

Historical analogues to the recently observed minima in the AMOC

Adam Blaker, Joel Hirschi, Bablu Sinha, Gerard
McCarthy, Sarah Taws, Robert Marsh, Andrew
Coward, Beverly de Cuevas

National Oceanography Centre, Southampton

16th-19th July 2013
Baltimore

AMOC

- Observations
- NEMO vs Obs
- Composite time series
- Meridional extent

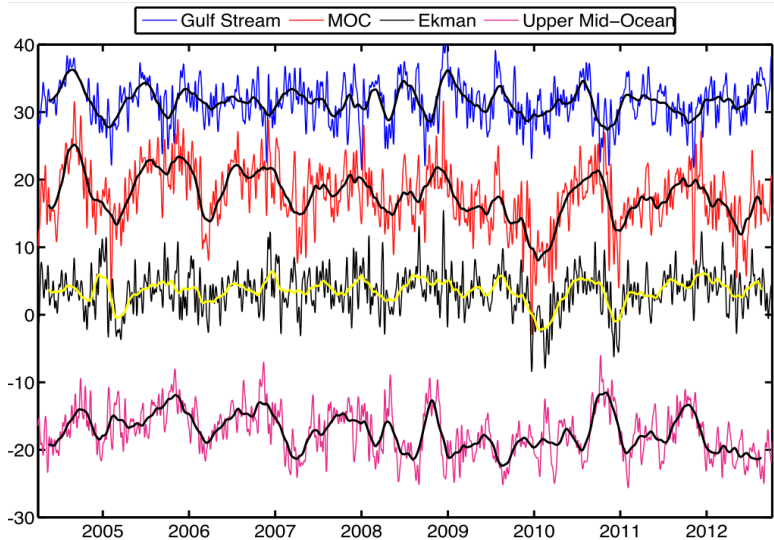
Atmospheric conditions

- Taux anomalies
- NAO and AO indices
- SLP anomalies
- SAT anomalies
- Re-emergence

Summary



RAPID Observations



Historical
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Blaker et al.

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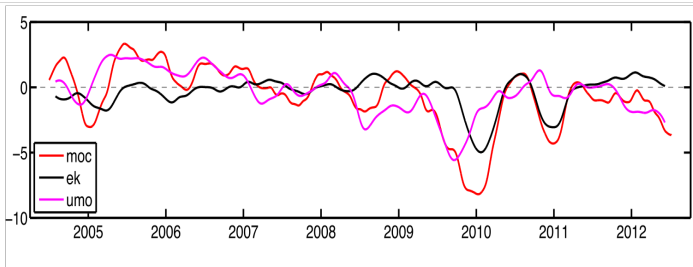
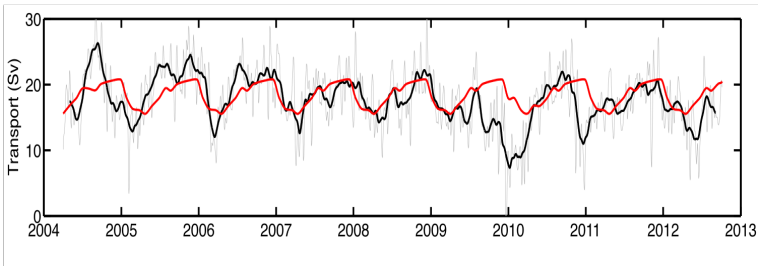


VALOR



courtesy of G. McCarthy

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McCarthy et al (2012) GRL

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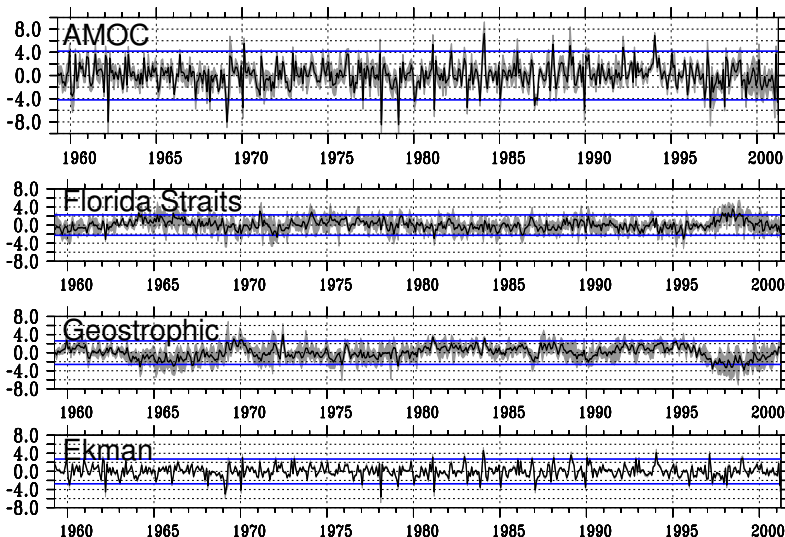
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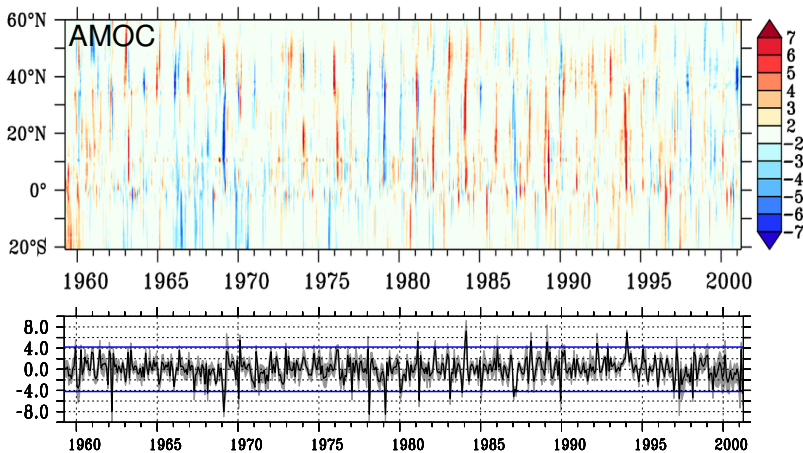
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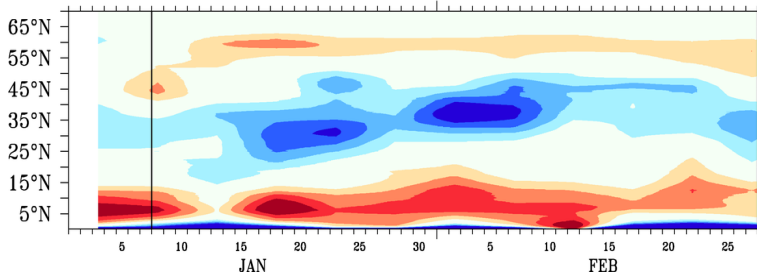
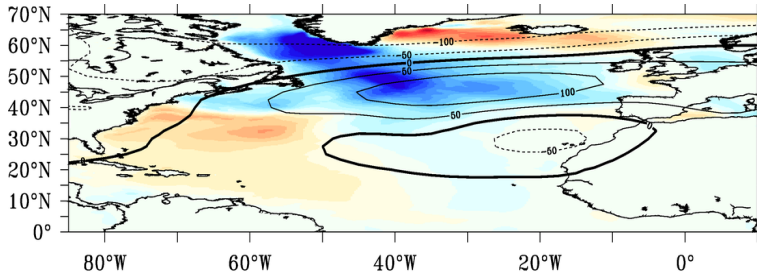
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1979



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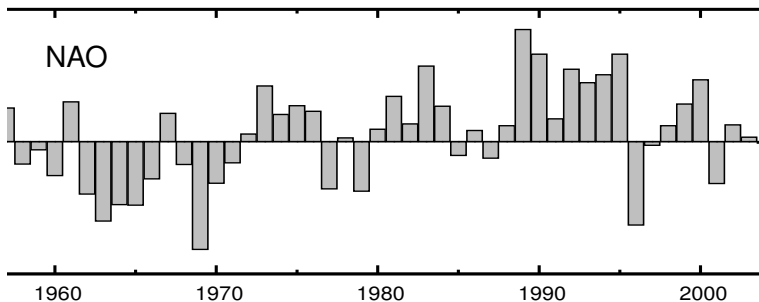
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National
Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



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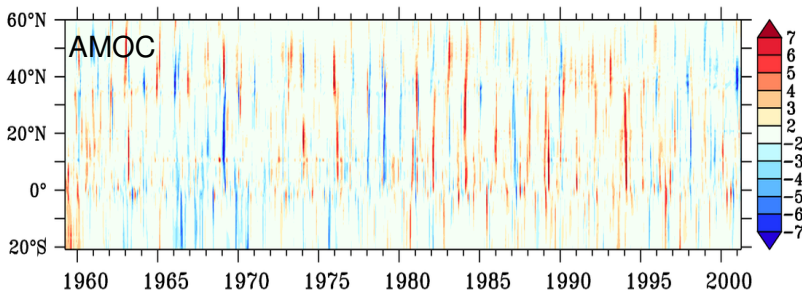
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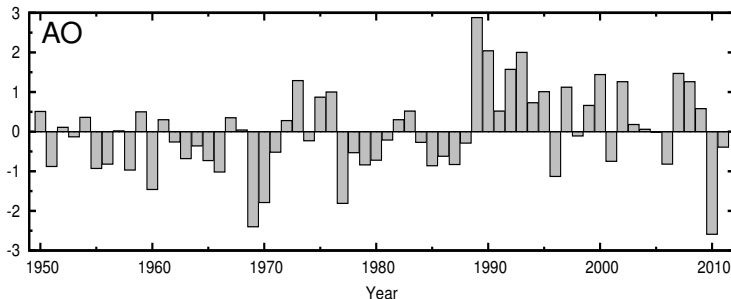
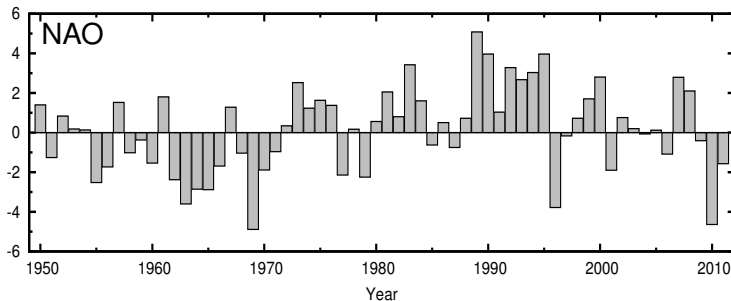
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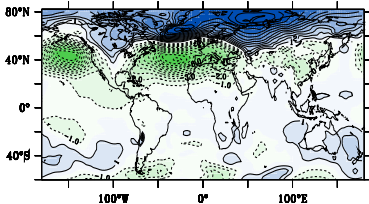
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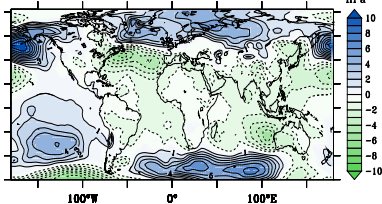
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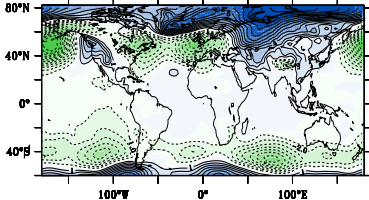
1968/1969



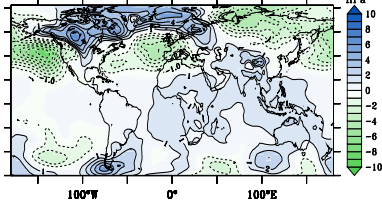
1969/1970



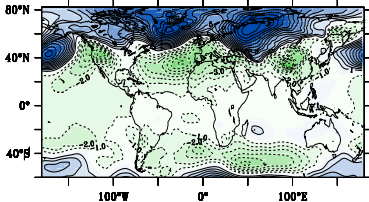
1977/1978



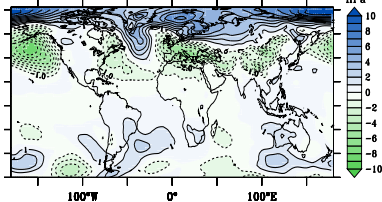
1978/1979



2009/2010



2010/2011



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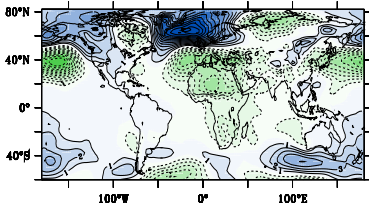
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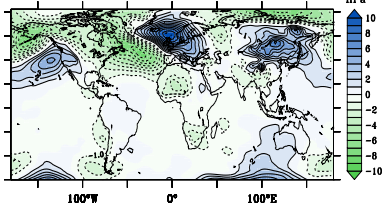
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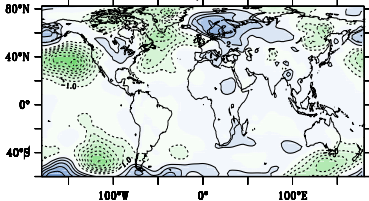
1962/1963



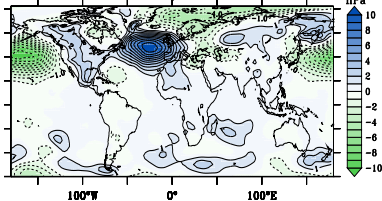
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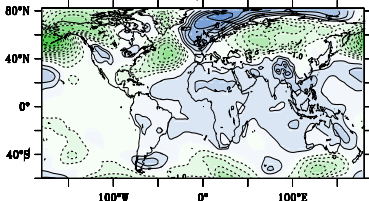
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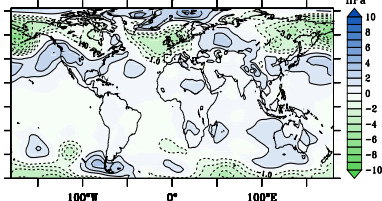
1981/1982



1987/1988



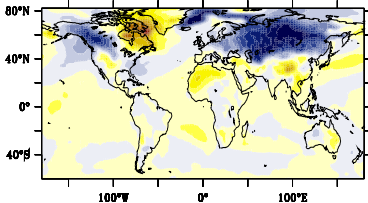
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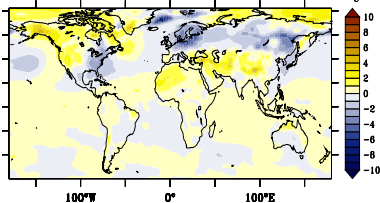
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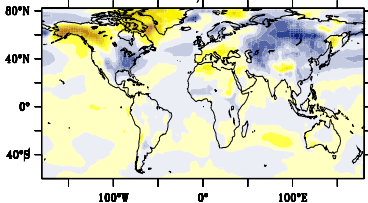
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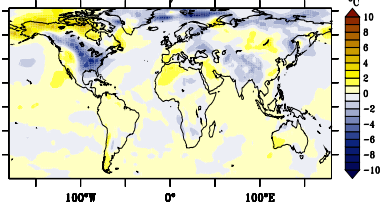
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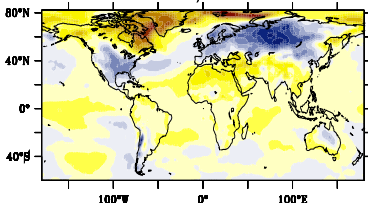
1977/1978



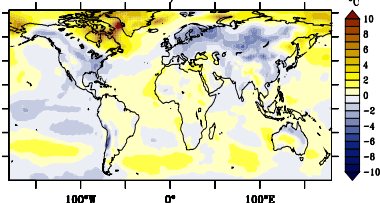
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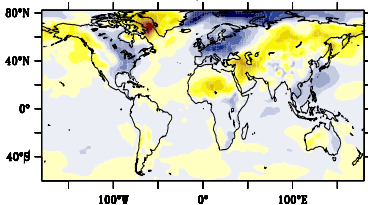
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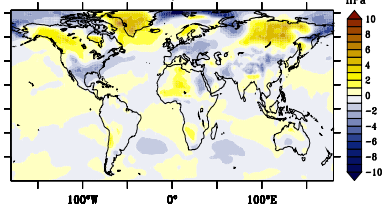
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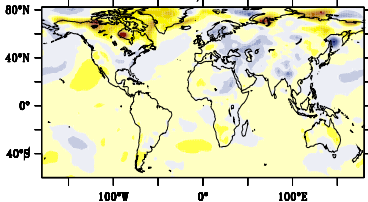
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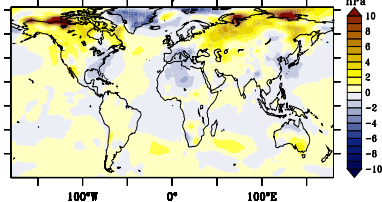
1963/1964



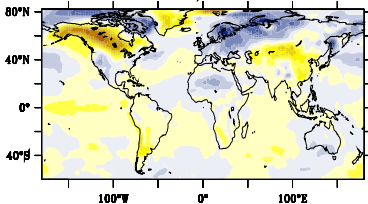
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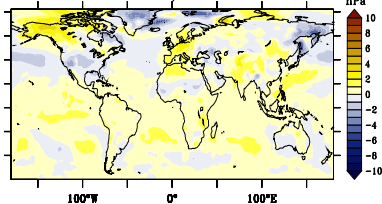
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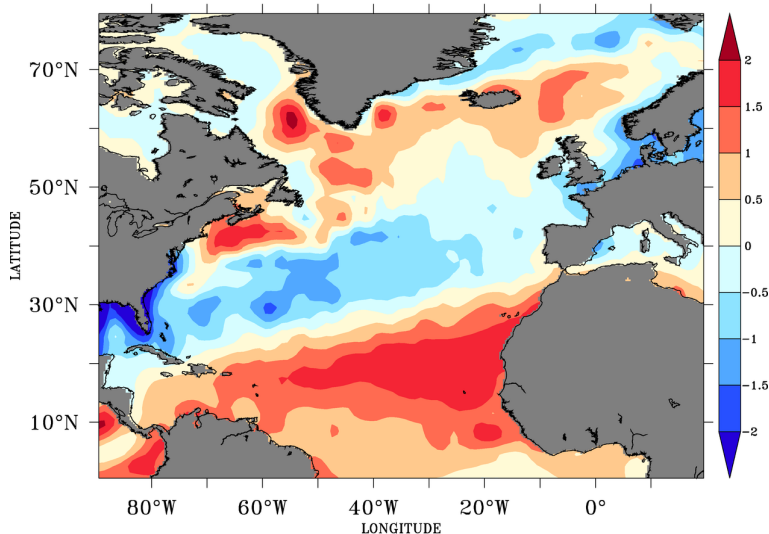
VALOR



TIME : 01-MAR-2010 00:00

DATA SET: sst.mnmean

NOAA Optimum Interpolation (OI) SST V2



March 2010 SST anomaly

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EN3

ORCA025

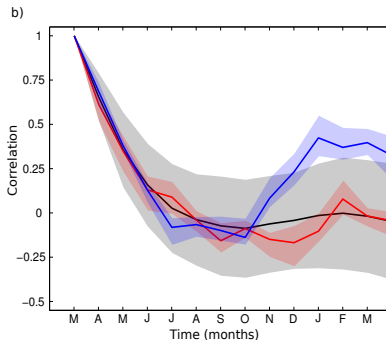
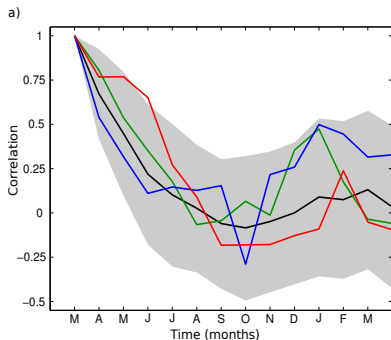
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Blue=1968/69, Red=1977/78, Green=2010/11

see Taws et al (2011) GRL

Buchan et al (2013), MWR, in review



Summary I

- ▶ Model analysis suggests several historical minima
- ▶ At least 2 previous pairs of events have occurred
- ▶ Events show substantial meridional coherence
- ▶ Some show northward propagation, due to τ_x anomalies
- ▶ Events frequently correlate with negative NAO
- ▶ Pairs of events appear to correlate with negative AO

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Summary II

- ▶ Atmospheric conditions (SAT, SLP) over Eurasia important for establishing AO conditions in 2009/10 (Cohen et al (2010) GRL)
- ▶ Re-emergence of Atlantic SST anomalies may explain persistence of negative NAO state for consecutive events during 68/69 and 09/10, but not for 77/78
- ▶ Memory from Arctic Ice cover (Deser et al 2007, Strey et al 2010) or snow cover over Siberia (Peings et al 2012) may also contribute to persistence

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