3_19700101_20001230_HF_v850.nc	03-Nov-2008 14:24	3.4G	
LU20C3_19700101_20001230_HF_v700.nc	03-Nov-2008 14:45	3.4G	
LU20C3_19700101_20001230_HF_v500.nc	03-Nov-2008 15:08	3.4G	

Surface Temperature at 2m, every 6h from 1970 to 2000

[LU20C3_19700101_20001230_HF_t2m.nc](#) (3.4G)

4. Forcings, Initial and Boundary Conditions

Biogeochemical Simulations

(pH [DIC, Alk], O₂, nutrients,)

→ Monthly means available for 1860-2100 and all simulations.

.... Decadal means ?

Or/and Time series (annual means, monthly means) ?

.... On the original irregular grid ? Or interpolated on a regular grid ?

... which periods ?

1980-2010 ?

2040-2049 ?

2090-2099 ?

.. Which scenarios is prioritized ? A1B, A2, ...?

5. Uncertainties?

Climate:

IPCC database

Biogeochemistry

-Simulations done for FP6-Euroceans / FP7-EPOCA:

- 1 scenario (A2)
- 4 models
 - IPSL-PISCES
 - NCAR
 - Bergen Coupled Model
 - MPI

-Data available on a dedicated dods server