



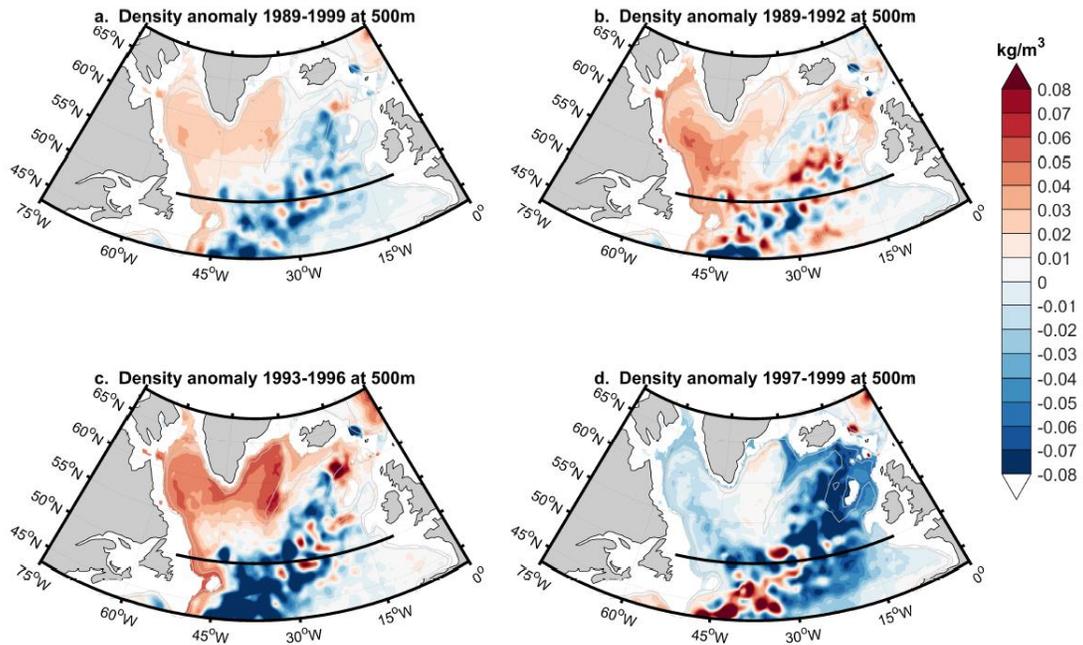
AMS
American Meteorological Society

Supplemental Material

[© Copyright 2020 American Meteorological Society](#)

Permission to use figures, tables, and brief excerpts from this work in scientific and educational works is hereby granted provided that the source is acknowledged. Any use of material in this work that is determined to be “fair use” under Section 107 of the U.S. Copyright Act or that satisfies the conditions specified in Section 108 of the U.S. Copyright Act (17 USC §108) does not require the AMS’s permission. Republication, systematic reproduction, posting in electronic form, such as on a website or in a searchable database, or other uses of this material, except as exempted by the above statement, requires written permission or a license from the AMS. All AMS journals and monograph publications are registered with the Copyright Clearance Center (<http://www.copyright.com>). Questions about permission to use materials for which AMS holds the copyright can also be directed to permissions@ametsoc.org. Additional details are provided in the AMS Copyright Policy statement, available on the AMS website (<http://www.ametsoc.org/CopyrightInformation>).

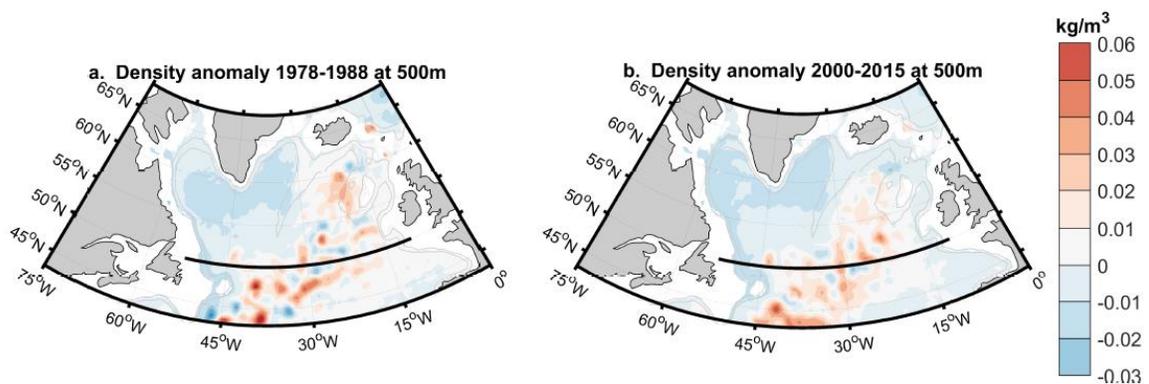
1 Supplementary Materials



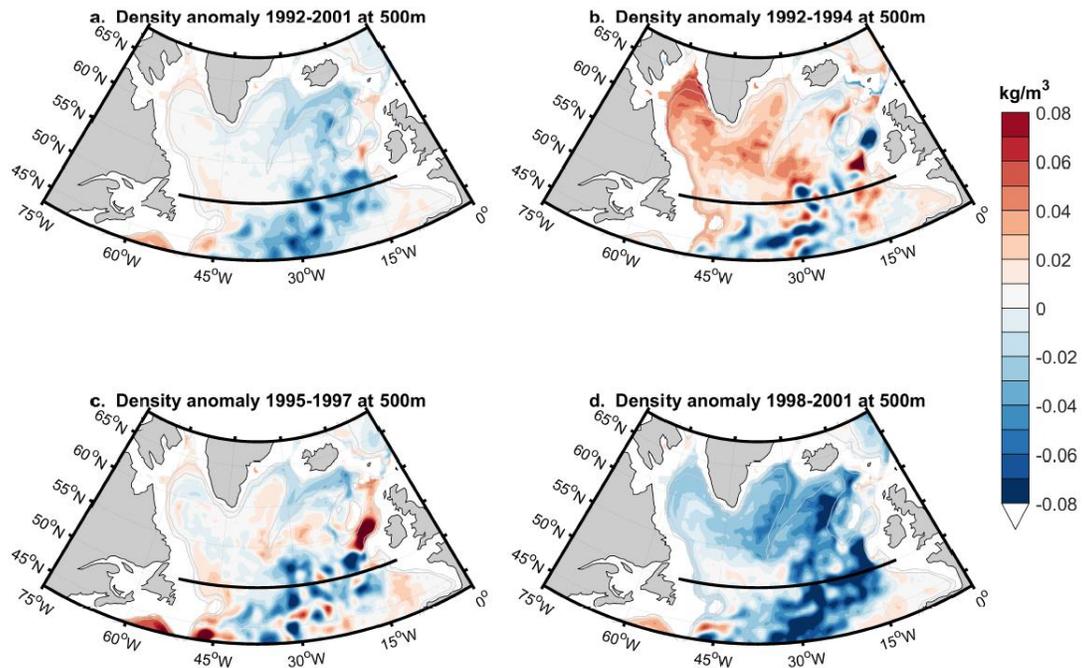
2

3 **Figure S1. (a)** Density anomalies at 500m during 1989-1999 in HYCOM. This decade is characterized by
4 strong AMOC (**Figure 10c**). 50°N section is shown as a black line. 1000m and 2000m isobaths are shown
5 in gray. **(b-d)** Similar to **(a)**, except that during 1989-1992 **(b)**, 1993-1996 **(c)** and 1997-1999 **(d)**. The
6 three short time periods between 1989 and 1999 represent the years when AMOC increases, reaches the
7 maximum, and decreases.

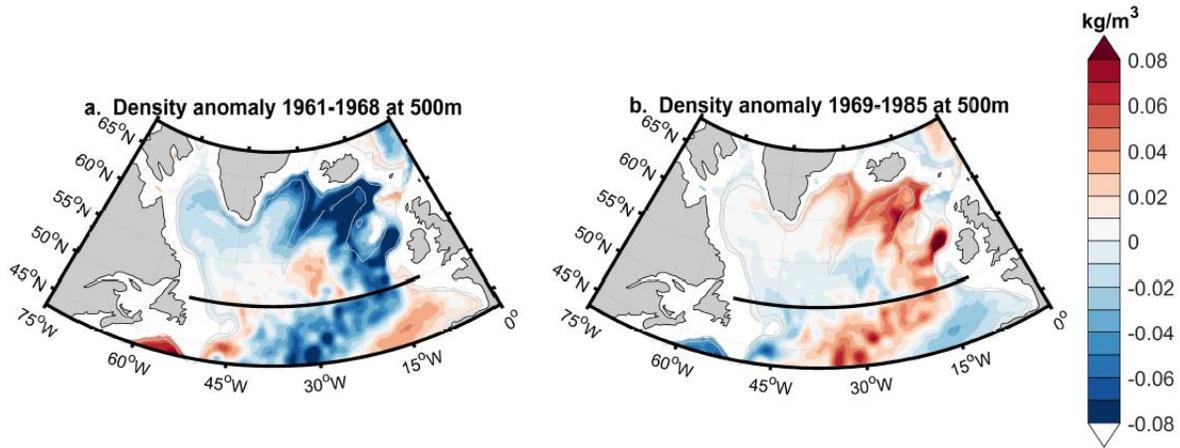
8



9 **Figure S2.** Density anomalies at 500m during 1978-1988 (a) and 2000-2015 (b) in HYCOM. These two
10 decades are associated with weak decadal AMOC strength (**Figure 10c**). 50°N section is shown as a black
11 line. 1000m and 2000m isobaths are shown in gray.

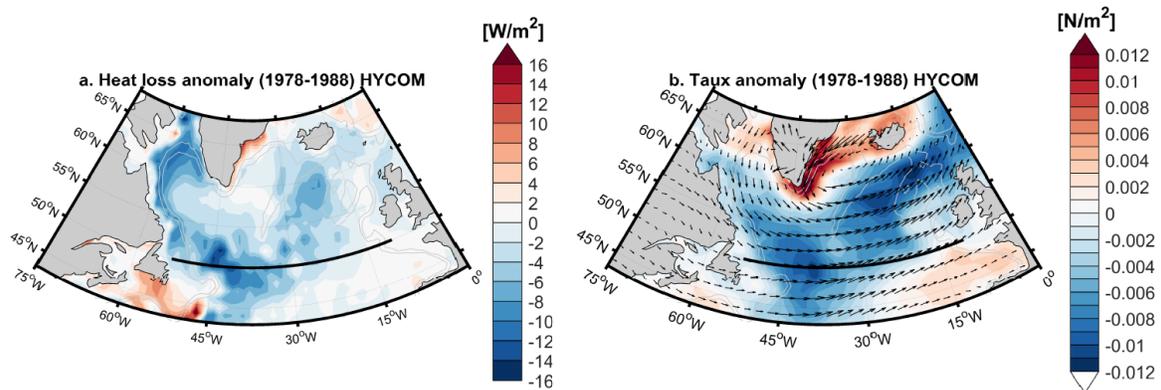


12
13 **Figure S3.** (a) Density anomalies at 500m during 1992-2001 in ORCA. This period is characterized by
14 strong AMOC (**Figure 10b**). 50°N section is shown as a black line. 1000m and 2000m isobaths are
15 shown in gray. (b-d) Similar to (a), except that during 1992-1994 (b), 1995-1997 (c) and 1998-2001 (d).
16 The three short time periods between 1992 and 2001 represent the years when AMOC increases, reaches
17 the maximum, and decreases.



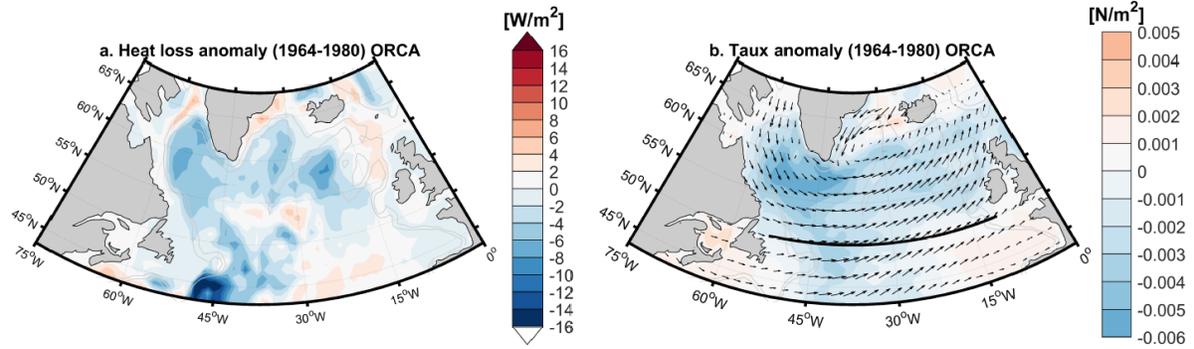
18

19 **Figure S4.** (a) Density anomalies at 500m during 1961-1968 in ORCA, when AMOC is strong. (b)
 20 During 1969-1985 in ORCA, when AMOC is weak. 50°N section is shown as a black line. 1000m and
 21 2000m isobaths are shown in gray.



22

23 **Figure S5.** (a) Surface heat loss anomalies during period of weak decadal AMOC (1978-1988) in
 24 HYCOM. Negative values indicate less heat loss from ocean to the atmosphere. The 50°N section is
 25 shown as a black line. (b) Zonal wind stress magnitude anomalies during the same period. Negative
 26 values indicate weaker zonal wind stress without considering its sign. The climatological zonal and
 27 meridional wind stress fields are shown with black arrows for reference. The heat loss and wind stress
 28 anomalies during the other weak AMOC period (2000-2015) are similar to these plots.



29

30 **Figure S6. (a)** Surface heat loss anomalies during 1964-1980 in ORCA. This time period is 5 years
 31 before the weak decadal AMOC takes place (1969-1985). **(d)** Zonal wind stress magnitude anomalies
 32 during the same period. The climatological zonal and meridional wind stress fields are shown with black
 33 arrows for reference.

34