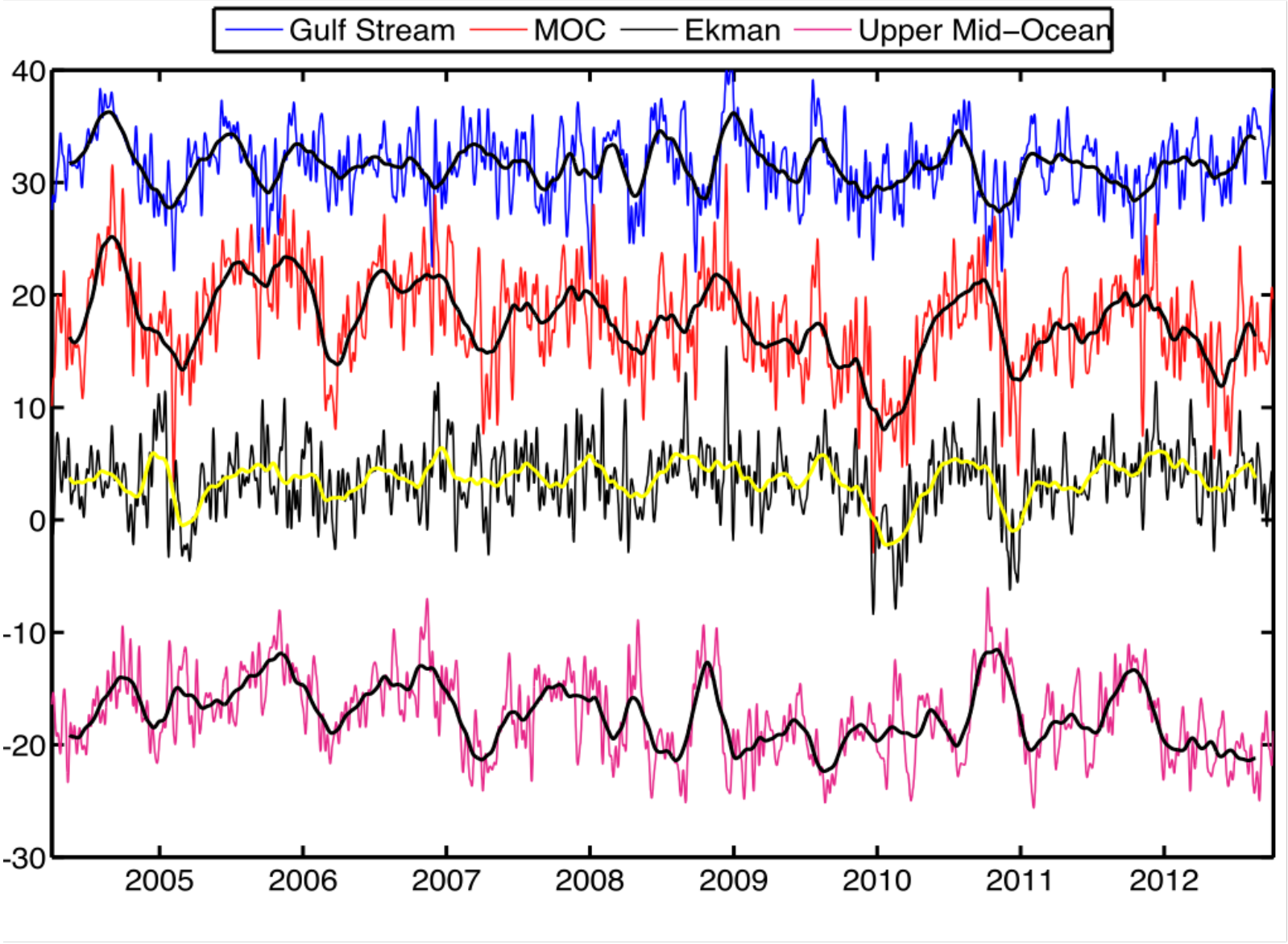
Historical analogues to the recently observed minima in the AMOC

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

RAPID Observations



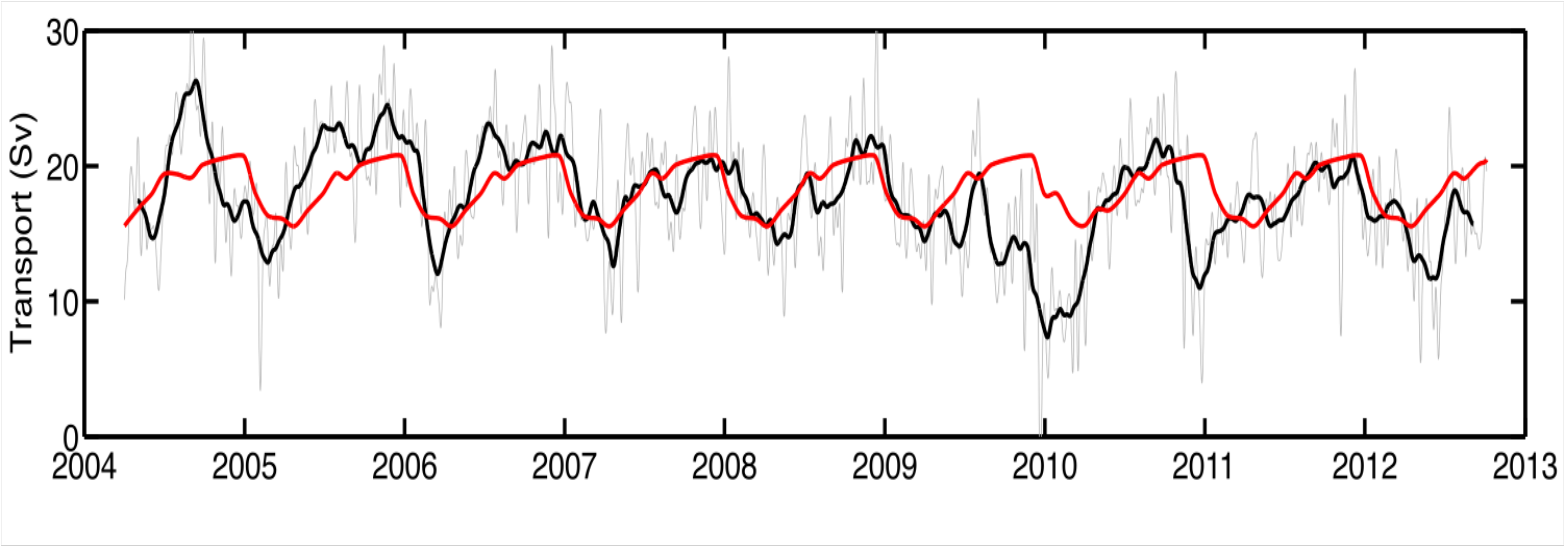
courtesy of G. McCarthy

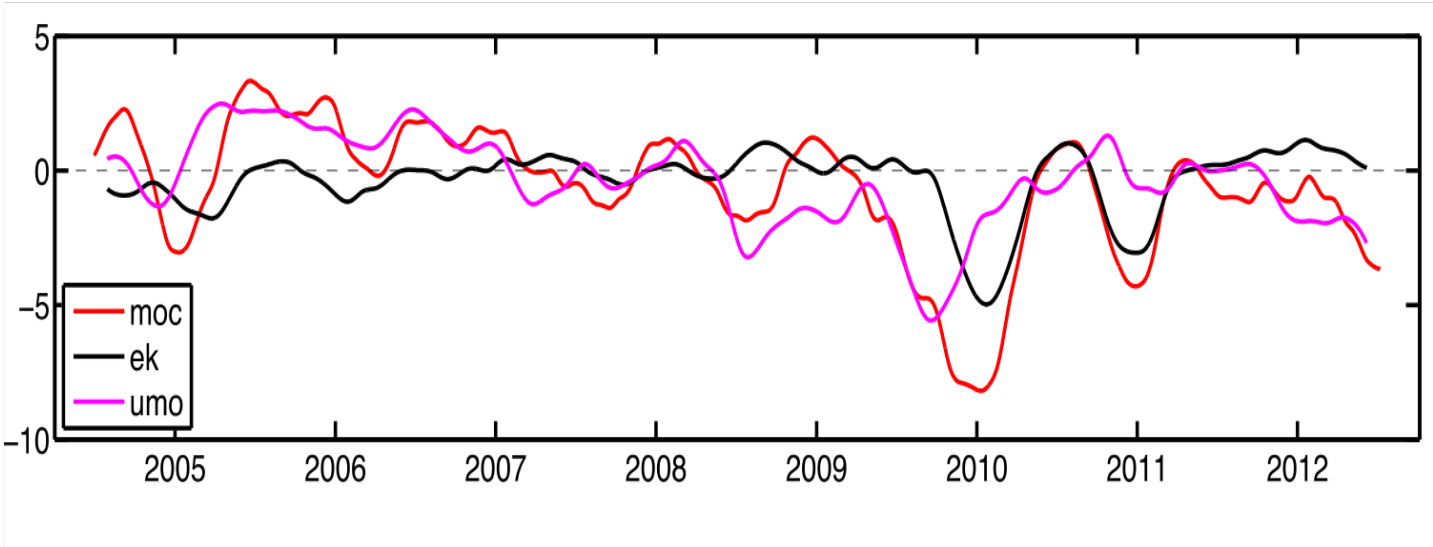
Historical analogues to the recently observed minima in the AMOC

Blaker et al.

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

RAPID Observations

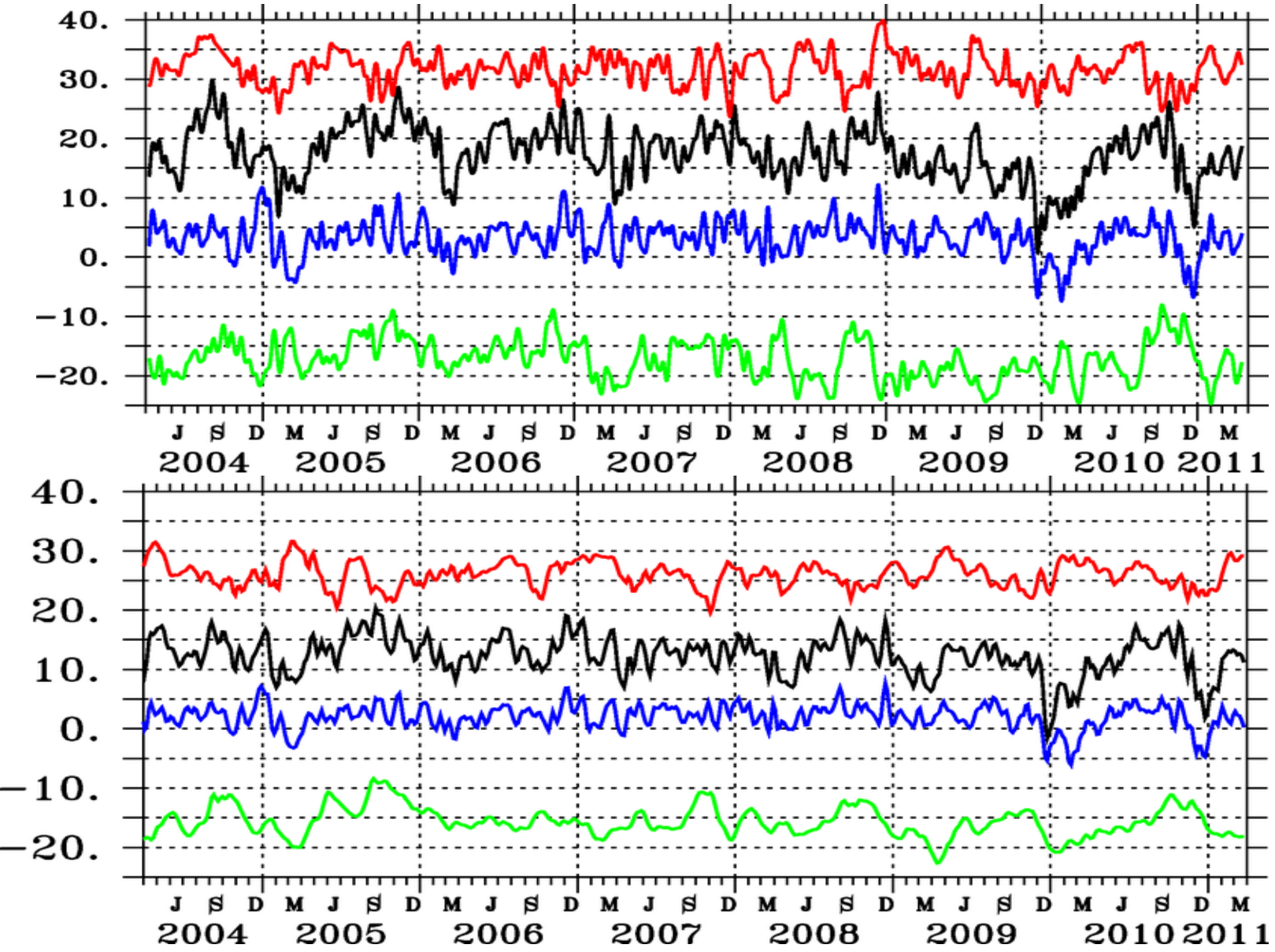




McCarthy et al (2012) GRL

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

RAPID Observations



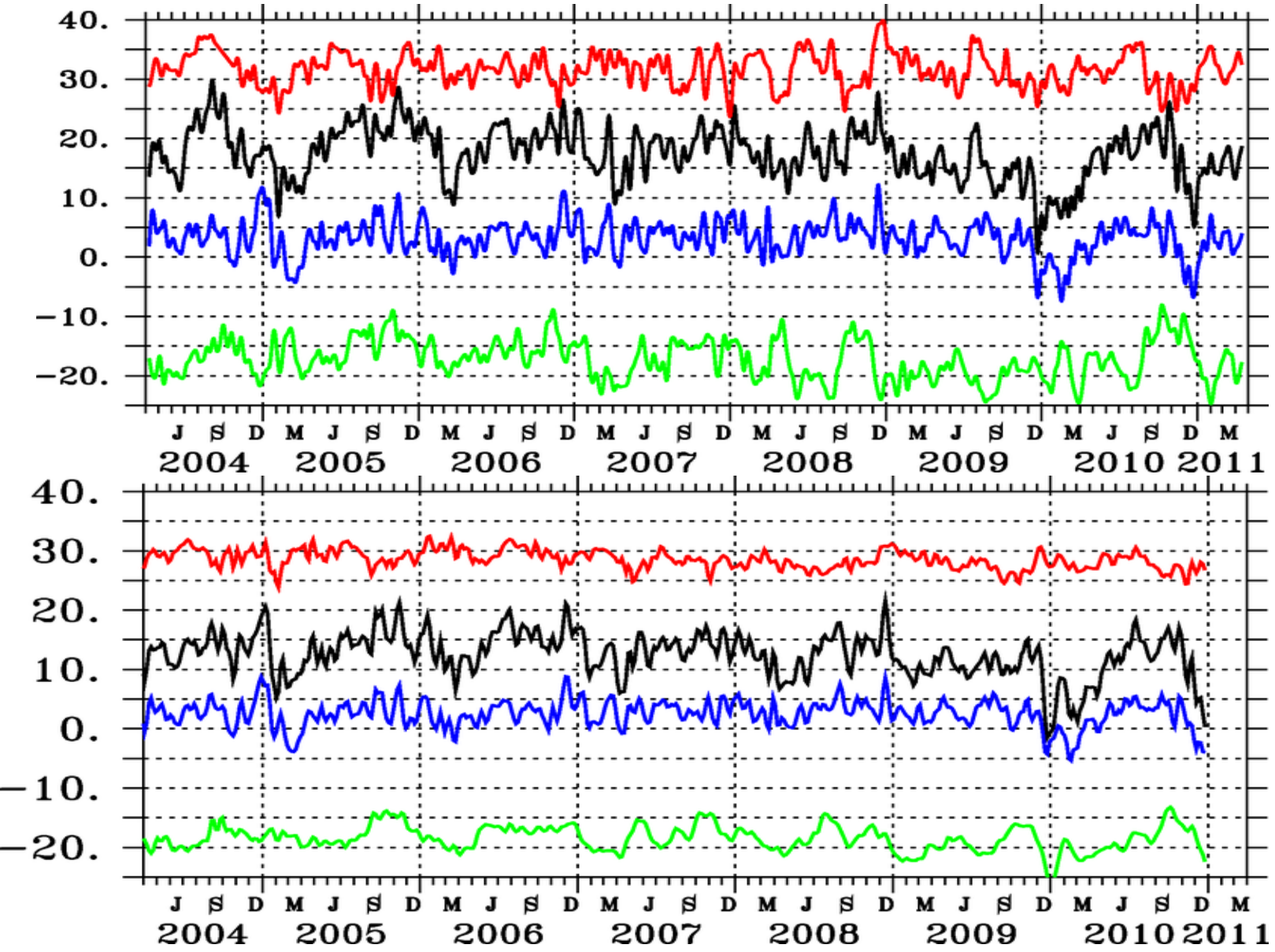
ORCA025 (ERA Interim forcing)

Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

RAPID Observations



ORCA0083 (DFS4.1/DFS5.1.1 forcing)

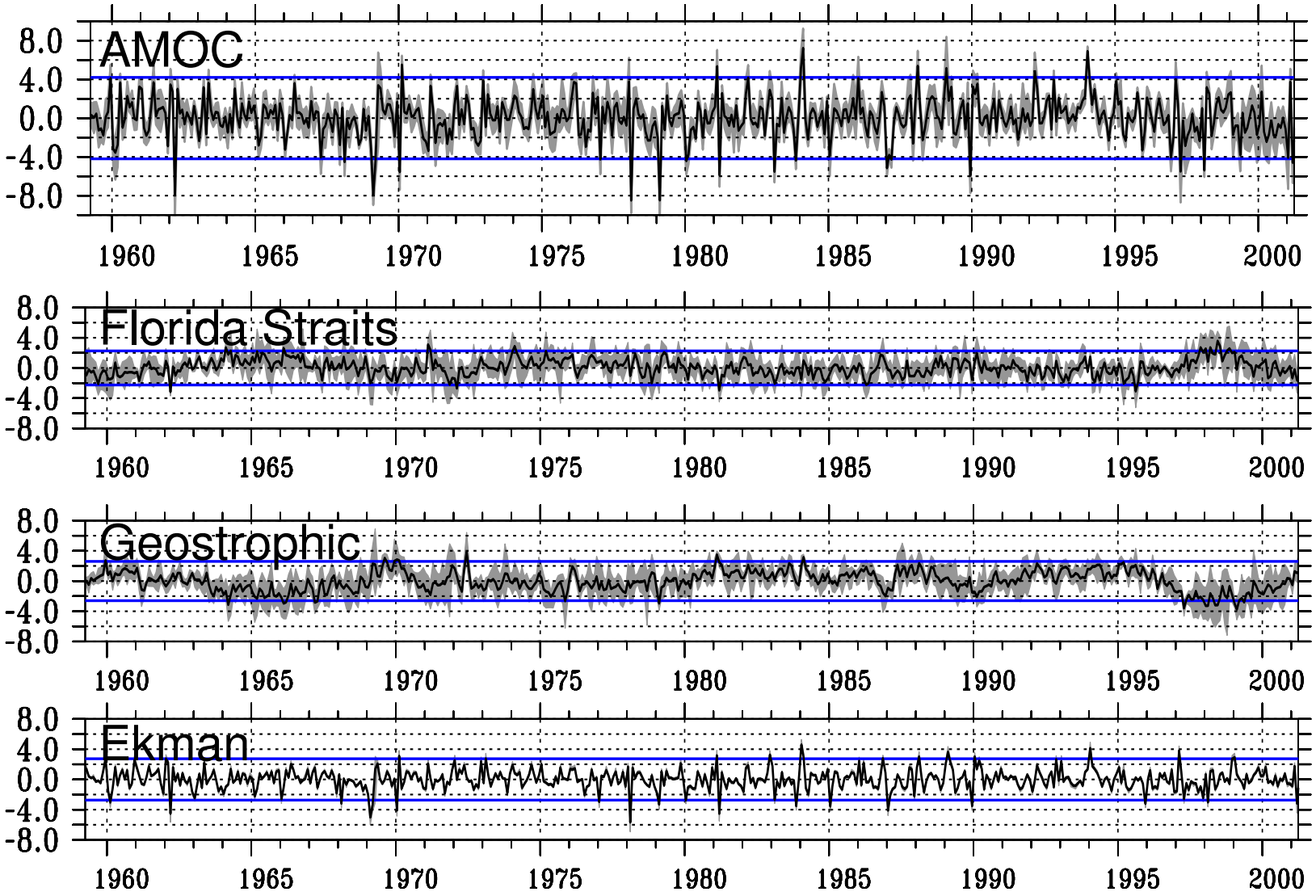
Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change

VALOR

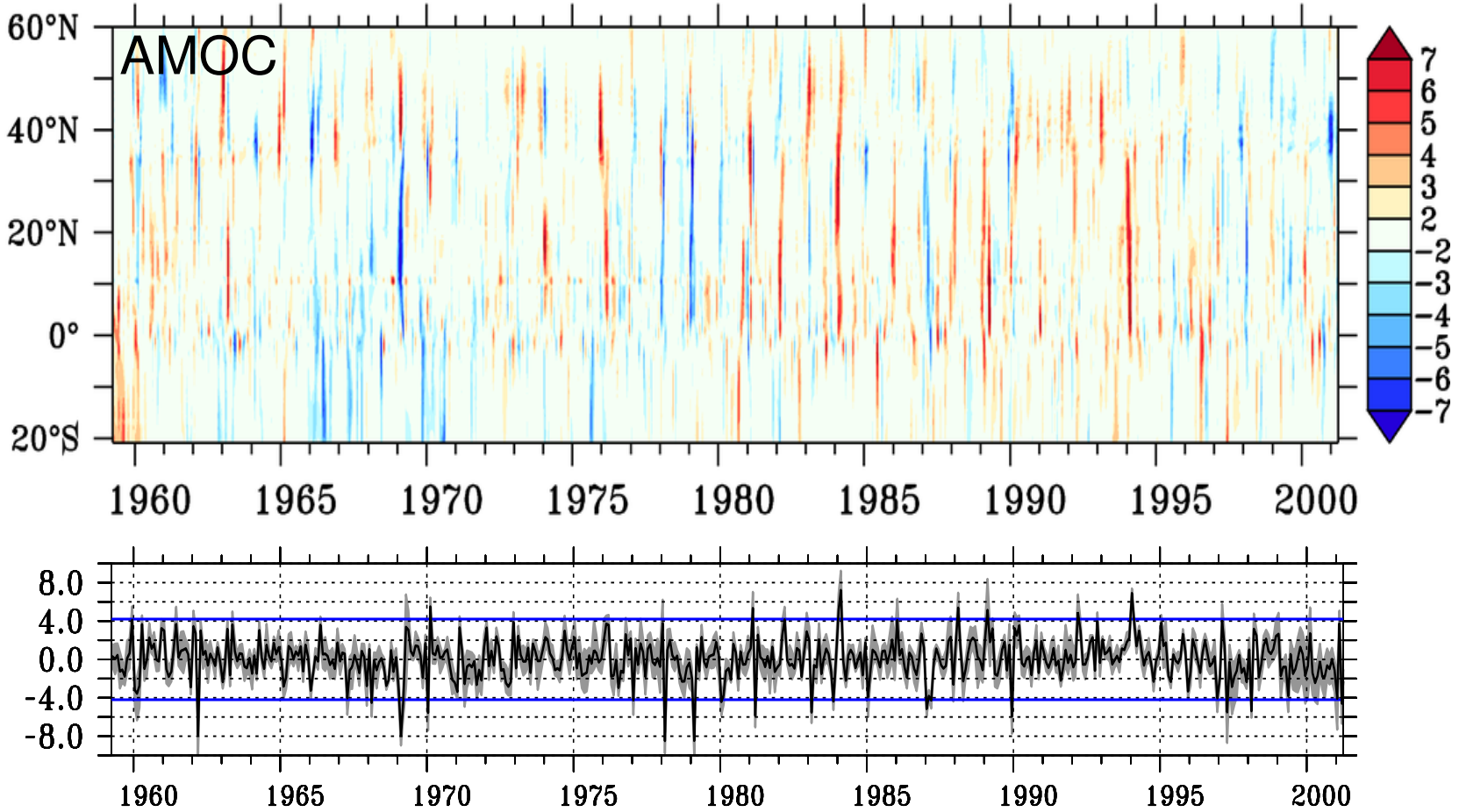
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

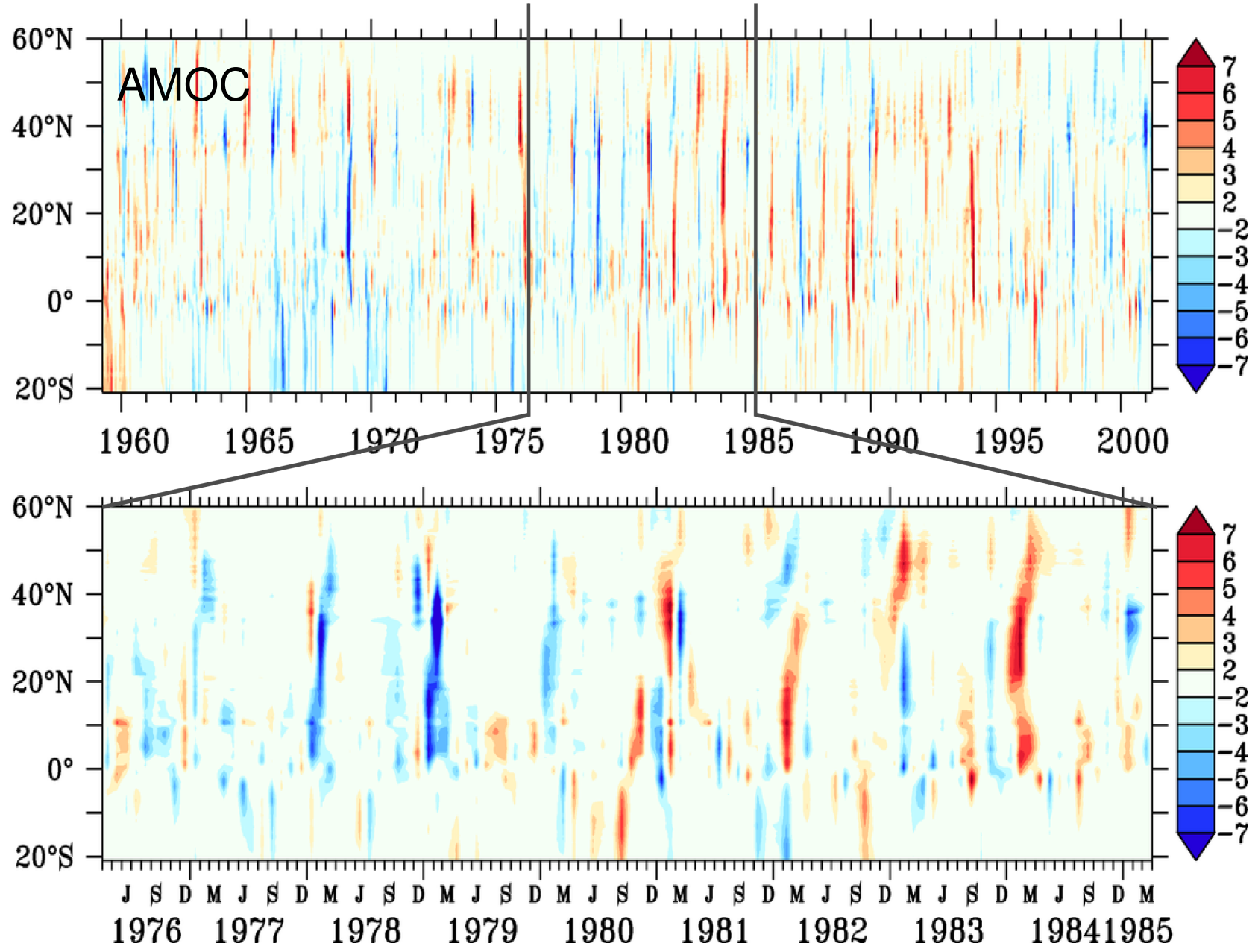
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

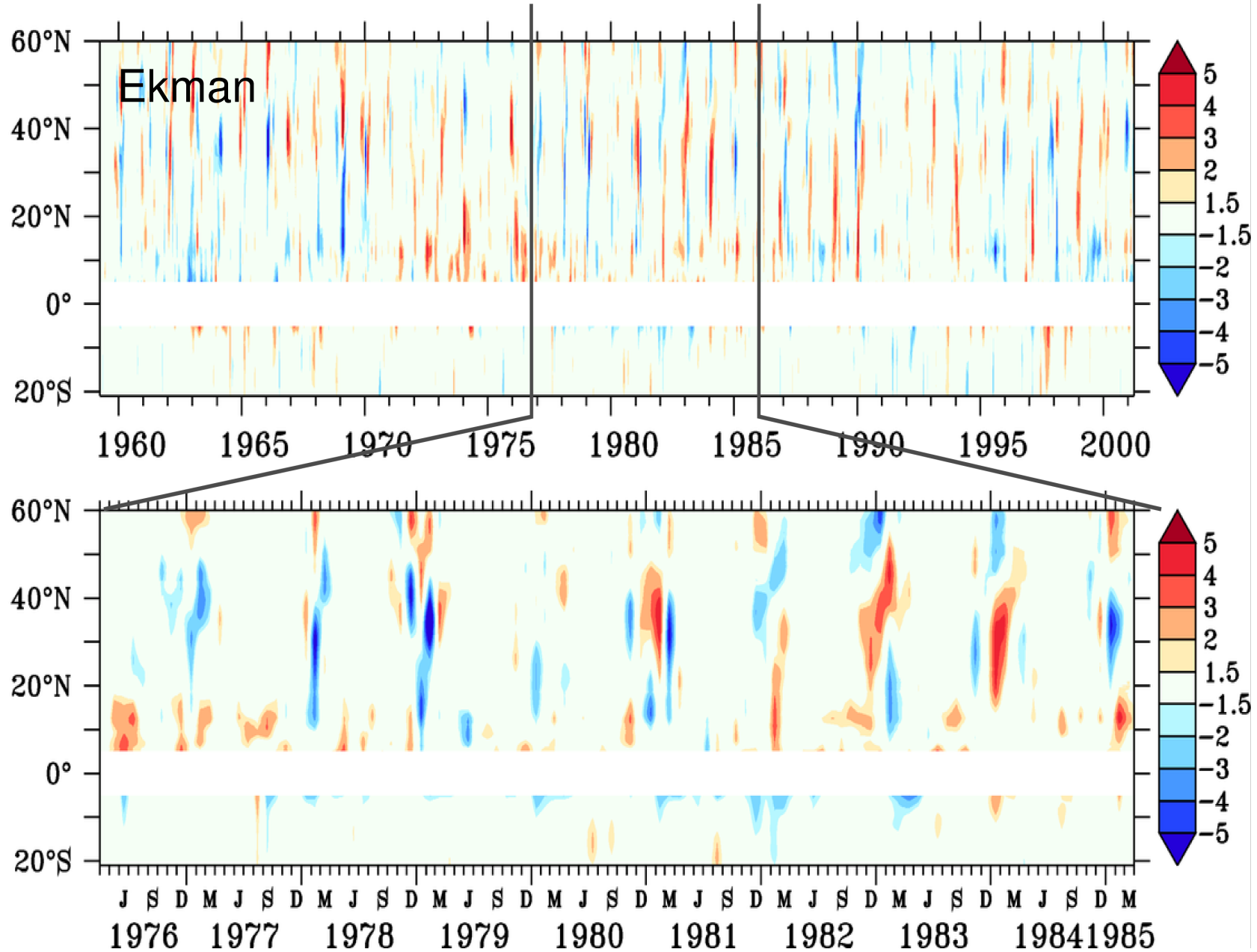
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

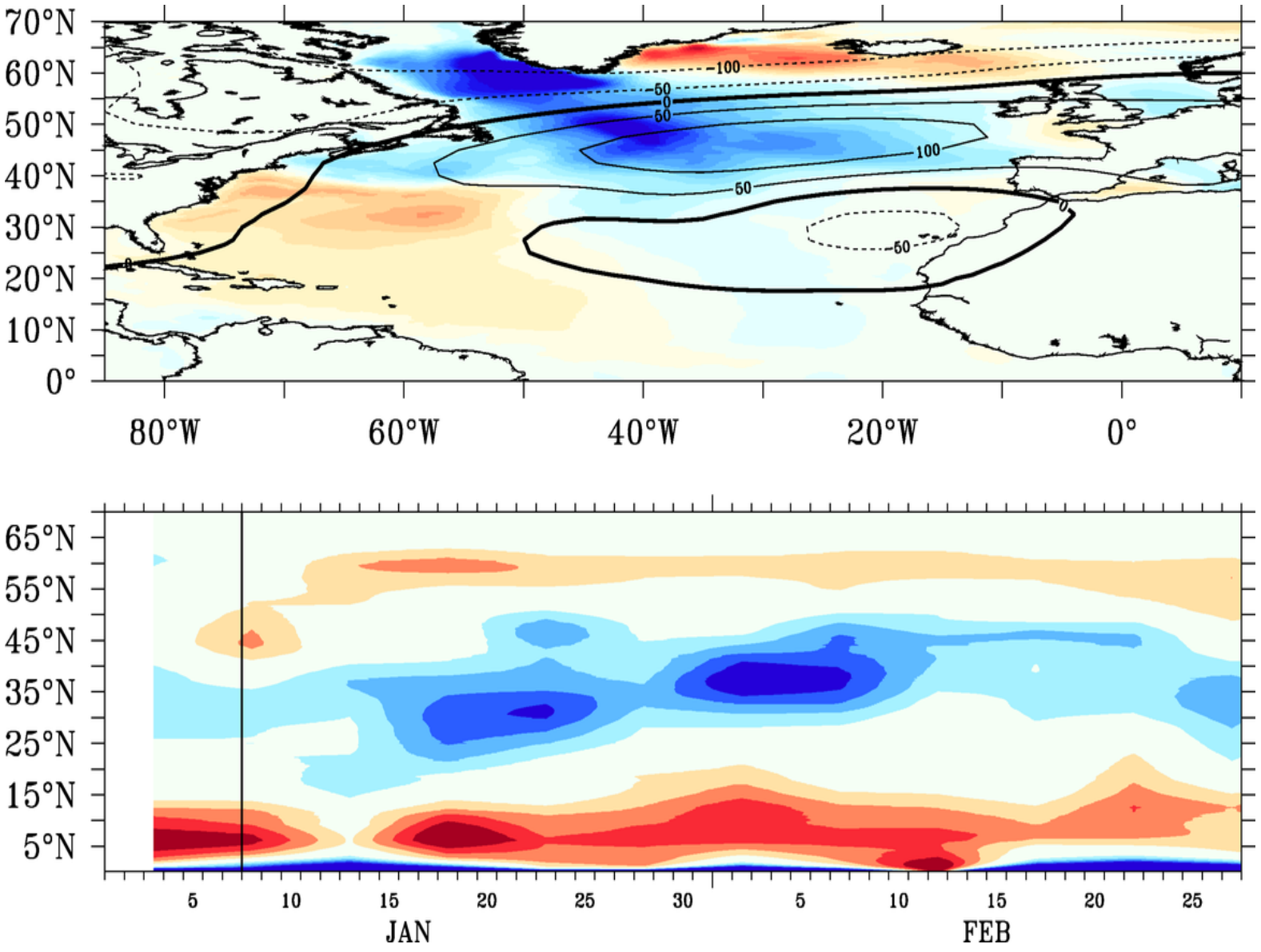
Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

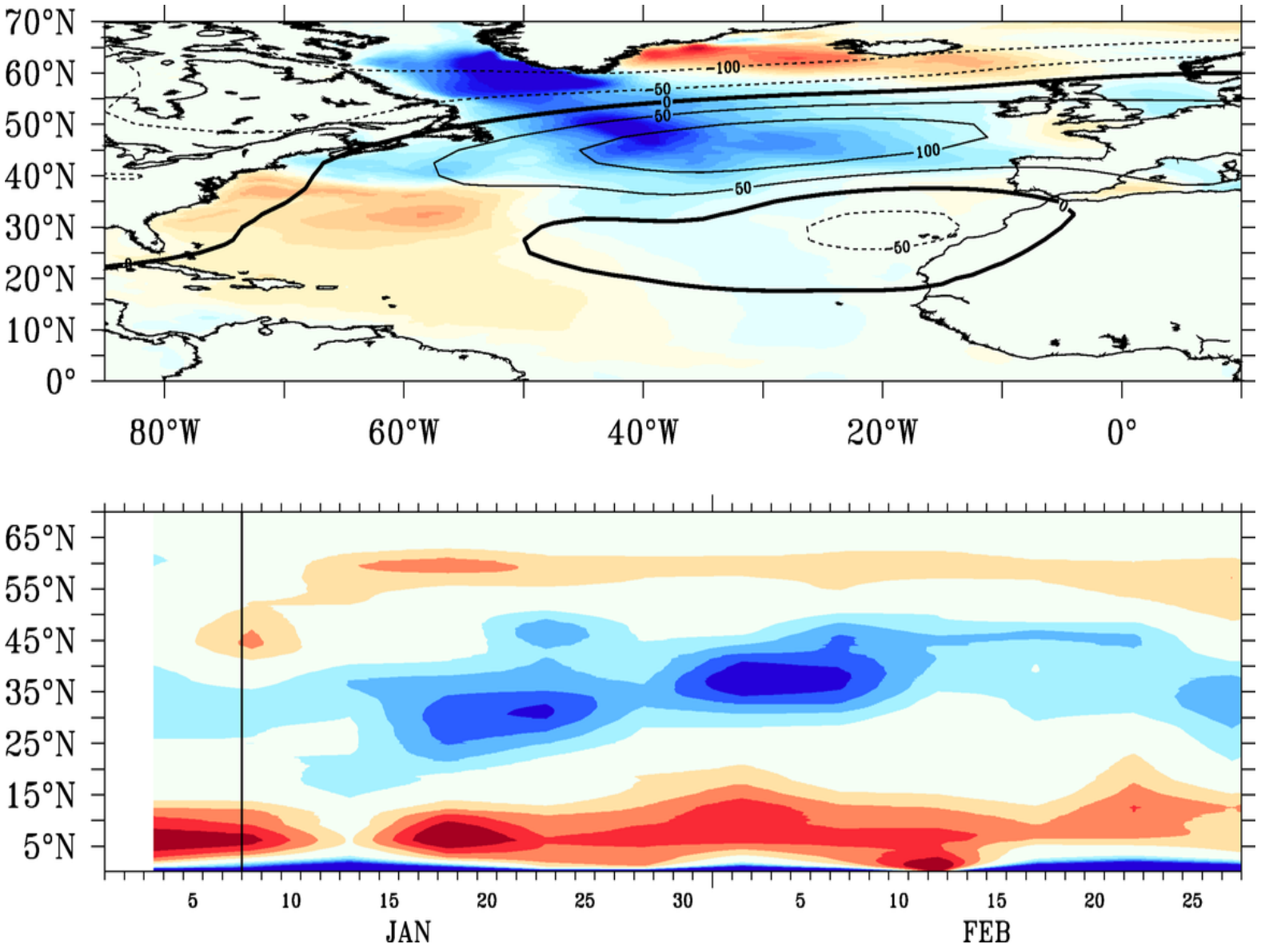
Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

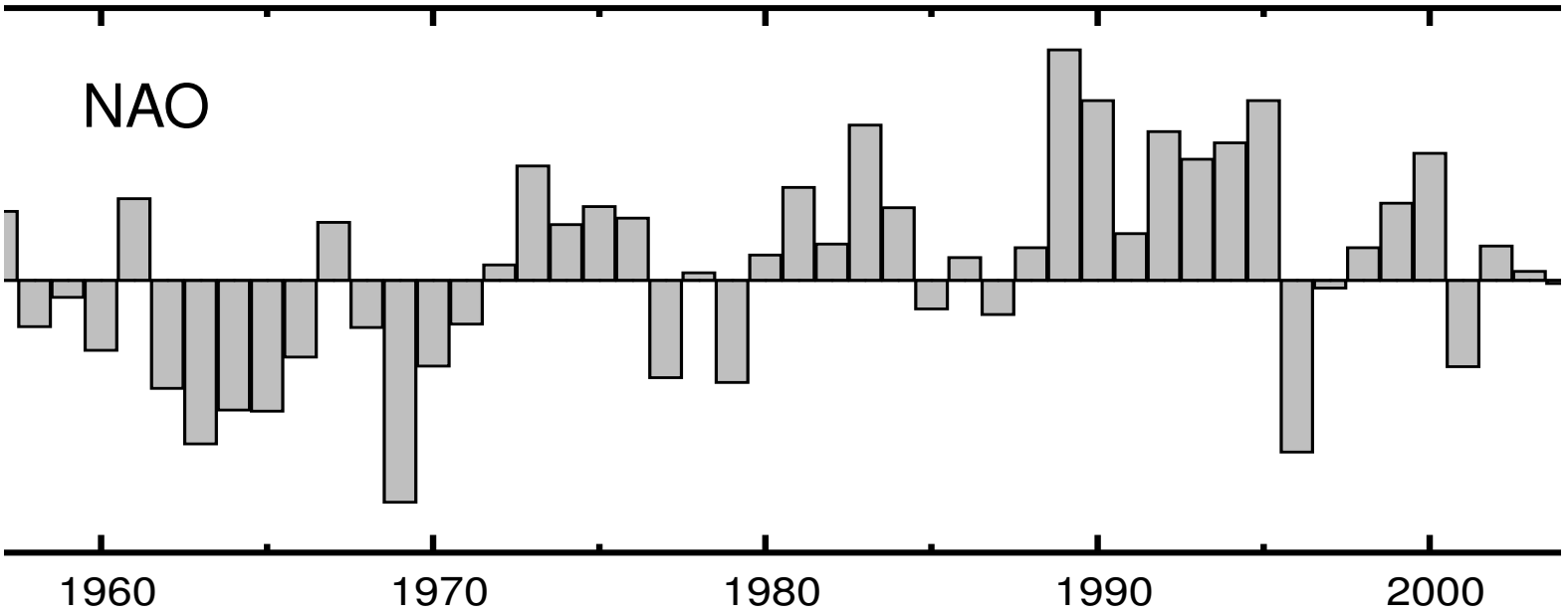
Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

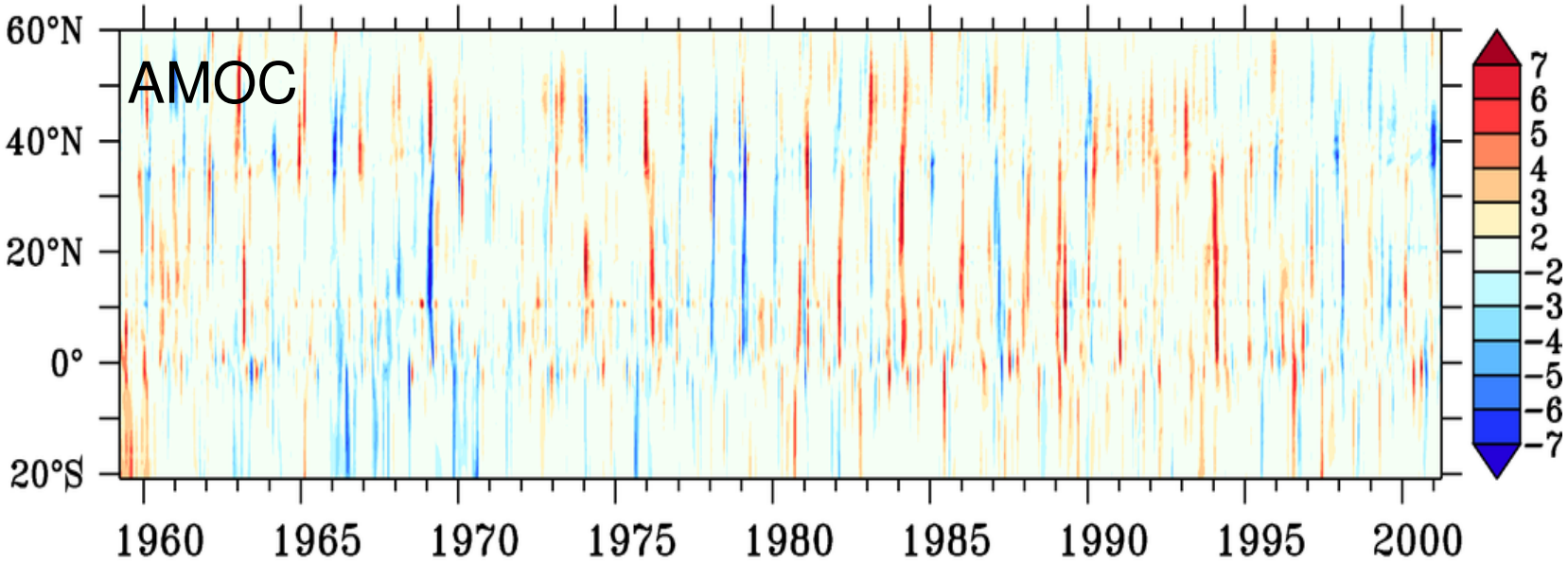


Historical analogues to the recently observed minima in the AMOC

Blaker et al.

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

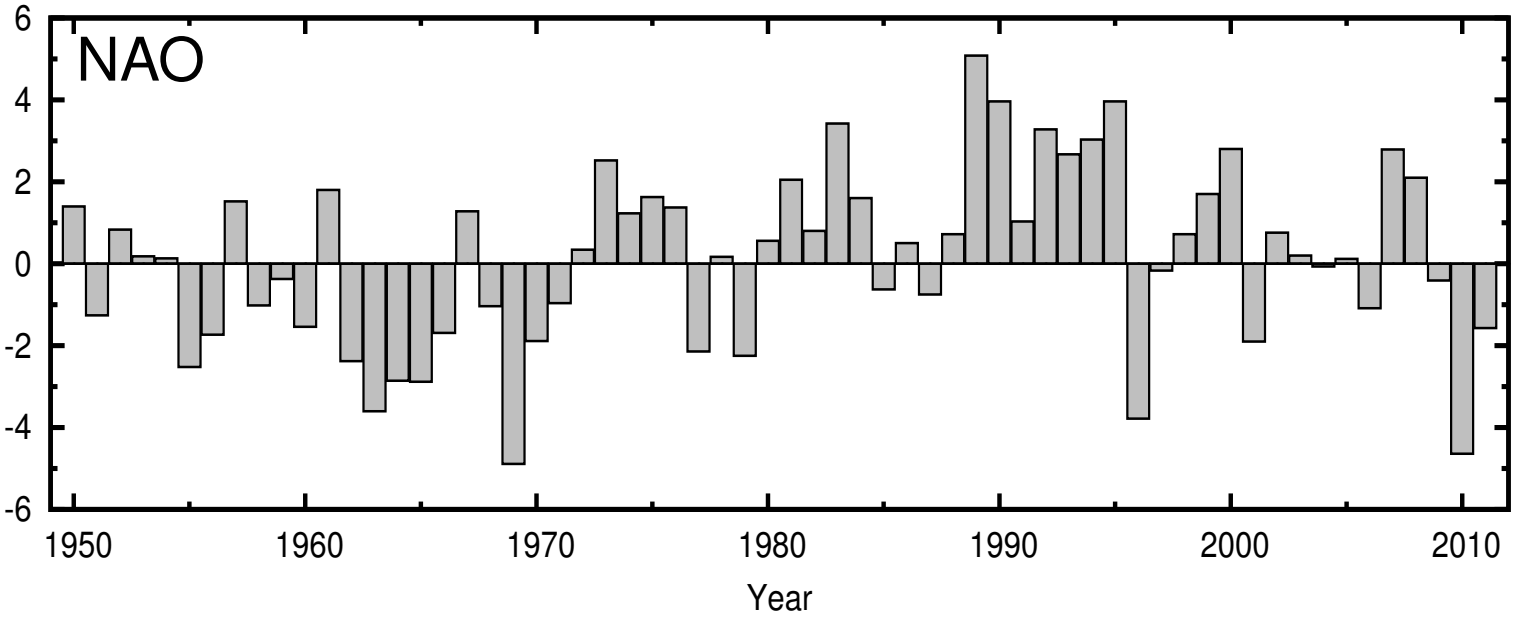


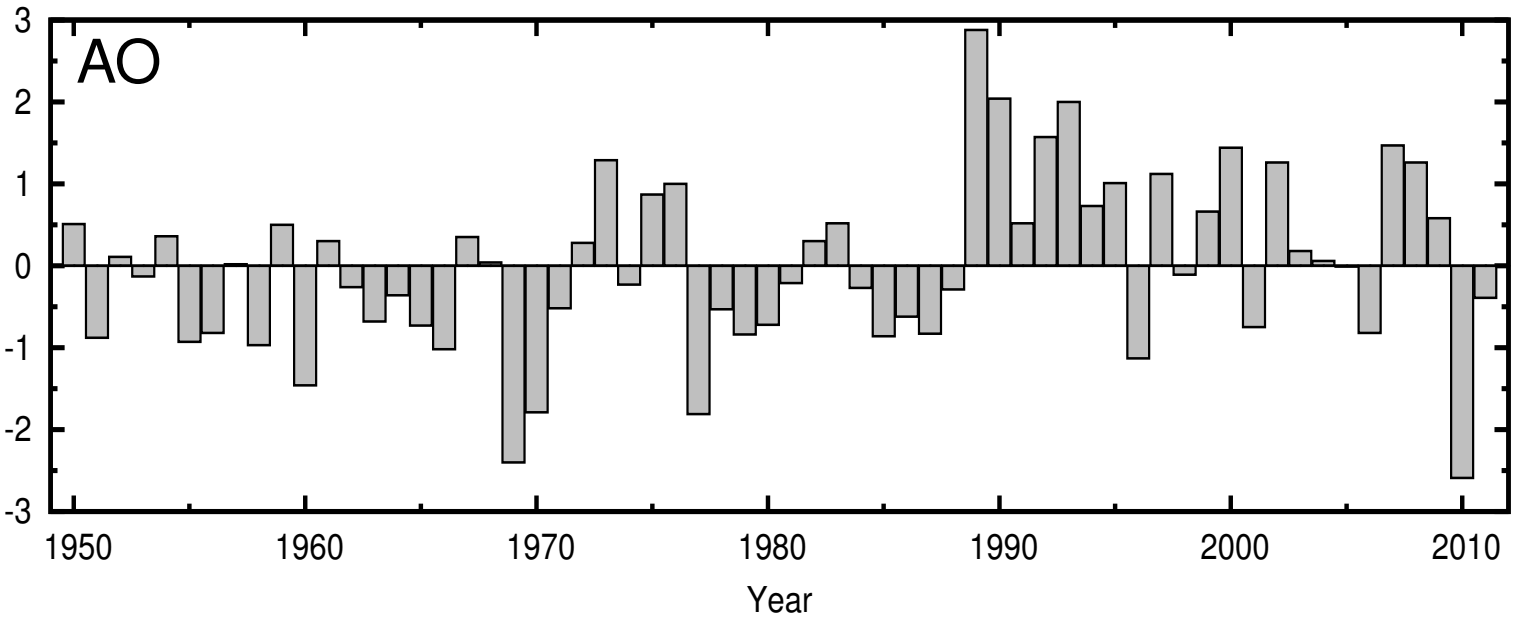


Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

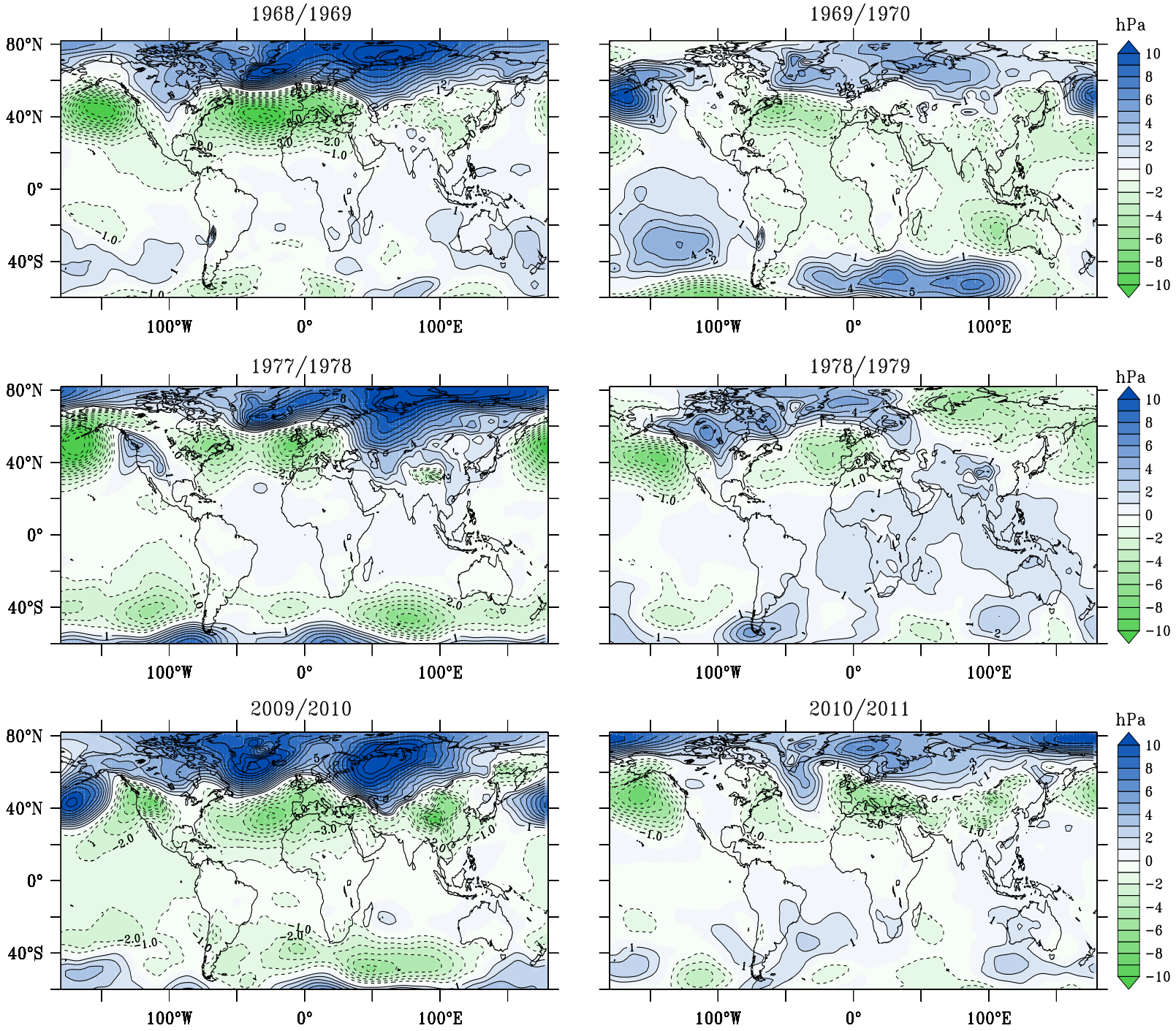




Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



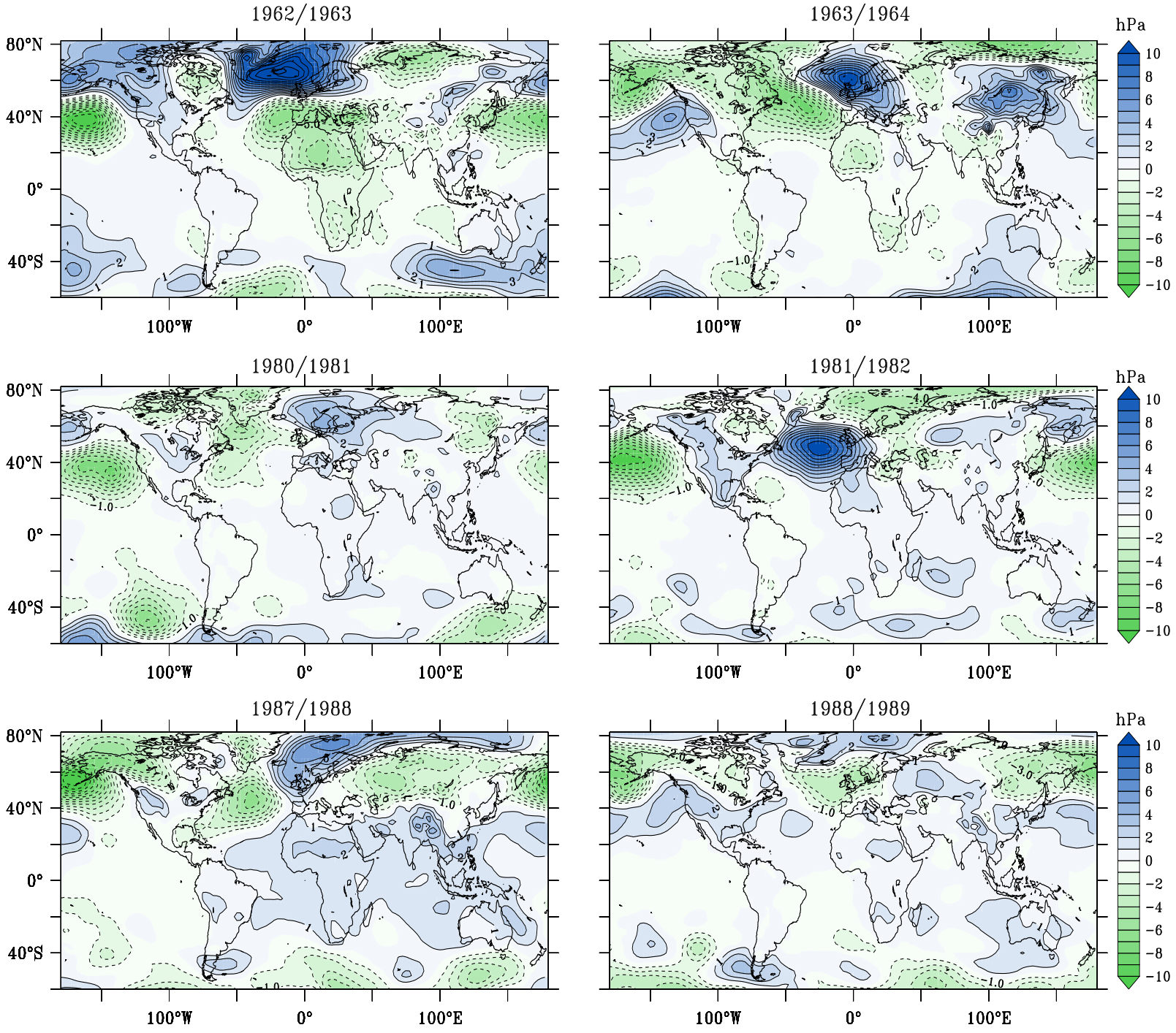
Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change

VALOR

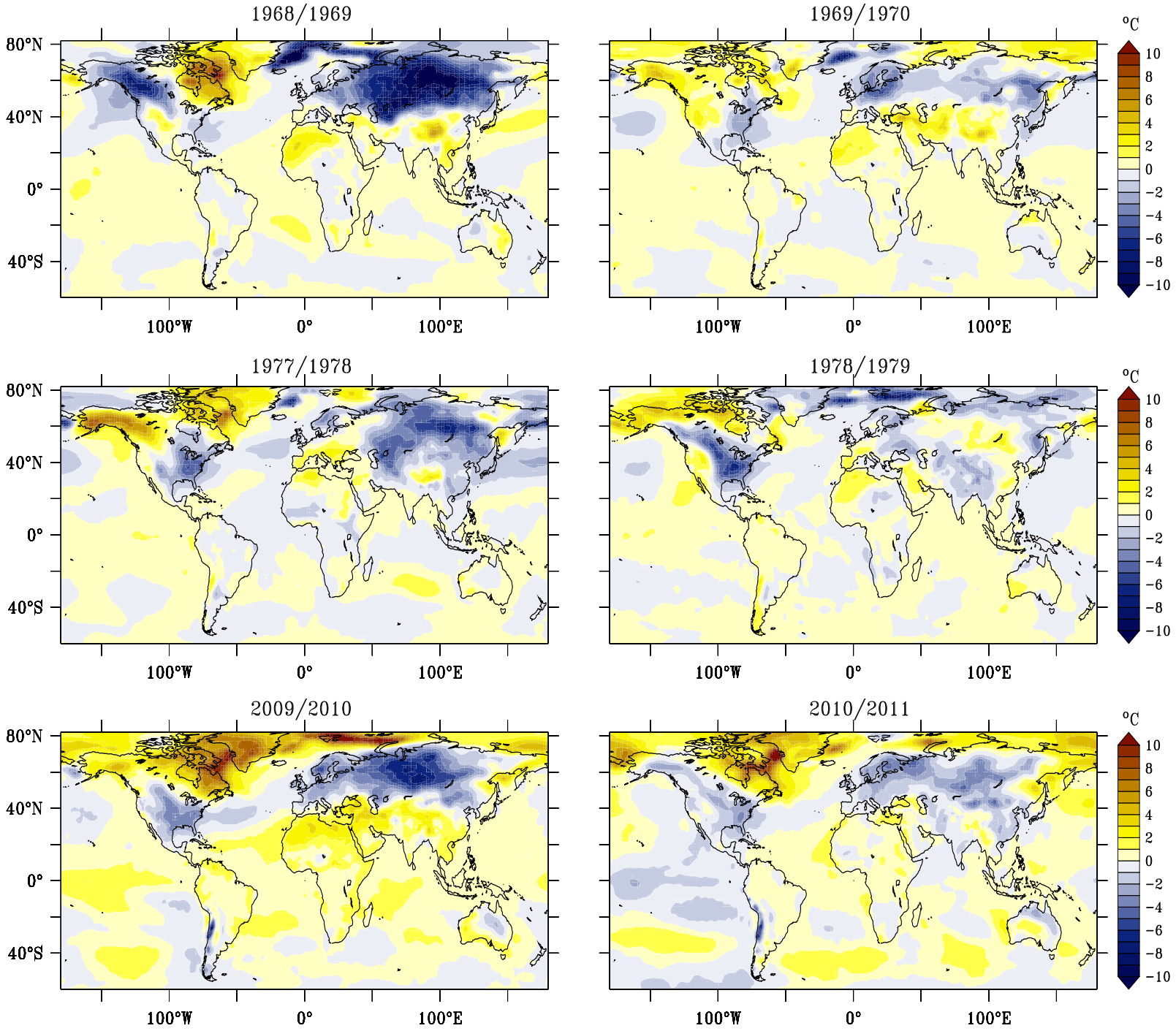
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



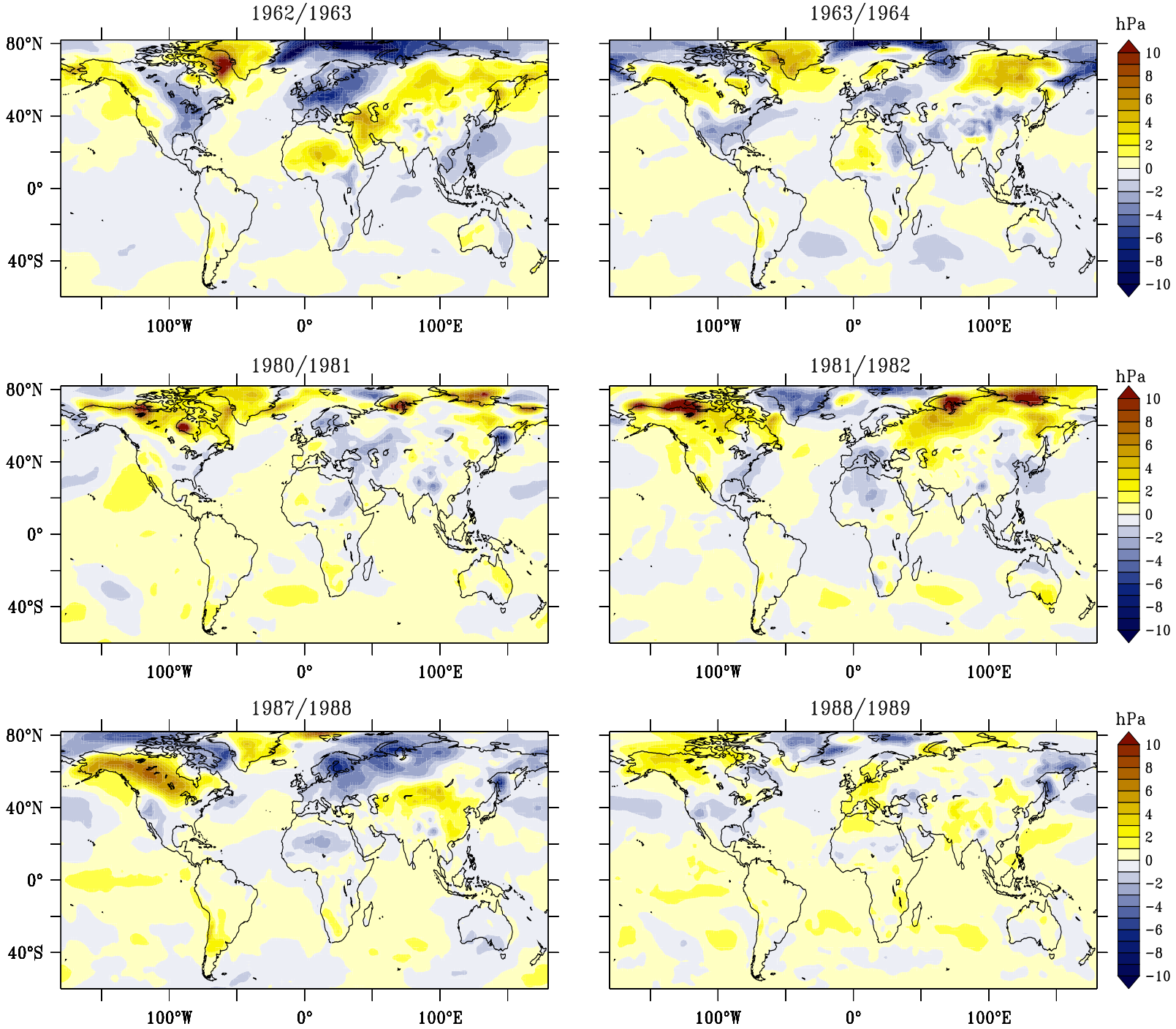
Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change

VALOR

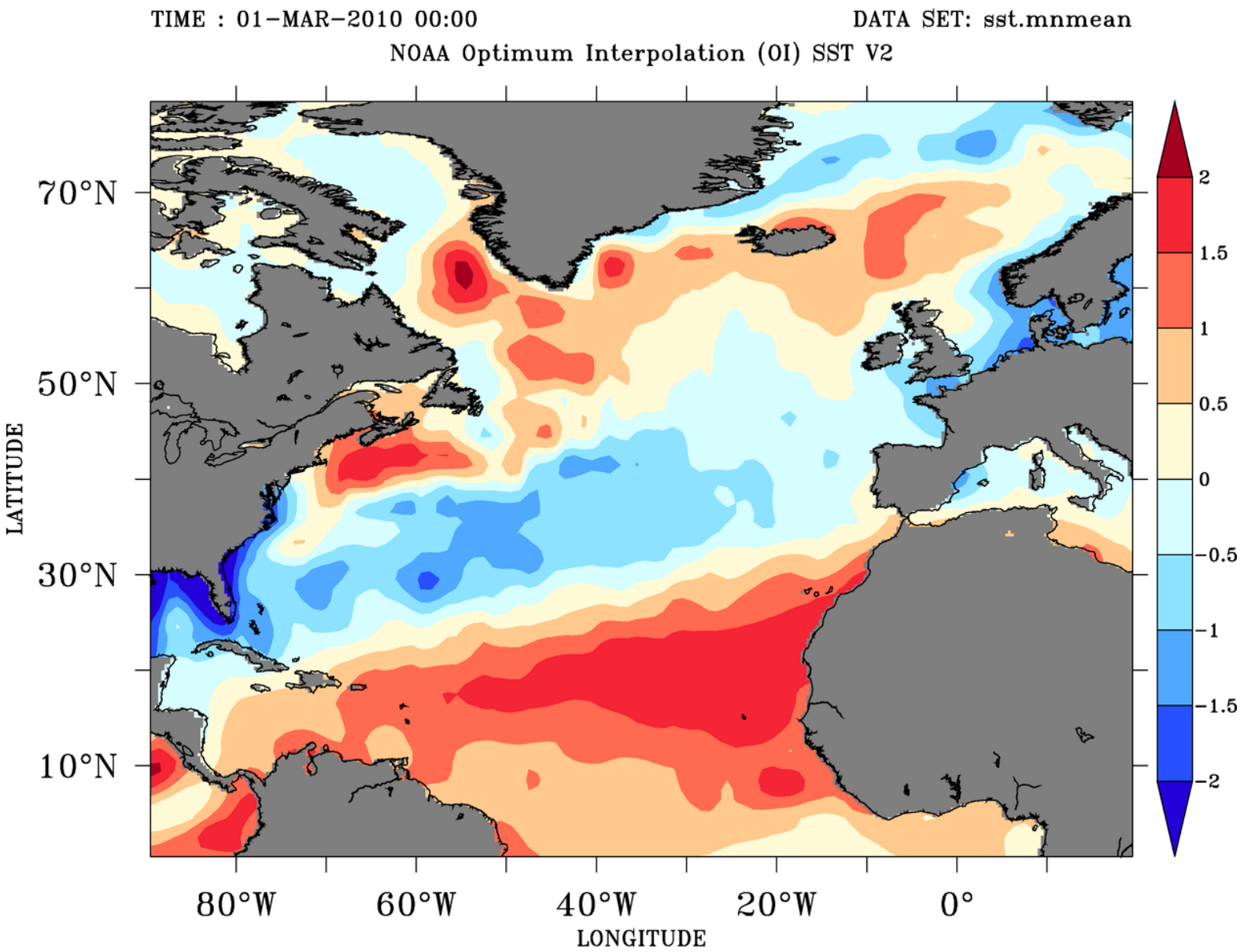
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Historical analogues to the recently observed minima in the AMOC

Blaker et al.

Rapid Climate Change
VALOR
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



March 2010 SST anomaly

Historical analogues to the recently observed minima in the AMOC

Blaker et al.

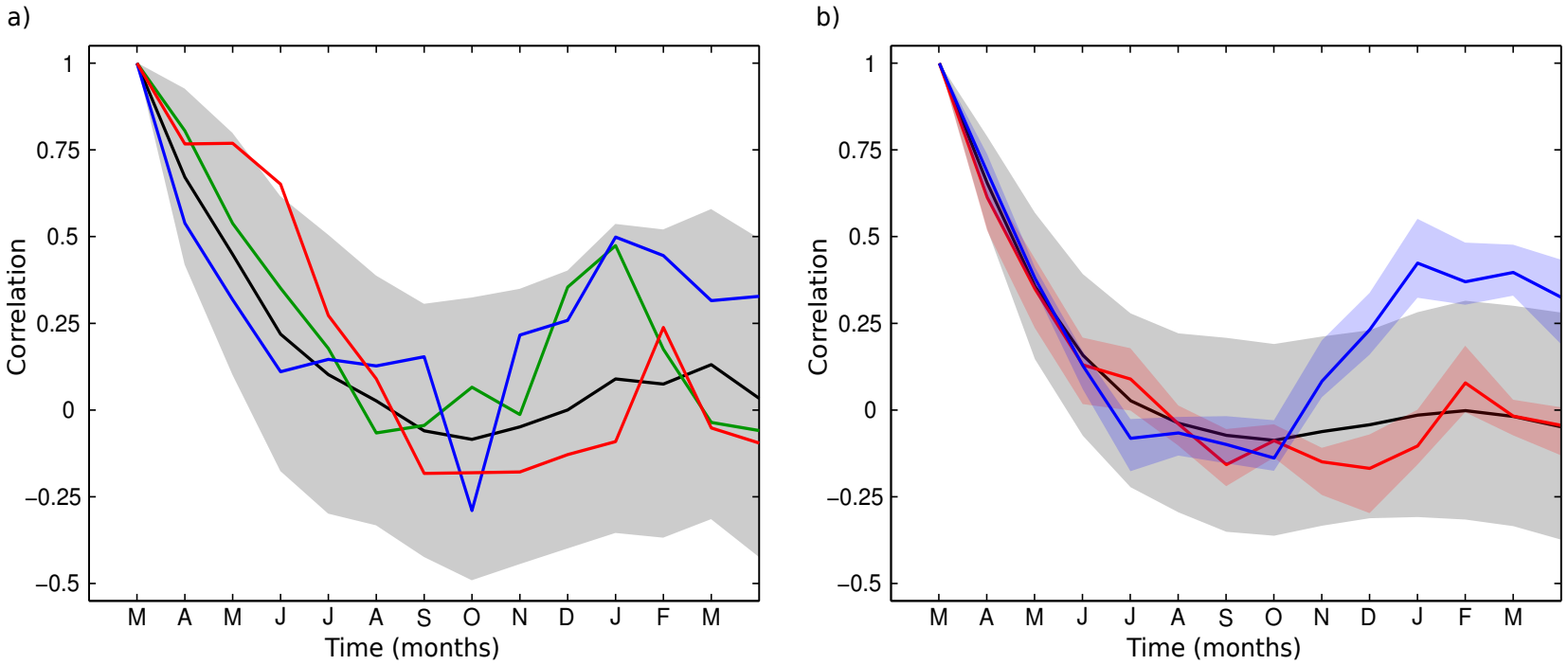
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

Historical analogues to the recently observed minima in the AMOC

Blaker et al.

EN3

ORCA025



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

see Taws et al (2011) GRL

Buchan et al (2013), MWR, in review

Rapid Climate Change

VALOR

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

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

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