

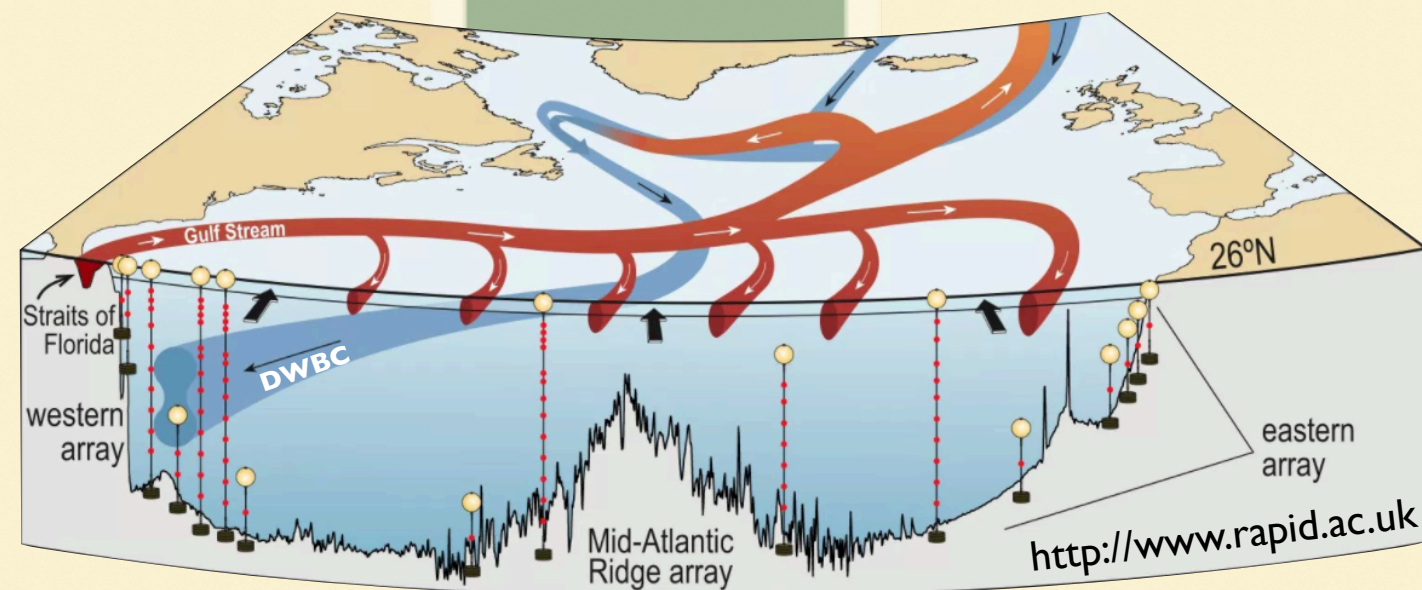
Interior pathways of Labrador Sea Water in the North Atlantic from the Argo perspective

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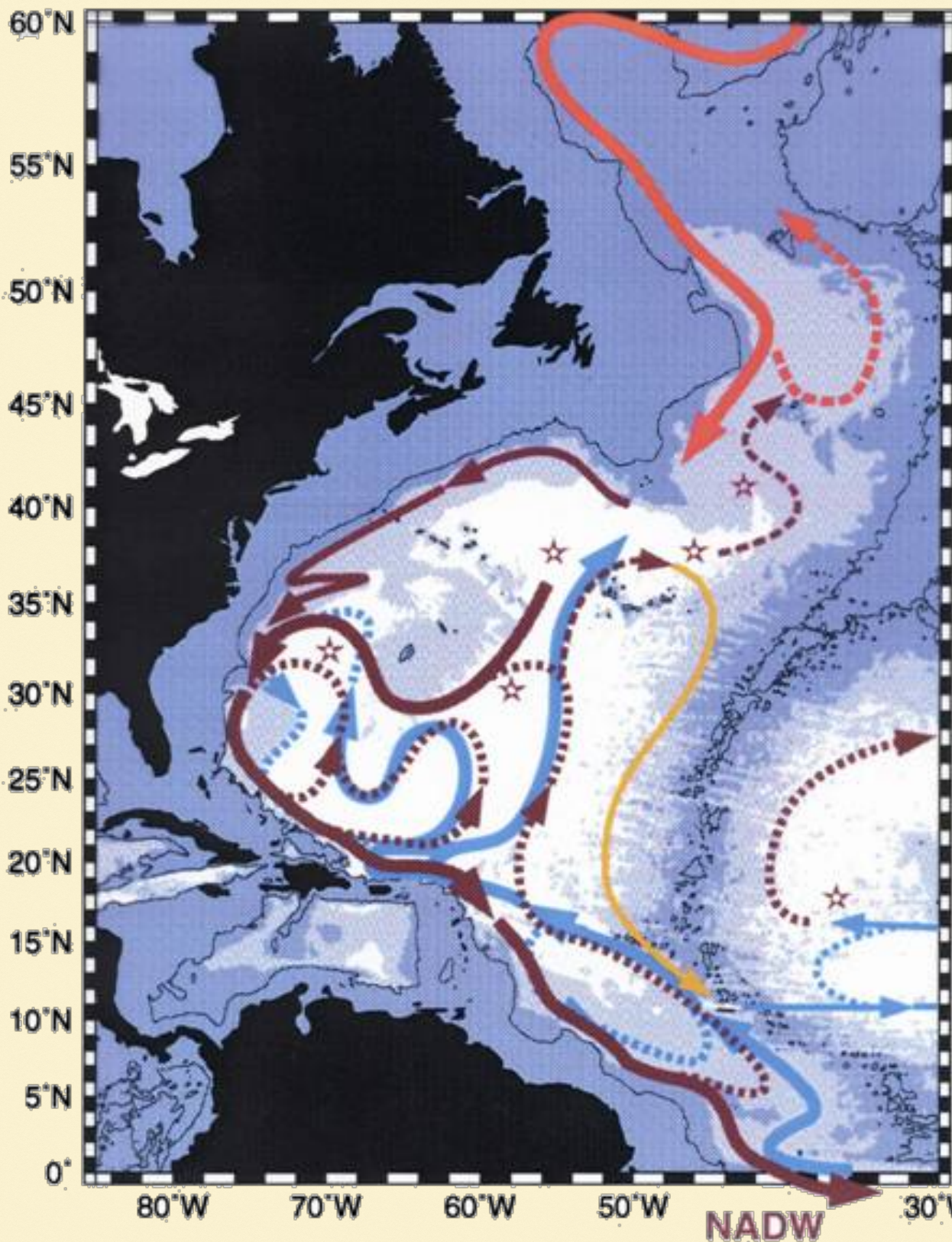
07-12 April 2019



Awards

OCE1332978
OCE1259398
OCE1756231

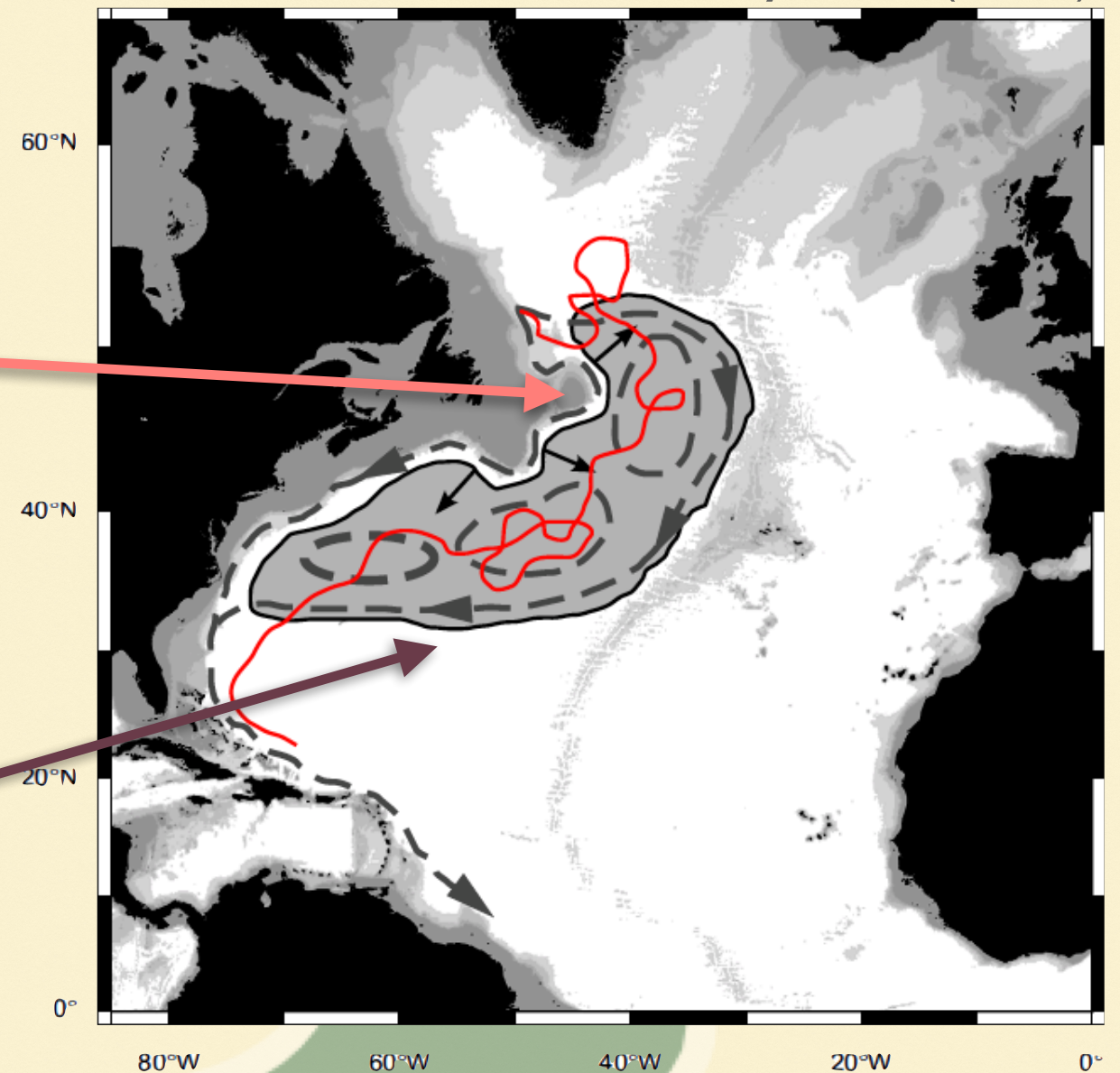
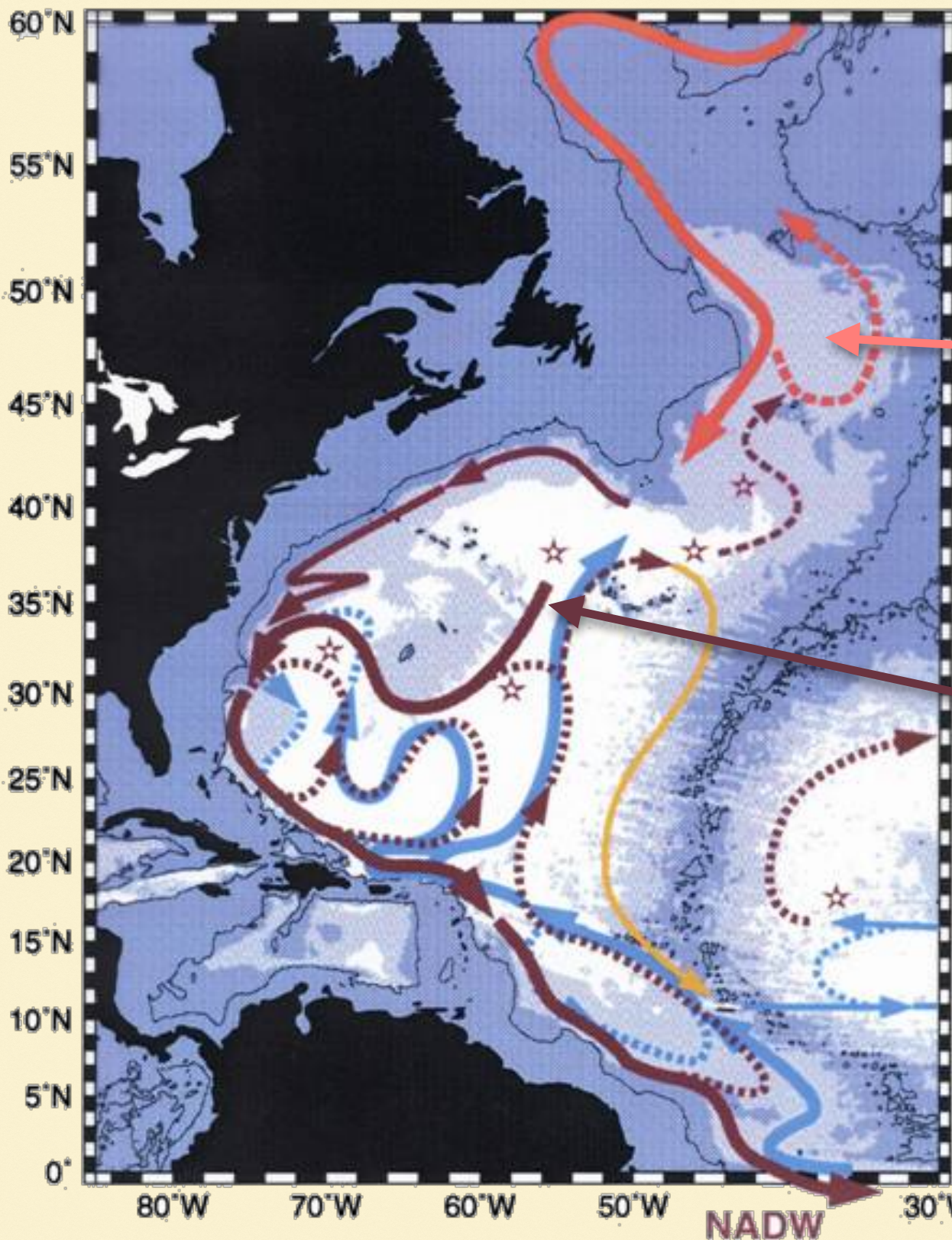
The deep circulation ($z > 1000$ m) in the North Atlantic



Talley et al. (2011)

The deep circulation ($z > 1000$ m) in the North Atlantic

Gary et al. (2011)



Anti-cyclonic gyre (Lozier, 1997)

Talley et al. (2011)

Goal

Describe the mean Labrador Sea Water (LSW) interior pathways and estimate the LSW circulation strength mainly using the Argo array



Goal

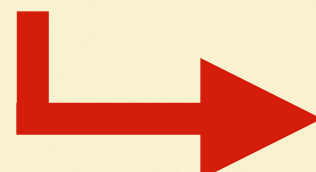
Describe the mean Labrador Sea Water (LSW) interior pathways and estimate the LSW circulation strength mainly using the Argo array

Data and Methods

Mean Absolute Geostrophic Velocity at 0-2000 m
(2004-2016)

RG - T and S Argo Climatology
+ (Roemmich & Gilson, 2009)

Argo drift data YoMaHa'07
~1000 dbar (Lebedev et al., 2007)

 **Dynamical Method**

Goal

Describe the mean Labrador Sea Water (LSW) interior pathways and estimate the LSW circulation strength mainly using the Argo array

Data and Methods

Mean Absolute Geostrophic Velocity at 0-2000 m
(2004-2016)

(Li et al., 2006)

RG - T and S Argo Climatology
+

Argo drift data YoMaHa'07
~1000 dbar

Ψ at $\sigma_2 = 36.88 \text{ kg m}^{-3}$

(van Sebille et al., 2011)

Transport:

World Ocean Atlas
 $z > 2000 \text{ m}$

uLSW

$36.50 \leq \sigma_2 \leq 36.82$

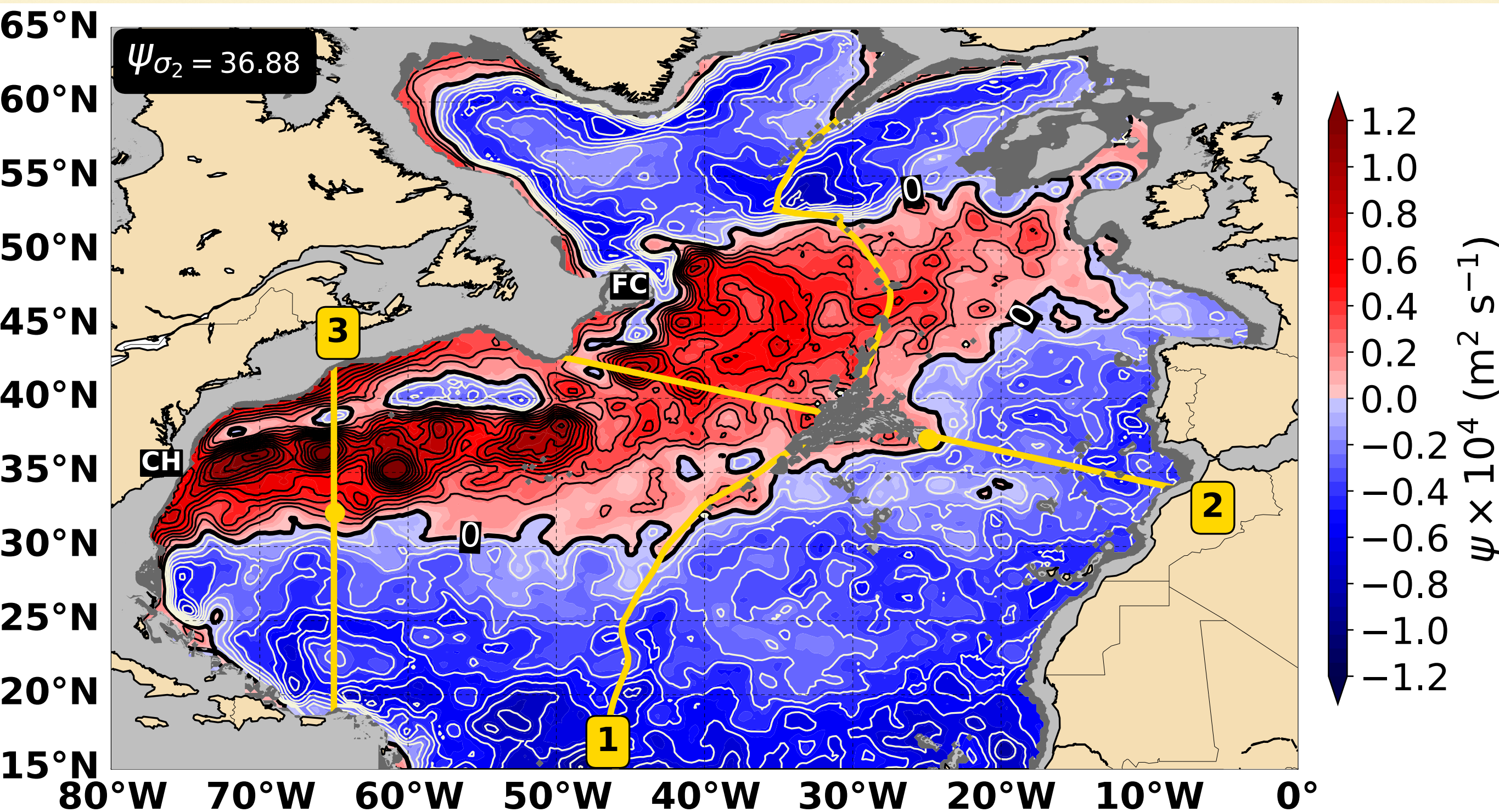
cLSW

$36.82 < \sigma_2 \leq 36.97$

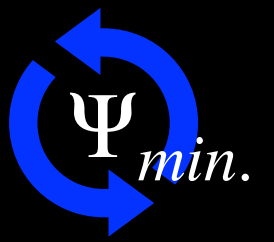
Dynamical Method



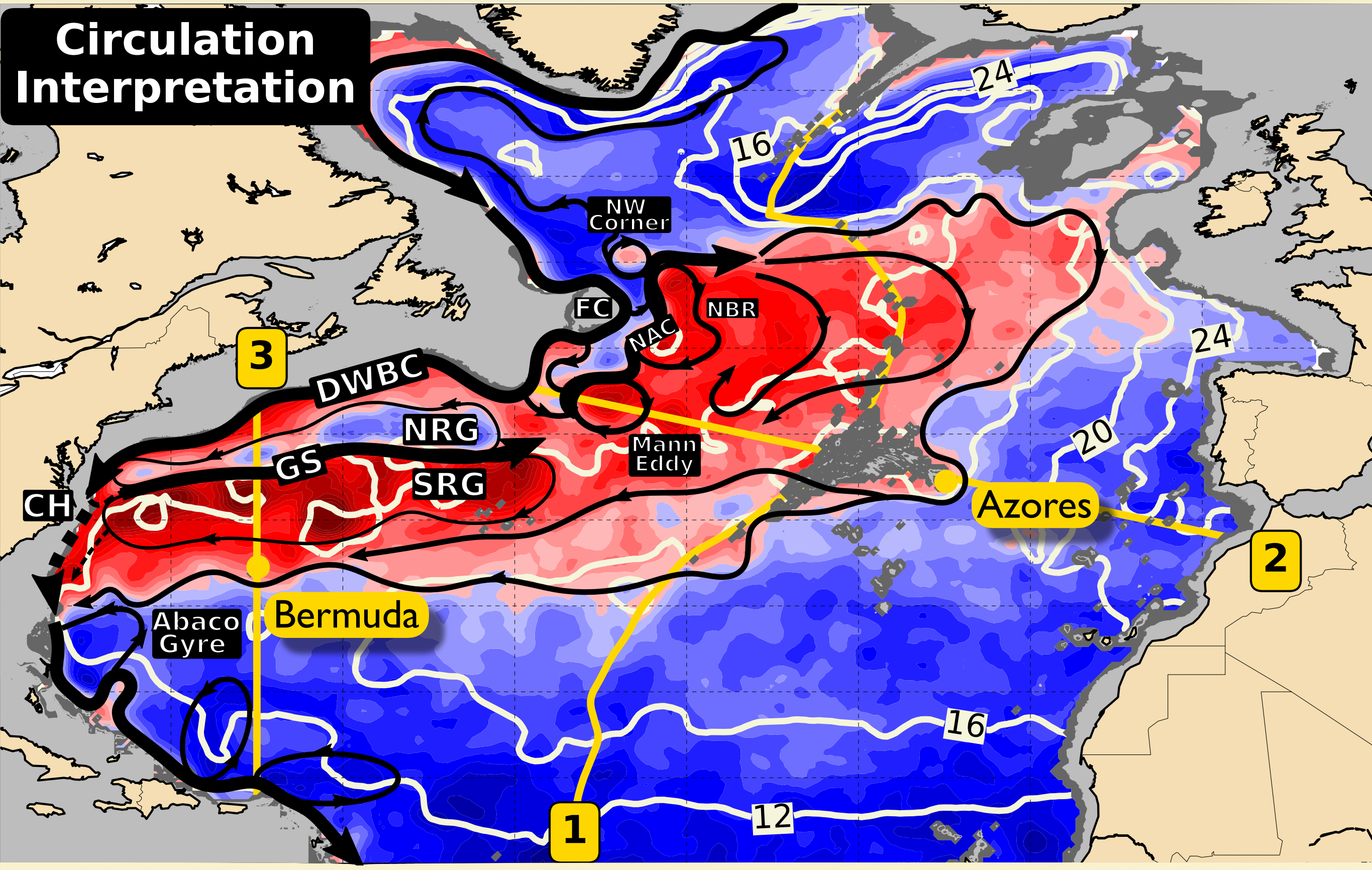
$\Psi_{min.}$

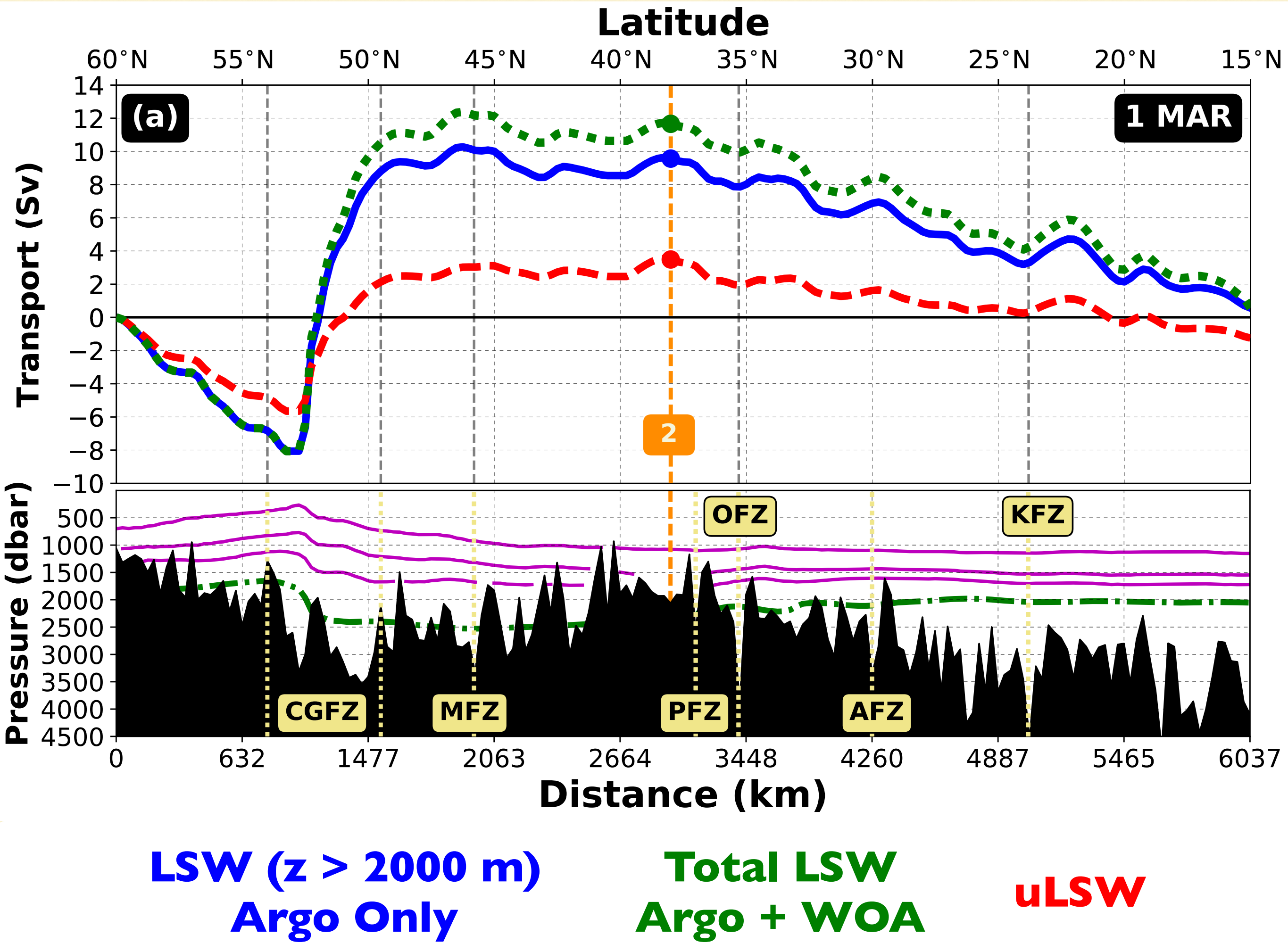


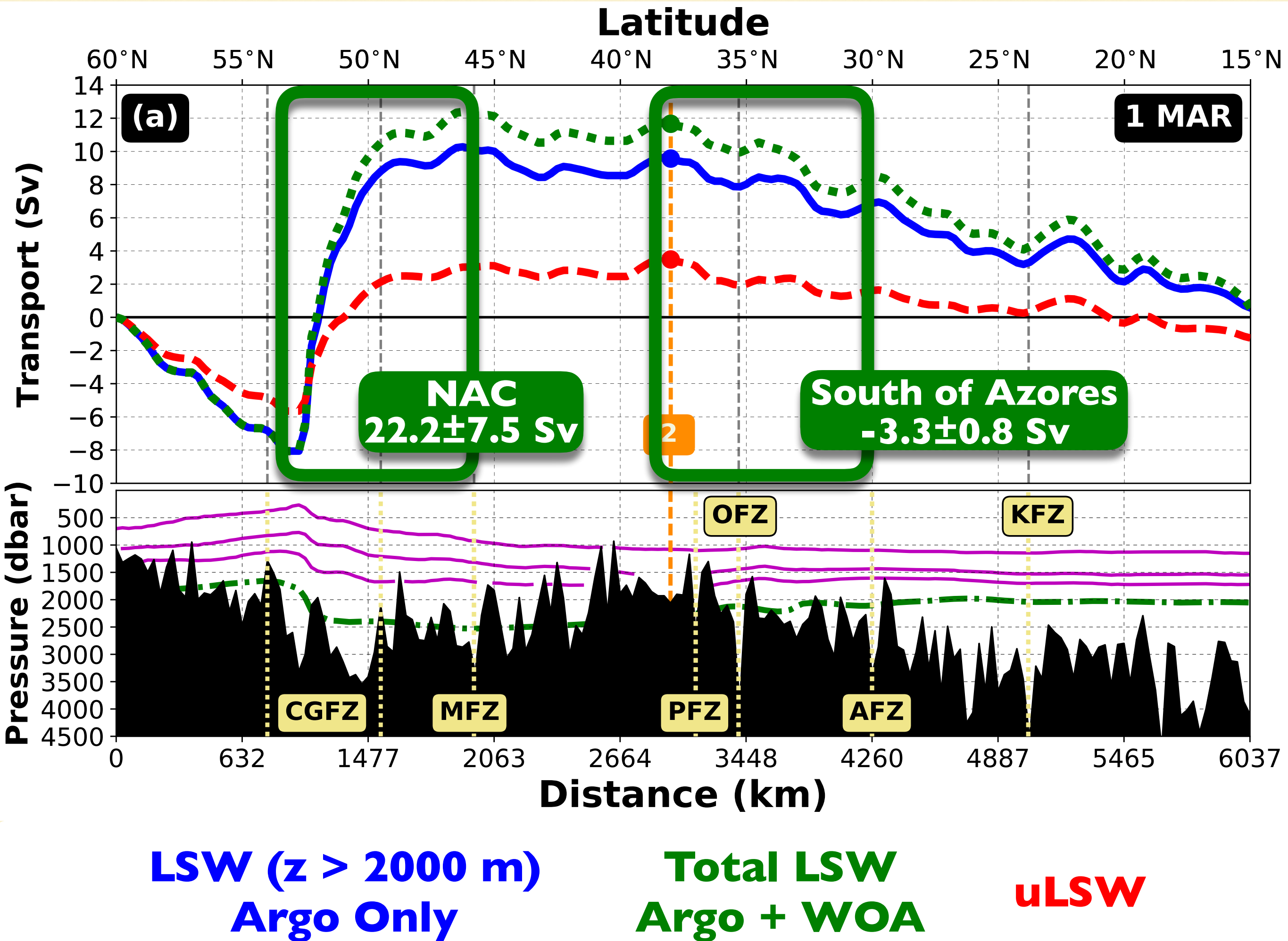
$$PV = -\frac{f_0}{\rho} \frac{\partial \sigma}{\partial z} \times 10^{-12} \text{ m}^{-1} \text{ s}^{-1}$$



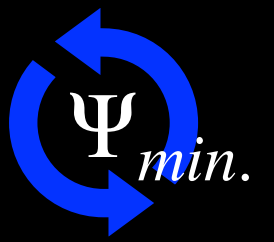
Circulation Interpretation



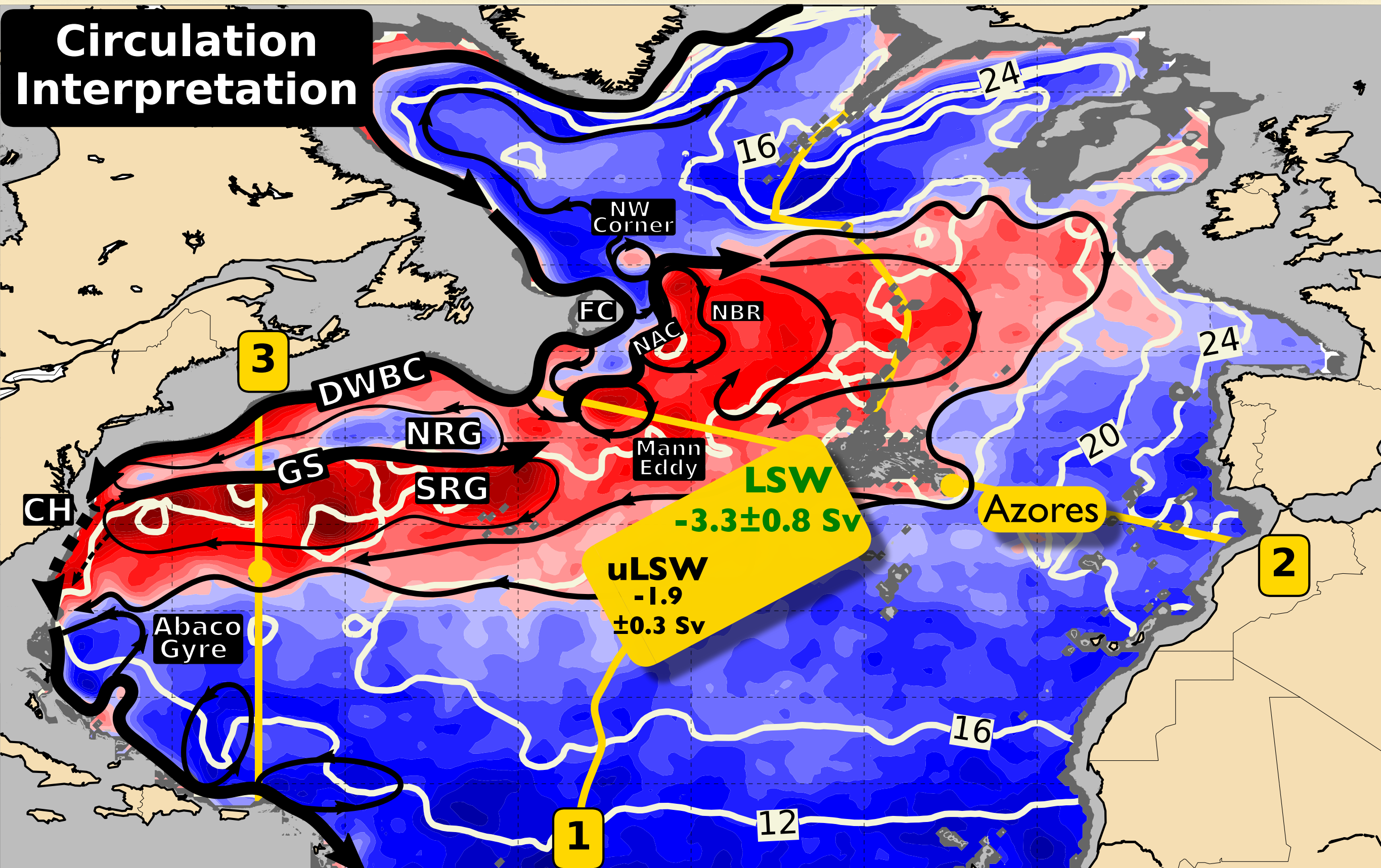




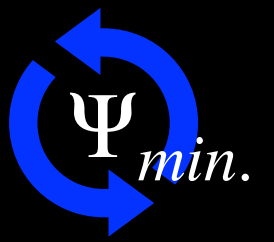
LSW Transports



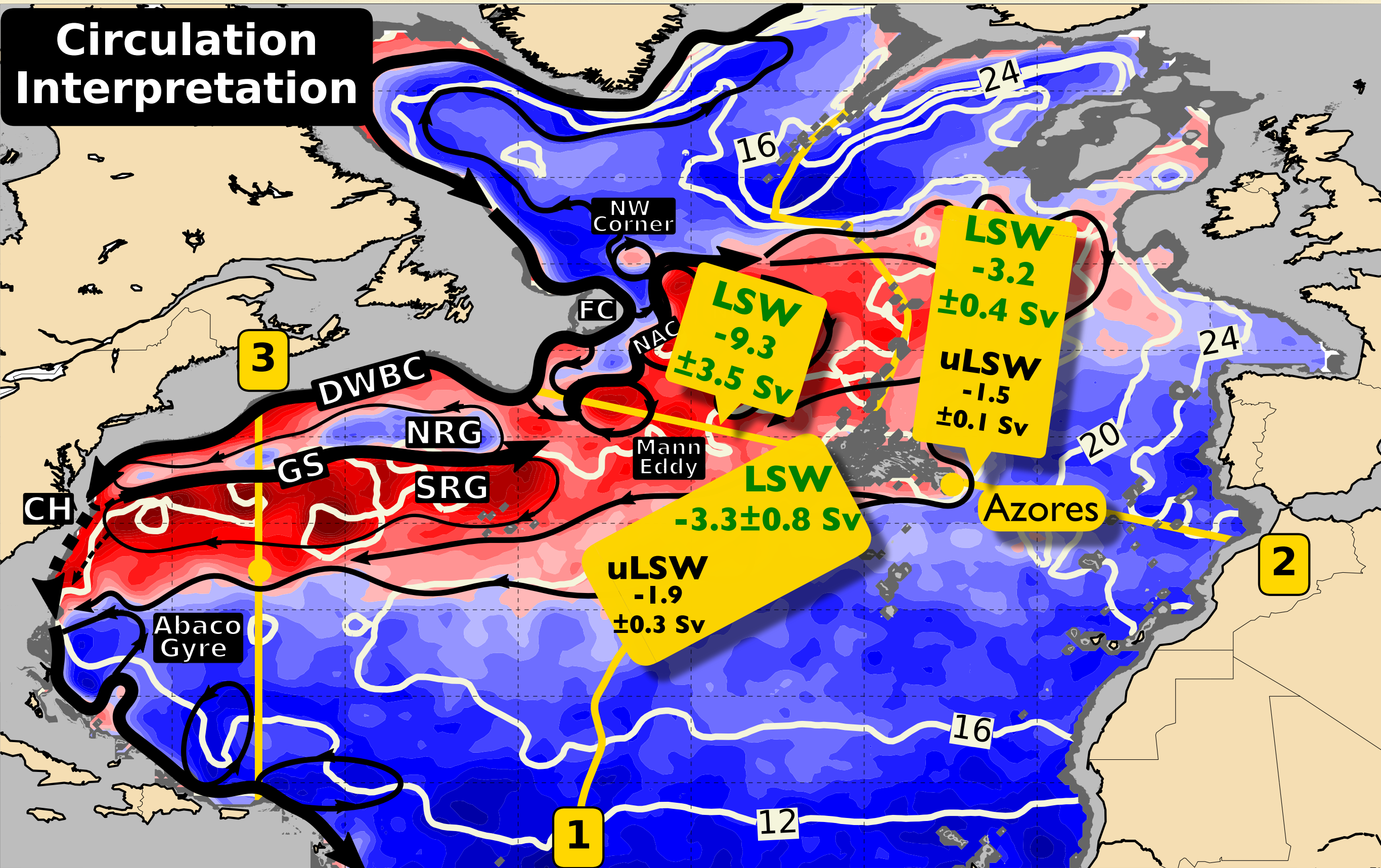
Circulation Interpretation



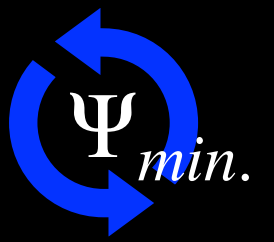
LSW Transports



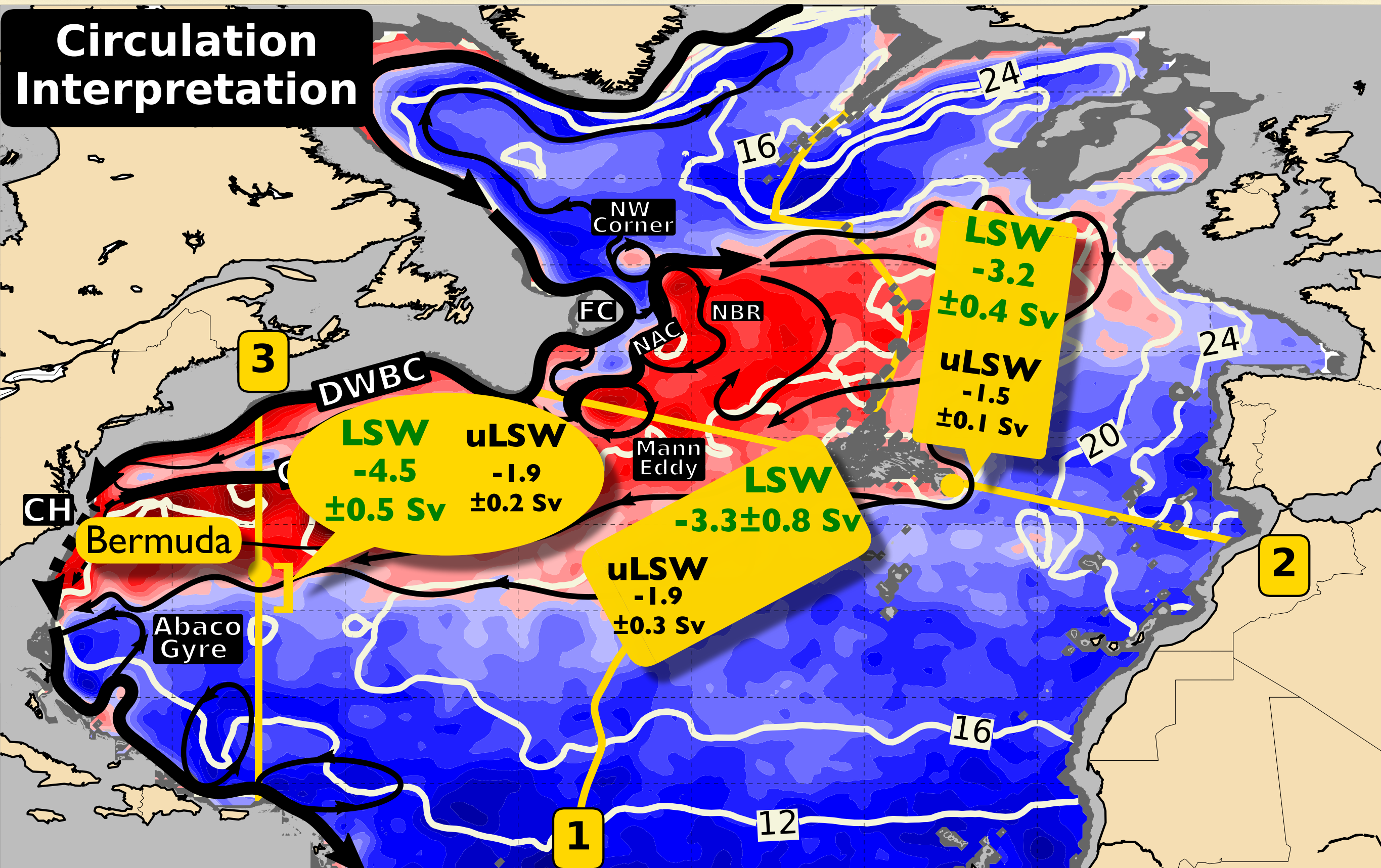
Circulation Interpretation



LSW Transports



Circulation Interpretation



Take-home messages

Transports validation (not shown here):

We obtained good comparisons with regional transport estimates at different areas



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Compelling description of the LSW spreading patterns in the North Atlantic

Although most of the LSW recirculates in the Newfoundland Basin, the ~ 3 Sv that crosses the MAR feeds the quasi-zonal pathway along 30°N

Take-home messages

Transports validation (not shown here):

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Compelling description of the LSW spreading patterns in the North Atlantic

Although most of the LSW recirculates in the Newfoundland Basin, the ~ 3 Sv that crosses the MAR feeds the quasi-zonal pathway along 30°N

PV distribution: significant water transformation processes occurring over the MAR. Processes are likely to include elevated diapycnal mixing.

References

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Thank You

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<https://github.com/tiagobilo/>

Questions?

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