

US CLIVAR Working Group on Large Ensembles

The Large Ensembles Workshop

July 24 – 26, 2019

Boulder, Colorado



Credit: F. Lehner

115+ Participants (42 early career)

Diverse backgrounds:

atmosphere, ocean, land, biogeochemistry,
air quality, health, economics, statistics.

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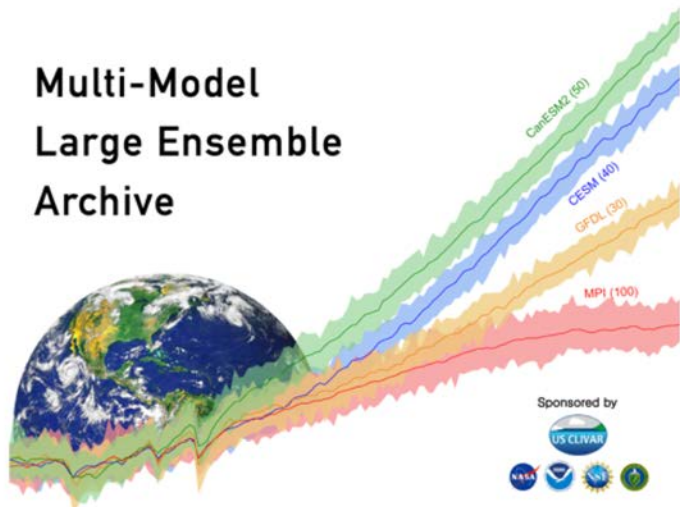
Why are we here?

- to exchange knowledge and ideas
- to foster new research directions and collaborations
- to inform a coordinated strategy for Large Ensembles

The Multi-Model Large Ensemble Archive

Flavio Lehner (NCAR)

Multi-Model Large Ensemble Archive



As part of its activities, the [US CLIVAR Working Group on Large Ensembles](#) has created a data archive of initial-condition Large Ensembles conducted with currently used climate models. This archive contains gridded fields of key variables at both daily and monthly time steps, and is publicly accessible via the [NCAR Climate Data Gateway](#) or via NCAR's supercomputing center Cheyenne account ([/glade/collections/cdg/data/CLIVAR_LE](#)). The Table below summarizes the salient characteristics of the models and simulations contained within the archive. A discussion of the utility and applications of the archive is given in [Deser et al. \(2016\)](#).

Please direct questions about this archive to Dr. Flavio Lehner [flehner@ucar.edu] or Dr. Clara Deser [cdeser@ucar.edu]. When presenting results based on the Multi-Model Large Ensemble Archive in either oral or written form, please acknowledge the [US CLIVAR Working Group on Large Ensembles](#).

Modeling Center	Model Version	Model Resolution (atm/ocn)	Years	Initialization Method	Number of Members	Forcing	Reference
CCCma	CanESM2	~2.8°x2.8°/~1.4°x0.9°	1950–2100	Macro and Micro	50	historical, rcp85	Kirchmeier-Young et al. (2017)
CSIRO	MK3.6	~1.9°x1.9°/~1.9°x1.0°	1850–2100	Macro	30	historical, rcp85	Jeffrey et al. (2013)
GFDL	ESM2M	~2.0°x2.5°/~1.0°x0.9°	1950–2100	Macro	30	historical, rcp85	Rodgers et al. (2015)
GFDL	CM3	~2.0°x2.5°/~1.0°x0.9°	1920–2100	Micro	20	historical, rcp85	Sun et al. (2018)
MPI	MPI-ESM-LR	~1.9°x1.9°/nominal 1.5°	1850–2100	Macro	100	historical, rcp26, rcp45, rcp85	Maher et al. (2019)
NCAR	CESM1	~1.3°x0.9°/nominal 1.0°	1920–2100	Micro	40	historical, rcp85	Kay et al. (2015)
SMHI/KNMI	EC-EARTH	~1.1°x1.1°/nominal 1.0°	1860–2100	Micro	16	historical, rcp85	Hazeleger et al. (2010)

www.cesm.ucar.edu/projects/community-projects/CLIVAR-LE/



CGD's Climate Analysis Section
Climate Variability Diagnostics Package
for Large Ensembles

[Methodology and Definitions](#)

Input Namelists: [Observations](#) | [Models](#)

Derived Namelists: [CLT](#) | [MOC](#) | [PR](#) | [PSL](#) | [SIC NH](#) | [SIC SH](#) |
[TAS](#) | [TS](#)

Created: Fri Jul 19 10:36:09 MDT 2019

CVDP-LE Version 0.0.7

Ensemble Summary | [Individual Members](#)

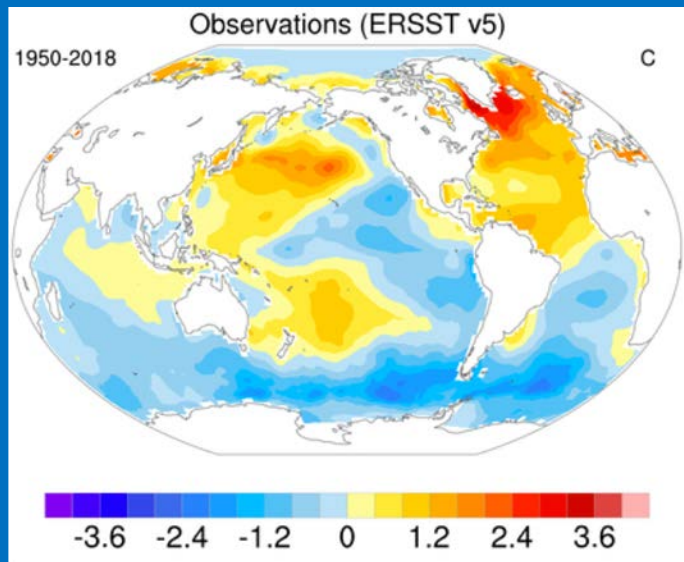
Defining modes of internal variability in an era of forced climate change

In progress (Adam Phillips, NCAR)

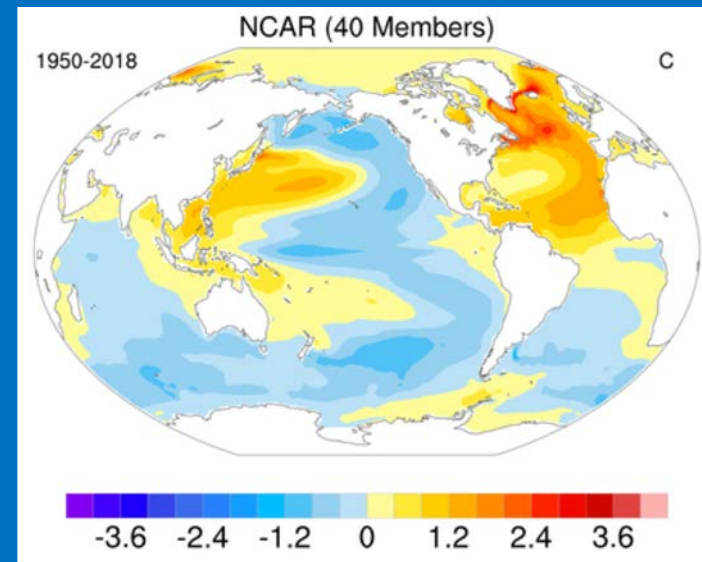
The Atlantic Multidecadal Oscillation (AMO)

Index: 10-year low-pass filtered

North Atlantic SST – Global mean SST (Trenberth and Shea, 2015)



1950-2018

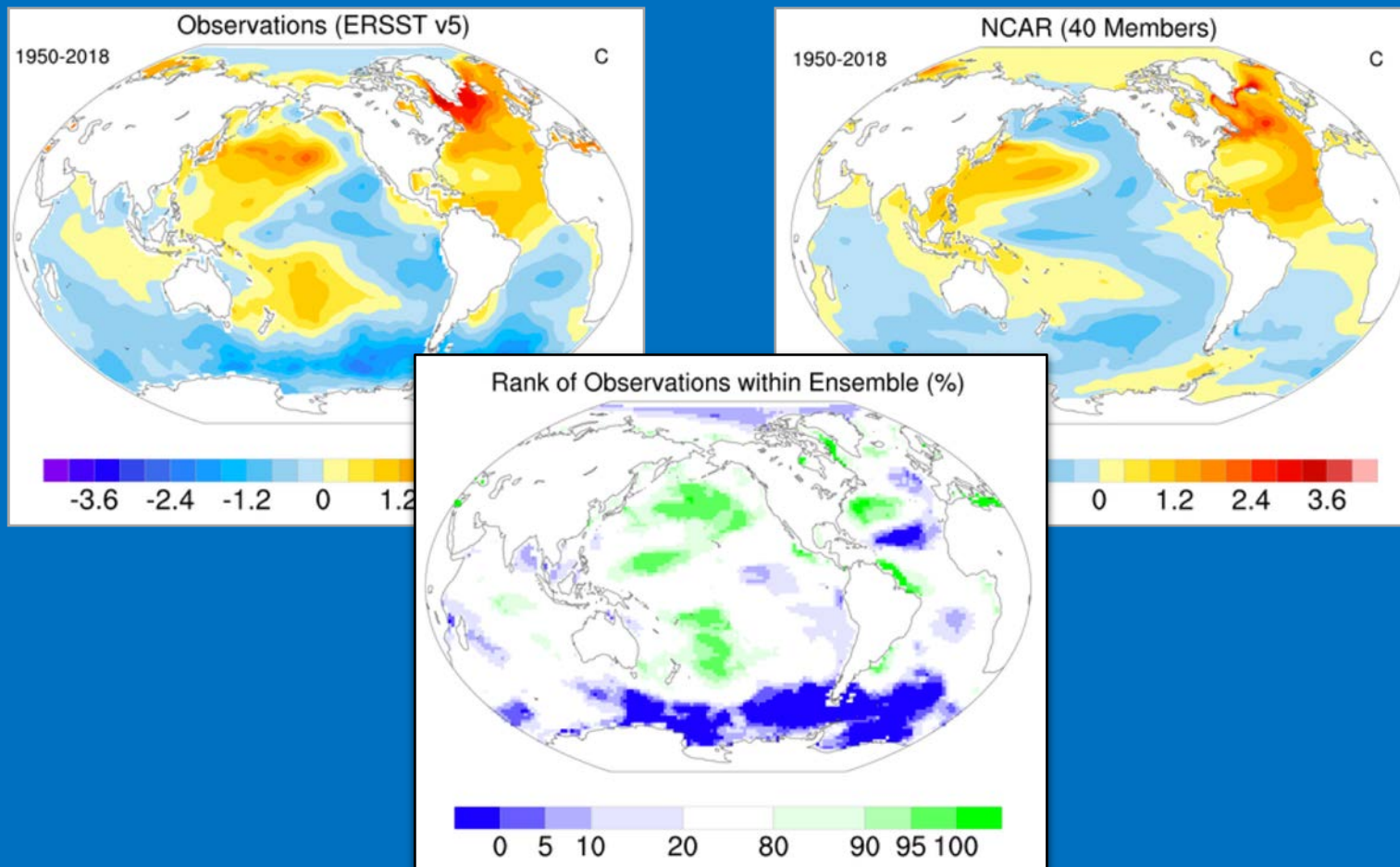


1950-2018

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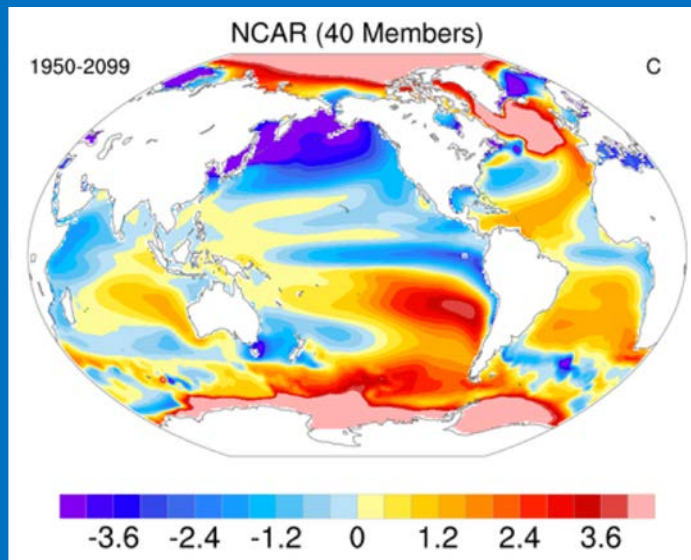
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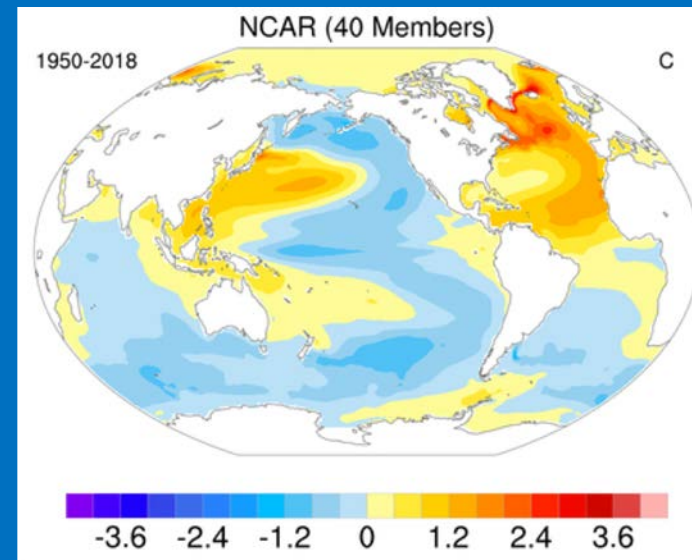
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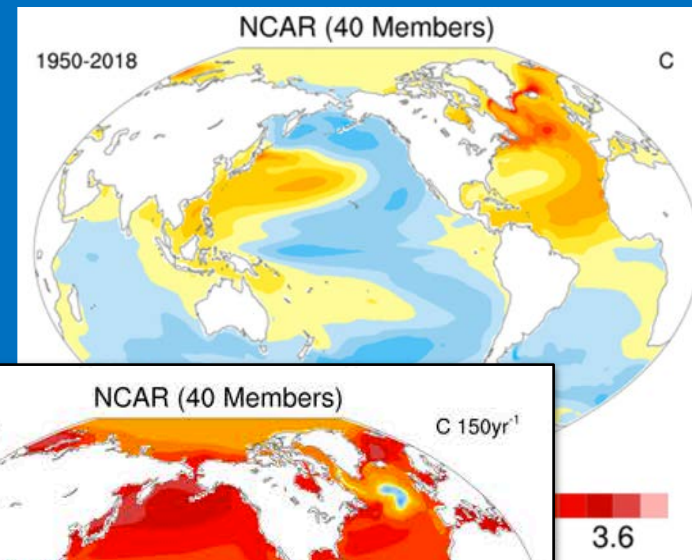
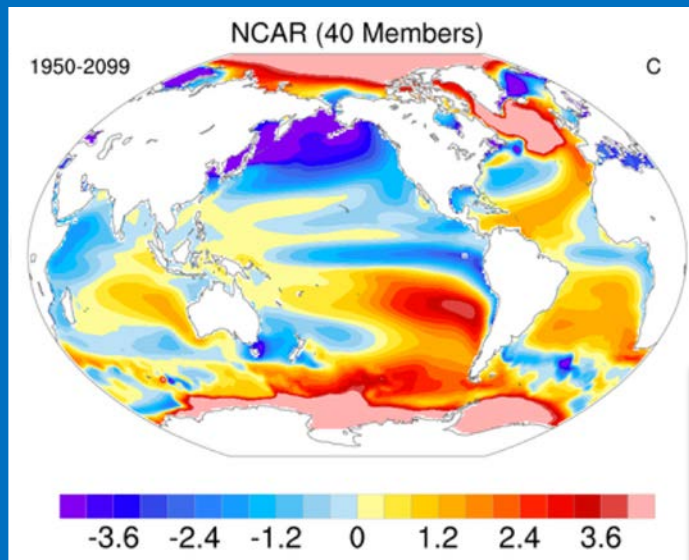


1950-2018

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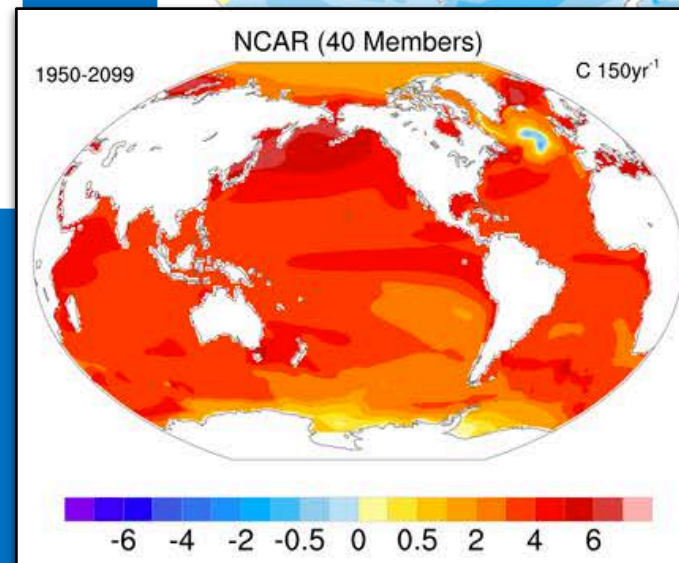
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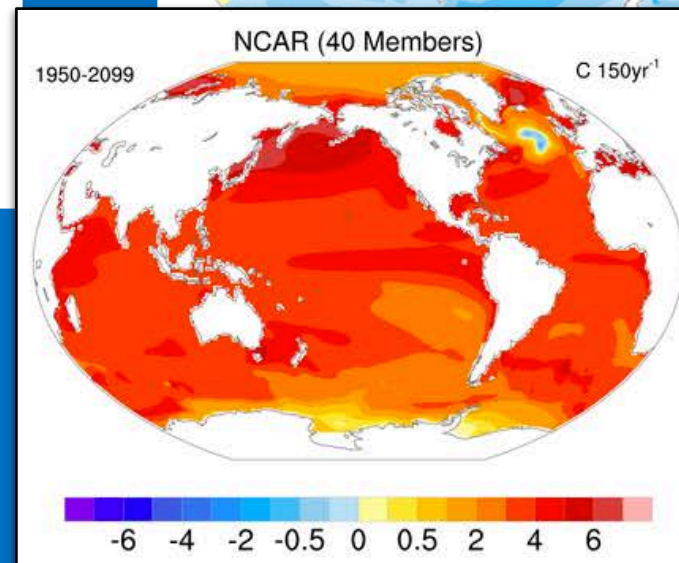
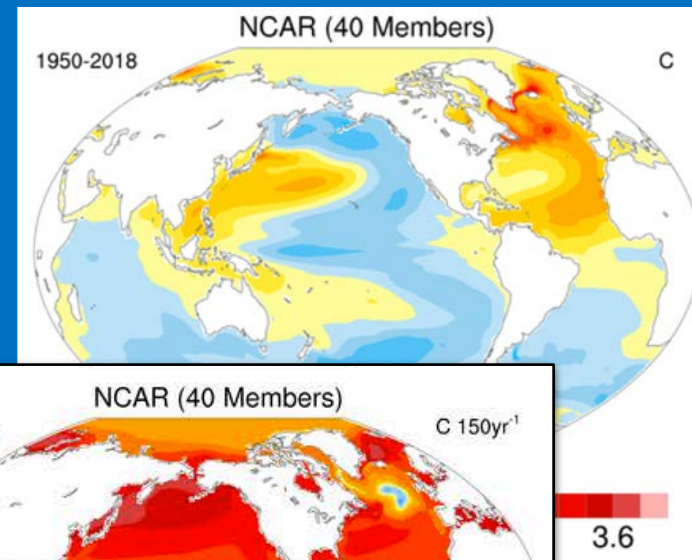
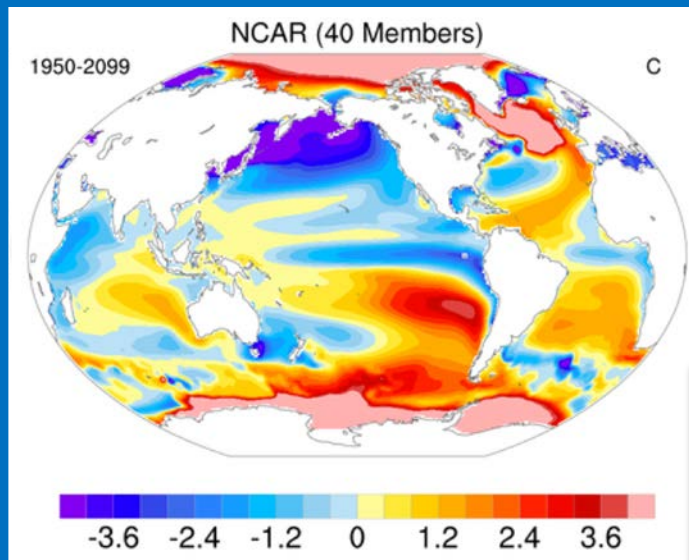
Linear Trend



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North Atlantic SST – Global ~~Mean~~ SST (Trenberth and Shea, 2015)



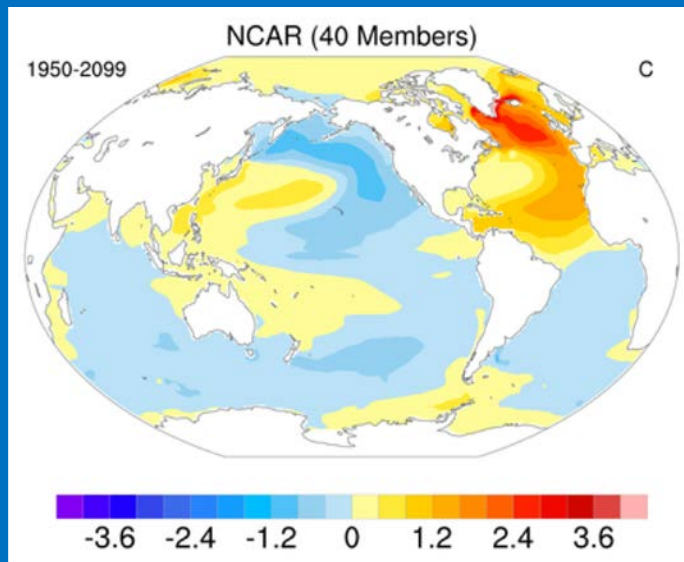
1950-2099

Linear Trend

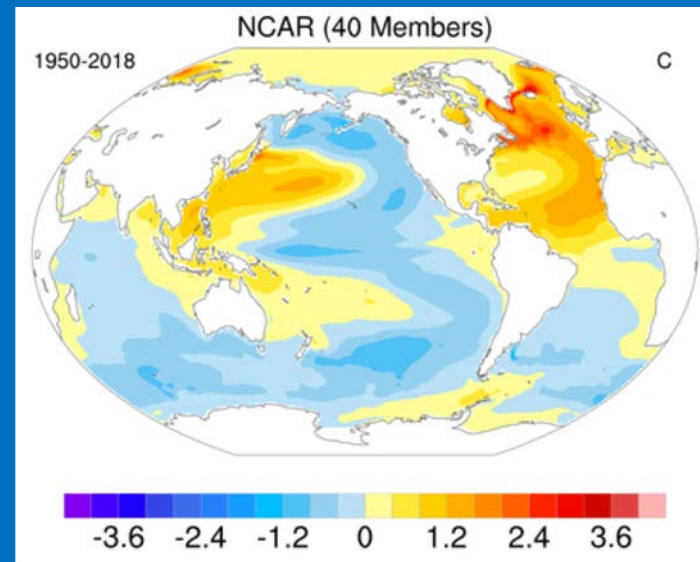
The Atlantic Multidecadal Oscillation (AMO)

Index: 10-year low-pass filtered

North Atlantic SST – *Ensemble mean SST*



1950-2099



1950-2018

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Where do we go from here?

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Where do we go from here?

- Workshop report
- Synthesis of “best practices” in LE usage?
- White paper on LE design considerations?
- Hackathon?
- Your ideas?