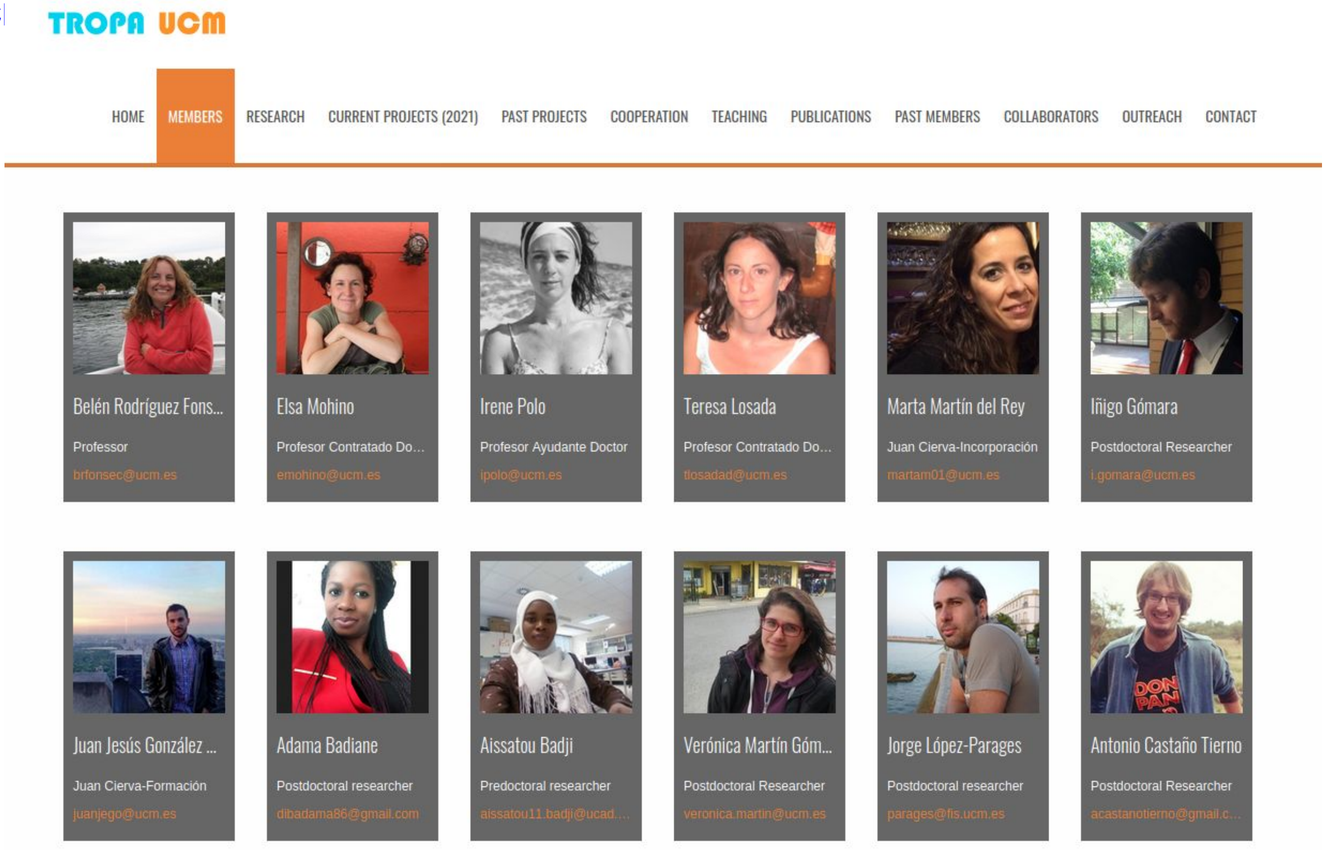
Analysing CMIP in smallgroups (TBC)

A CONTRIBUTION FROM **TROPA & STREAM** UCM- groups

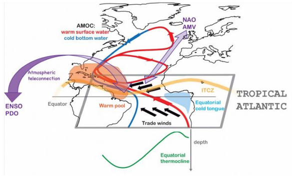
Description of Groups

TROPA: Tropical Climate Variability and Teleconnections

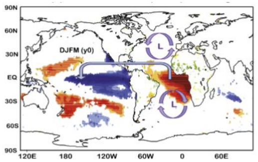
Web: http://tropa.fis.uc



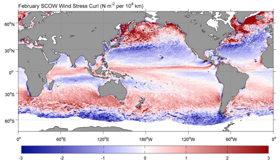
TROPA: lines of research



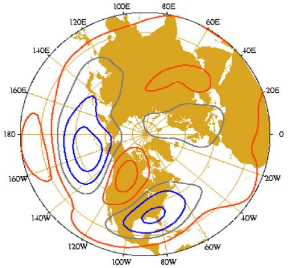
Air-Sea interactions & Tropical Atlantic Variability



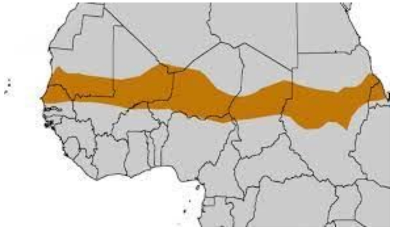
Tropical Interbasin connections



Ocean upwelling and impact on marine ecosystems and fisheries



Tropical-extratropical atmospheric teleconnections. European and Sahelian rainfall

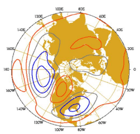


West African Monsoon. Interannual to decadal variability of Sahelian rainfall

Impacts of climate variability on agricultural production, crop yield variability, energy,public health

papers related to CMIP analysis

CMIP3



Clim Dyn (2015) 44:2989–3014
DOI 10.1007/s00382-014-2367-2

CrossMark

Evaluation of observed and simulated teleconnections over the Euro-Atlantic region on the basis of partial least squares regression

N. Gonzalez-Reviriego · C. Rodriguez-Puebla · B. Rodriguez-Fonseca

Received: 24 January 2014 / Accepted: 6 October 2014 / Published online: 22 October 2014

papers related to CMIP analysis

CMIP5

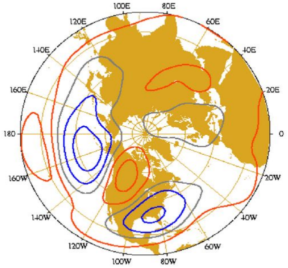
Clim Dyn (2015) 45:867–880
DOI 10.1007/s00382-014-2319-x

CrossMark

A mechanism for the multidecadal modulation of ENSO teleconnection with Europe

Jorge López-Parages · Belén Rodríguez-Fonseca · Laurent Terray

Received: 7



Multidecadal Modulation of ENSO Teleconnection with Europe in Late Winter: Analysis of CMIP5 Models

JORGE LÓPEZ PARAGES, BELÉN RODRÍGUEZ DE FONSECA,[a] ELSA MOHINO,[b] AND TERESA LOSADA[a]

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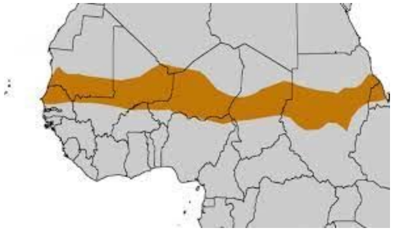

SPECIAL
GDIS Drought Worldwide
COLLECTION

Variability and Predictability of West African Droughts: A Review on the Role of Sea Surface Temperature Anomalies

BELEN RODRÍGUEZ-FONSECA,[a] ELSA MOHINO,[b] CARLOS R. MECHOSO,[c] CYRIL CAMINADE,[d]
MICHELA BIASUTTI,[e] MARCO GAETANI,[f] J. GARCIA-SERRANO,[g] EDWARD K. VIZY,[h]
KERRY COOK,[h] YONGKANG XUE,[c] IRENE POLO,[i] TERESA LOSADA,[j] LEONARD DRUYAN,[k]
BERNARD FONTAINE,[l] JUERGEN BADER,[m] FRANCISCO J. DOBLAS-REYES,[n]
LISA GODDARD,[o] SERGE JANICOT,[p] ALBERTO ARRIBAS,[q] WILLIAM LAU,[r]
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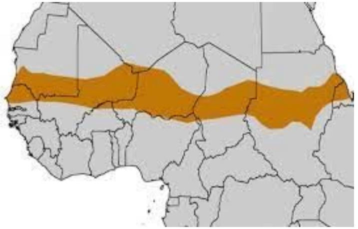
papers related to CMIP analysis

CMIP5



7708 JOURNAL OF CLIMATE VOLUME 26

Decadal Prediction of the Sahelian Precipitation in CMIP5 Simulations

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(Manuscript received 11 September 2012, in final form 8 March 2013)

Climate Dynamics (2020) 55:2801–2821
https://doi.org/10.1007/s00382-020-05417-w

Check for updates

Future evolution of the Sahel precipitation zonal contrast in CESM1

Paul-Arthur Monerie[1] · Emilia Sanchez-Gomez[2] · Marco Gaetani[3] · Elsa Mohino[4] · Buwen Dong[1]

Received: 13 February 2020 / Accepted: 7 August 2020 / Published online: 17 August 2020

AGU PUBLICATIONS

Geophysical Research Letters

RESEARCH LETTER
10.1002/2014GL062473

Robust Sahel drought due to the Interdecadal Pacific Oscillation in CMIP5 simulations

Julián Villamayor[1] and Elsa Mohino[1]

[1]Departamento de Física de la Tierra, Astronomía y Astrofísica I, Universidad Complutense de Madrid, Madrid, Spain

Key Points:
- Observed negative impact of IPO on Sahel rainfall supported by CMIP5
- IPO and Sahel rainfall relationship independent of anthropogenic gases forcing
- Skillful simulation of IPO is important to improve decadal prediction of Sahel

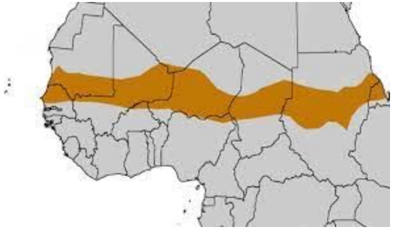
Supporting Information:
- Table S1 and Figures S1–S10

Abstract Many studies address the Interdecadal Pacific Oscillation (IPO) as a modulator of climate in several regions all over the globe. However, very few suggest that it has an impact on Sahel rainfall low-frequency variability. This work shows the relevance of such connection, supported by a robust response of state-of-the-art global climate models, involved in the Coupled Model Intercomparison Project Phase 5 (CMIP5). Our results reveal that the positive phase of the IPO has a negative impact on Sahel rainfall anomalies regardless of the externally forced changes induced by anthropogenic gases. Such relationship is stronger for those models in

Clim Dyn (2018) 50:4481–4506
DOI 10.1007/s00382-017-3886-4

CrossMark

Impact of dynamical regionalization on precipitation biases and teleconnections over West Africa



Iñigo Gómara[1,2,3] · Elsa Mohino[1] · Teresa Losada[1] · Marta Domínguez[1,2] · Roberto Suárez-Moreno[1,2] · Belén Rodríguez-Fonseca[1,2]

Received: 11 April 2017 / Accepted: 24 August 2017 / Published online: 6 September 2017

Clim Dyn (2018) 51:563–579
DOI 10.1007/s00382-017-3941-1

Influence of decadal sea surface temperature variability on northern Brazil rainfall in CMIP5 simulations

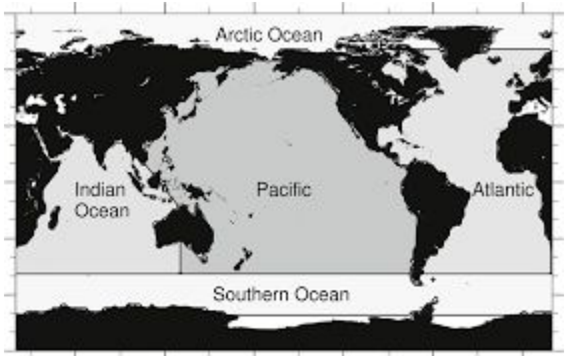
Julián Villamayor[1,2] · Tércio Ambrizzi[3] · Elsa Mohino[1]

Received: 14 October 2016 / Accepted: 26 September 2017 / Published online: 11 October 2017

papers related to CMIP analysis

CMIP5

PREFACE



AGU100 ADVANCING EARTH AND SPACE SCIENCE

Geophysical Research Letters

RESEARCH LETTER
10.1029/2018GL079847

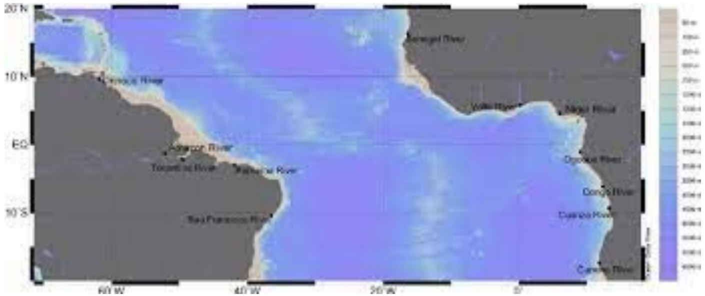
Key Points:
- The equatorial thermocline should be computed as the maximum vertical thermal gradient. The 20 °C isotherm shows different depth and slope
- The 20 °C isotherm depth is too dependent on model sea surface temperature bias in the eastern Pacific
- Thermocline depth is more sensitive

Revisiting the CMIP5 Thermocline in the Equatorial Pacific and Atlantic Oceans

A. Castaño-Tierno[1,2], E. Mohino[1], B. Rodríguez-Fonseca[1,2], and T. Losada[1,2]

[1]Department of Physics of the Earth and Astrophysics, Universidad Complutense de Madrid, Madrid, Spain, [2]Institute of Geosciences, Madrid, Spain

Abstract The thermocline is defined as the ocean layer for which the vertical thermal gradient is maximum. In the equatorial ocean, observations led to the use of the 20 °C isotherm depth (z20) as an estimate of the thermocline. This study compares z20 against the physical thermocline in the equatorial



Relationships among Intermodel Spread and Biases in Tropical Atlantic Sea Surface Temperatures

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(Manuscript received 12 December 2018, in final form 22 March 2019)

STREAM: **Stratospheric and Tropospheric REsearch And Modeling**

Web: http://stream-ucm.es/

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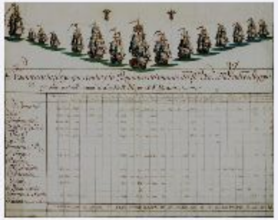
STREAM: lines of research

Stratospheric Dynamics (Middle Atmosphere)

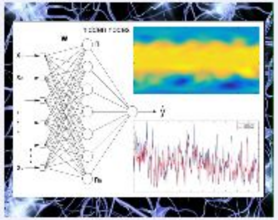
Tropospheric Climate Variability and Change



Climate Reconstruction

Extreme Events

Atmospheric Composition and Dynamics



Machine Learning Methods

papers related to CMIP analysis

CMIP5

15 April 2020 KELLEHER ET AL. 3079

Interseasonal Connections between the Timing of the Stratospheric Final Warming and Arctic Sea Ice

Michael E. Kelleher[a]
University of Exeter, Exeter, United Kingdom

Blanca Ayarzagüena
Universidad Complutense de Madrid, and Instituto de Geociencias, Centro Mixto CSIC-UCM, Madrid, Spain

James A. Screen
University of Exeter, Exeter, United Kingdom

(Manuscript received 23 January 2019, in final form 26 November 2019)

Journal of Climate

Papers related to CMIP analysis

CMIP5

Northern Hemisphere Stratospheric Pathway of Different El Niño Flavors in Stratosphere-Resolving CMIP5 Models

N. Calvo,[a] M. Iza,[a] M. M. Hurwitz,[b,c,j] E. Manzini,[d] C. Peña-Ortiz,[e] A. H. Butler,[f] C. Cagnazzo,[g] S. Ineson,[h] and C. I. Garfinkel[i]

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(Manuscript received 12 February 2016, in final form 9 February 2017)

ABSTRACT

The Northern Hemisphere (NH) stratospheric signals of eastern Pacific (EP) and central Pacific (CP) El Niño events are investigated in stratosphere-resolving historical simulations from phase 5 of the Coupled Model Intercomparison Project (CMIP5), together with the role of the stratosphere in driving tropospheric El Niño teleconnections in NH climate. The large number of events in each composite addresses some of the

papers related to CMIP analysis

The Brewer-Dobson circulation in CMIP6

Marta Abalos[1], Natalia Calvo[1], Samuel Benito-Barca[1], Hella Garny[2], Steven C. Hardiman[3], Pu Lin[4,5], Martin B. Andrews[6], Neal Butchart[6], Rolando Garcia[7], Clara Orbe[8], David Saint-Martin[9], Shingo Watanabe[10], and Kohei Yoshida[11]

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Received: 08 Mar 2021 – Accepted for review: 28 Mar 2021 – Discussion started: 29 Mar 2021

JGR Atmospheres

RESEARCH ARTICLE

10.1029/2019JD032345

Uncertainty in the Response of Sudden Stratospheric Warmings and Stratosphere-Troposphere Coupling to Quadrupled CO_2 Concentrations in CMIP6 Models

B. Ayarzagüena[1], A. J. Charlton-Perez[2], A. H. Butler[3], P. Hitchcock[4], I. R. Simpson[5], L. M. Polvani[6], N. Butchart[7], E. P. Gerber[8], L. Gray[9], B. Hassler[10], P. Lin[11], F. Lott[12], E. Manzini[13], R. Mizuta[14], C. Orbe[15], S. Osprey[9], D. Saint-Martin[16], M. Sigmond[17], M. Taguchi[18], E. M. Volodin[19], and S. Watanabe[20]

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Key Points:

- The tropospheric signal of sudden stratospheric warming (SSWs) in the North Atlantic does not change under 4xCO_2 forcing
- There is high uncertainty in changes of SSW frequency under 4xCO_2 forcing; single models show the rate to be significantly halved or doubled
- The boreal polar vortex will form earlier and disappear later under increased CO_2, extending the season of stratosphere-troposphere coupling

Supporting Information:

- Supporting Information S1

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Citation:
Ayarzagüena, B., Charlton-Perez, A. J., Butler, A. H., Hitchcock, P., Simpson, I. R., Polvani, L. M., et al. (2020).

Climatic Change (2021) 165:50
https://doi.org/10.1007/s10584-021-03086-0

Impact of climate change on Spanish electricity demand

Jose M. Garrido-Perez [1,2] · David Barriopedro [2] · Ricardo García-Herrera [1,2] ·
Carlos Ordóñez [1]

Environmental Research 186 (2020) 109447

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Temperature-related excess mortality in German cities at 2 °C and higher degrees of global warming

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Weather Clim. Dynam., 1, 277–292, 2020
https://doi.org/10.5194/wcd-1-277-2020

Northern Hemisphere blocking simulation in current climate models: evaluating progress from the Climate Model Intercomparison Project Phase 5 to 6 and sensitivity to resolution

Reinhard Schiemann[1], Panos Athanasiadis[2], David Barriopedro[3], Francisco Doblas-Reyes[4,5], Katja Lohmann[6], Malcolm J. Roberts[7], Dmitry V. Sein[8,9], Christopher D. Roberts[10], Laurent Terray[11], and Pier Luigi Vidale[1]

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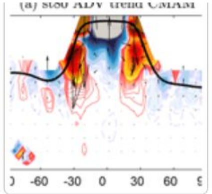
papers using CCMI (Chemistry-Climate Model Intercomparison project) analysis

Future trends in stratosphere-to-troposphere transport in CCMI models



Marta Abalos[1], Clara Orbe[2], Douglas E. Kinnison[3], David Plummer[4], Luke D. Oman[5], Patrick Jöckel[6], Olaf Morgenstern[7], Rolando R. Garcia[3], Guang Zeng[7], Kane A. Stone[8,9,a], and Martin Dameris[6]

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Atmos. Chem. Phys., 18, 11277–11287, 2018
https://doi.org/10.5194/acp-18-11277-2018

Atmospheric Chemistry and Physics
Open Access
EGU

No robust evidence of future changes in major stratospheric sudden warmings: a multi-model assessment from CCMI

Blanca Ayarzagüena[1,2,a], Lorenzo M. Polvani[3], Ulrike Langematz[4], Hideharu Akiyoshi[5], Slimane Bekki[6], Neal Butchart[7], Martin Dameris[8], Makoto Deushi[9], Steven C. Hardiman[7], Patrick Jöckel[8], Andrew Klekociuk[10,11], Marion Marchand[6], Martine Michou[12], Olaf Morgenstern[13], Fiona M. O'Connor[7], Luke D. Oman[14], David A. Plummer[15], Laura Revell[16,17], Eugene Rozanov[18,16], David Saint-Martin[12], John Scinocca[15], Andrea Stenke[16], Kane Stone[19,20,b], Yousuke Yamashita[5,c], Kohei Yoshida[9], and Guang Zeng[13]

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How does a small group deal with CMIP simulations?

- How do we download the data?
- Where do we storage the data?
- Which software do we use?
- How do we pre-proccess the data?

 problems??

How do we download the data?

-Normally we download to our **local systems**. Currently TROPA has an account in JASMIN.

-For **CMIP3, CMIP5**: we created a shell script for selected variables, downloading the data

-**CMIP6**: we used the “wget script” available in the CMIP6 web site. We download it from ESGF

note: apart from CMIP, some of us have worked with other intercomparison projects as FISHMIP, CCMI, CORDEX, NMME etc..

PROBLEMS WITH THE DOWNLOADING and READING

-SPACE…we need space for storaging

Some groups have racks or mass storage systems.

Otherwise, we work with hard disks

-RAM: One of the big problems is to open a very large file when working on daily data...it can be opened but there is a RAM limitation (Matlab lets you open it for a while).

Which software do we use?

-We **visualize** the data with ncview, panoply, GrADs, python, Matlab, R etc..

-After downloading the data, we use **MATLAB, R, Python** for the pre-processing...sometimes **GrADS**

-**CDO** is used by most of us for **re-gridding** & calculating **seasonal averages ,** selecting regions , defining indices (NAO, Niño3, SOI)

-For other calculations (Creation of indices, EOF, SVD, regression maps, correlation maps, variance analysis etc..), MATLAB, Python , R

-Some people use **IDL** or **NCL**

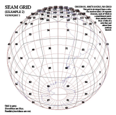
How do we pre-process the data?

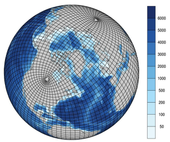
-We agree that the preprocessing should be equal for all groups (problems with the re-gridding algorithm, interpolation, problems with the units for avoiding misleading preprocessing due to some particular differences in particular models, problems with calendar months)

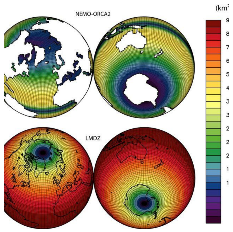
Identification of Problems

PROBLEMS:

- Ocean grids







- Interpolation algorithms

- vertical levels (ocean-atmosphere)

- Calendar: When you work with daily data, British models have 360 years and others have 365 years and others have Gregorian calendar.

  The time label does not always correspond (maybe January 31 is already February 1).

  Leap years

  etc..

  - offset and scale factor are sometimes a problem, as some programs take them into account directly and others not.

SOME VARIABLES ARE NEEDED

-Eddy fluxes

-thermocline depth

-Components of the ocean heat budget

.TEM variables: “transform eulerian mean” (as BD circulation, in CMIP6 DYNVAR)

. velocity potential, stream function.

SUGGESTION FOR A TOOL: A direct way to see which models have some variables (automatized)

WE HAVE CREATED SOME TOOLS

- Eliassen Palm Flux
- Calculation of the AMOC for all models
- Calculation of the thermocline depth as the depth for maximum gradient
- heat budget

- Principal Component to group models
- Hovmöller diagrams for multidecadal modulations
- cluster analysis (k-means)