



**PPGOGQG**  
**TE: Oceanos e Clima**

# Aula 4 – O Oceano Atlântico e a MOC

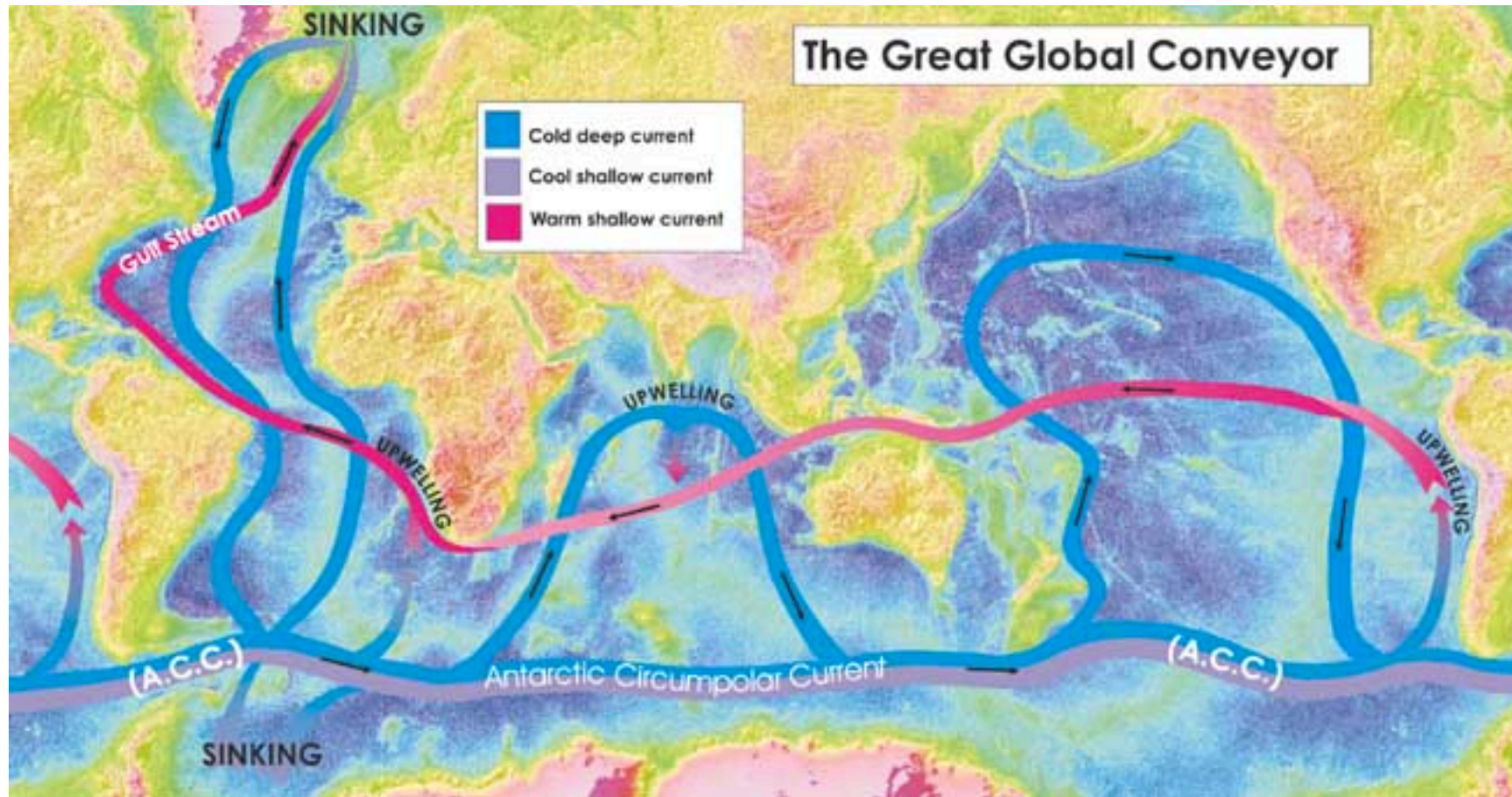
*Prof. Dr. Mauricio M. Mata*

Laboratório de Estudos dos Oceanos e Clima  
(LEOC)

1º SEM. 2016  
Terça-feira – 14:00/16:00h, sala 2119

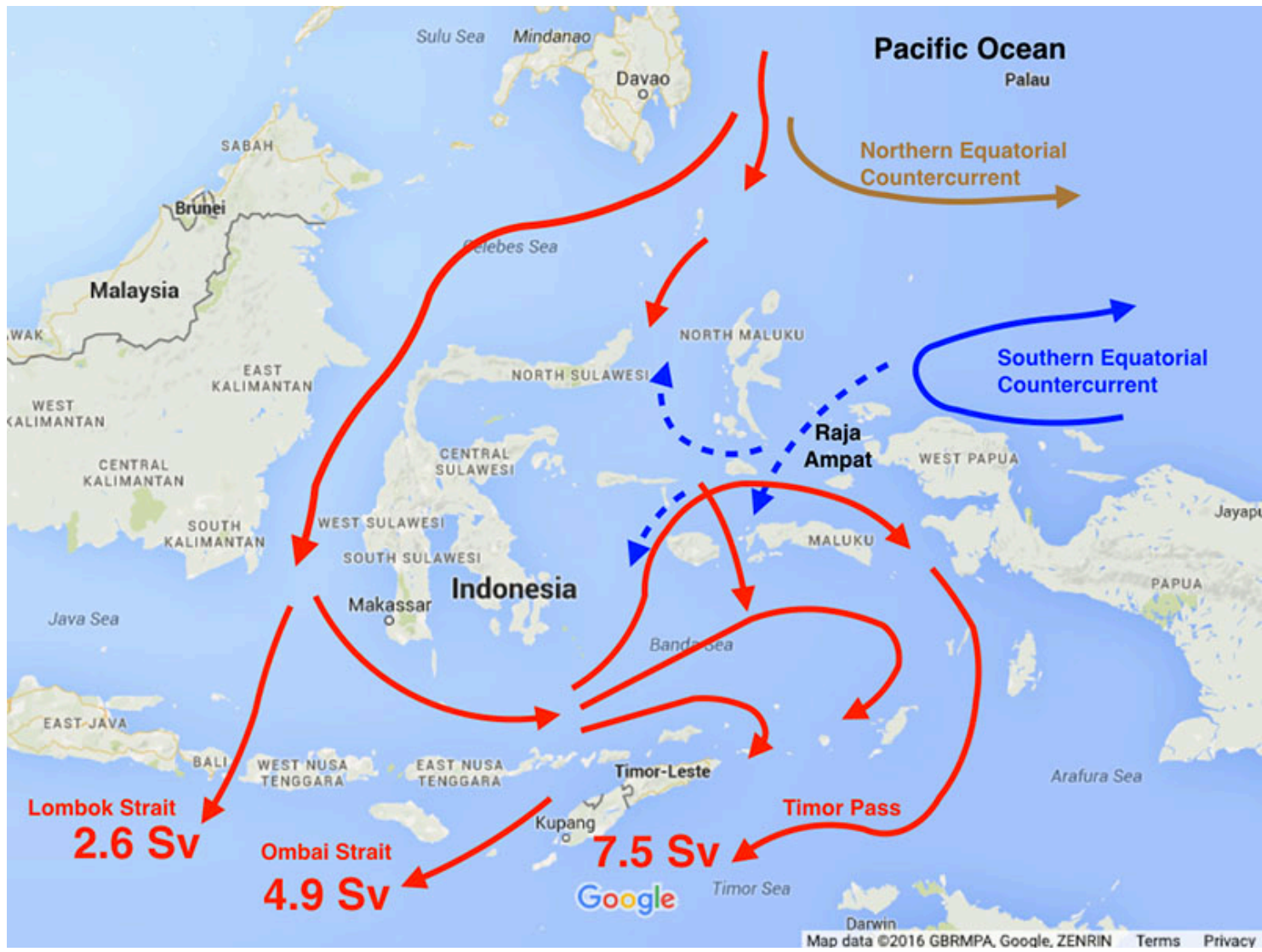


# Conveyor Belt

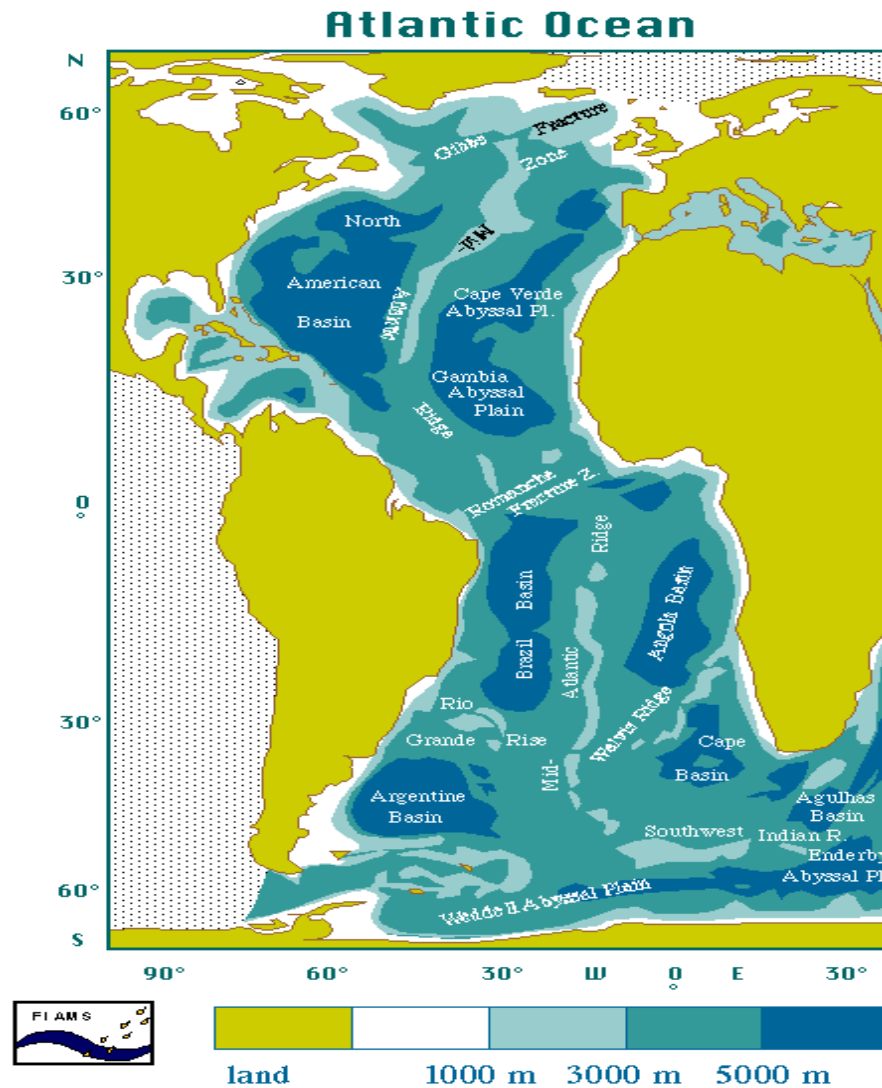


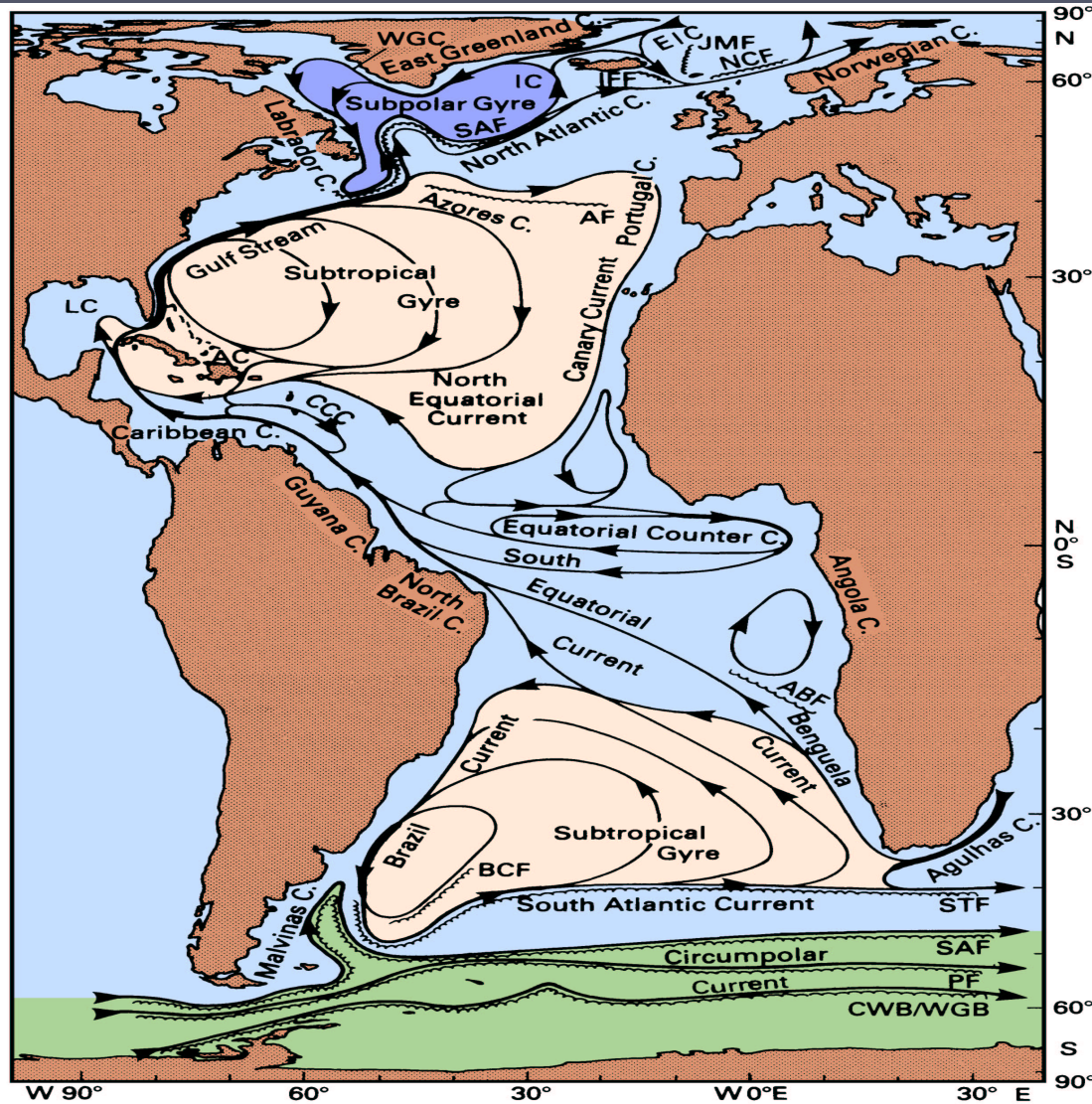


# A Geografia e a continuidade do fluxo



# O Oceano Atlântico





## Correntes de superfície do Oceano Atlântico

Abreviações usadas para correntes:

EIC (Leste da Islândia)

IC (Irminger)

Oeste da Groelândia (WGC)

Loop/Giro (LC)

Antilhas (AC)

Contracorrente do Caribe (CCC)

Abreviações usadas para frentes:

Frente Jan Mayen (JMF)

Frente da Corrente da Noruega (NCF)

Frente da Islândia-Faroe (IFF)

Frente Subártica (SAF)

Frente de Açores (AF)

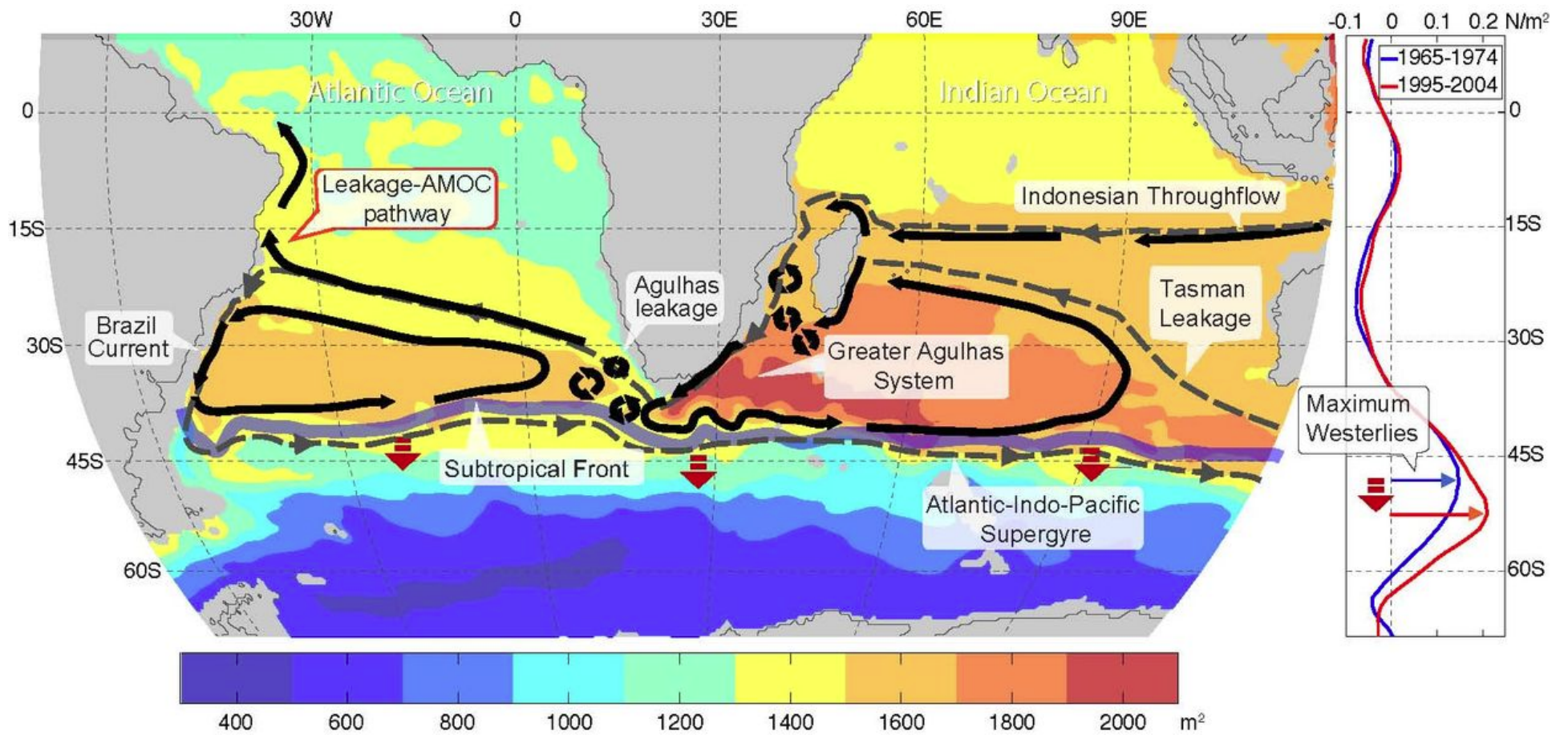
Frente de Angola-Benguela (ABF)

Frente da Corrente do Brasil (BCF)

Frente SubTropical (STF)

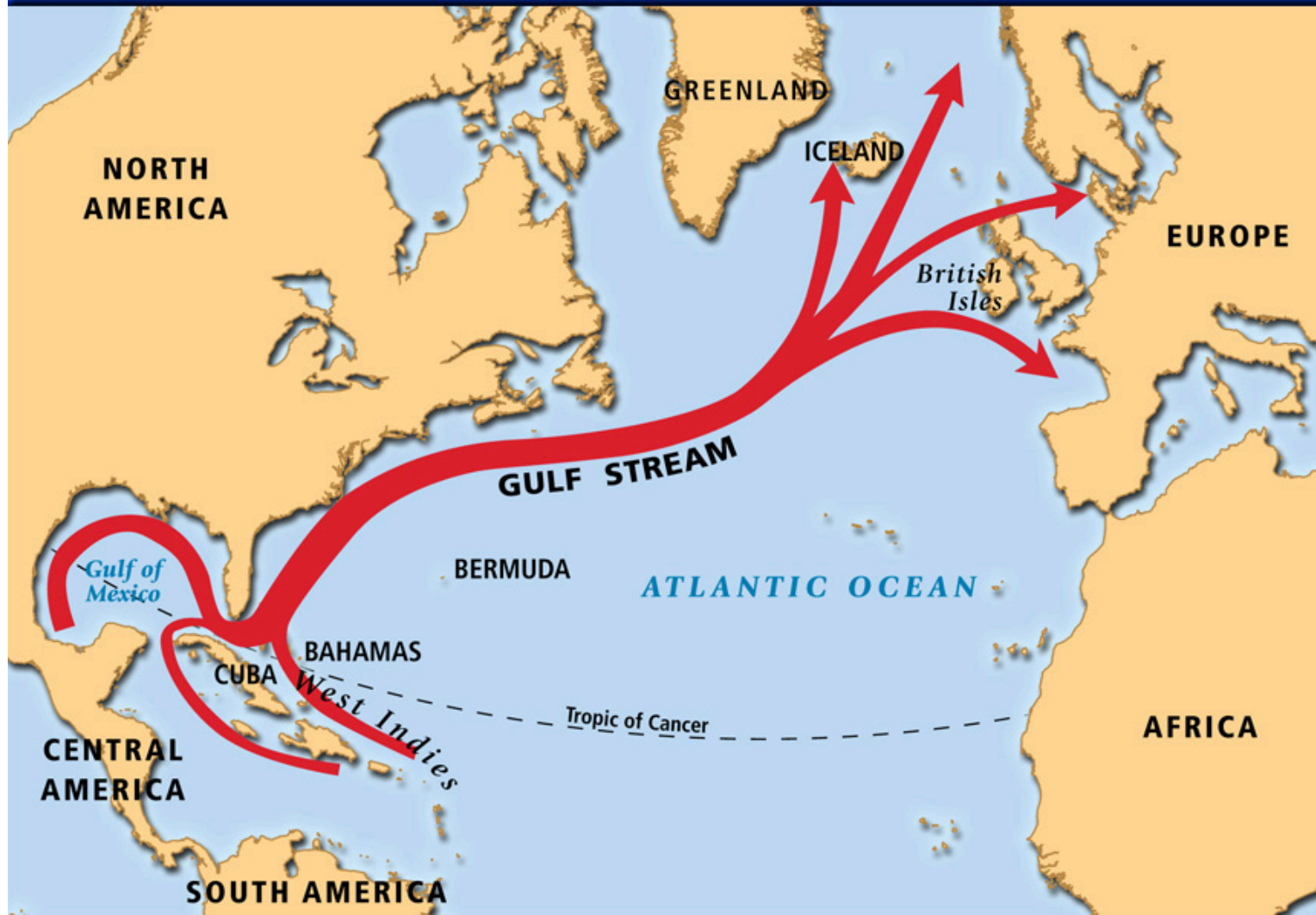
Frente Polar (PF)

Borda do Giro de Weddell (CWB/WGB)



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## Gulf Stream

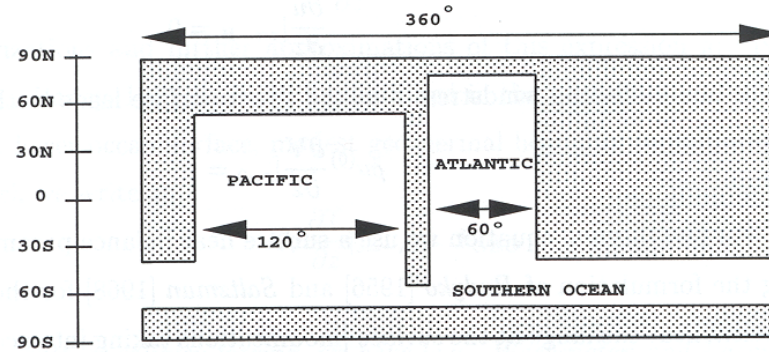




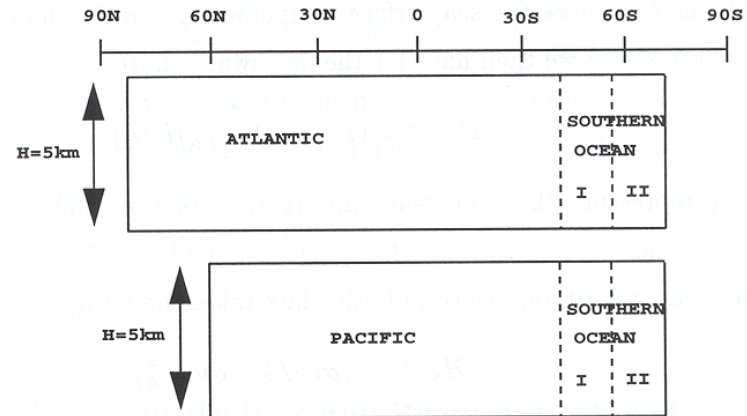
# MODELO PARA MOC

## MODEL GEOMETRY

### LAT/LON SECTION



### VERTICAL/MERIDIONAL SECTION

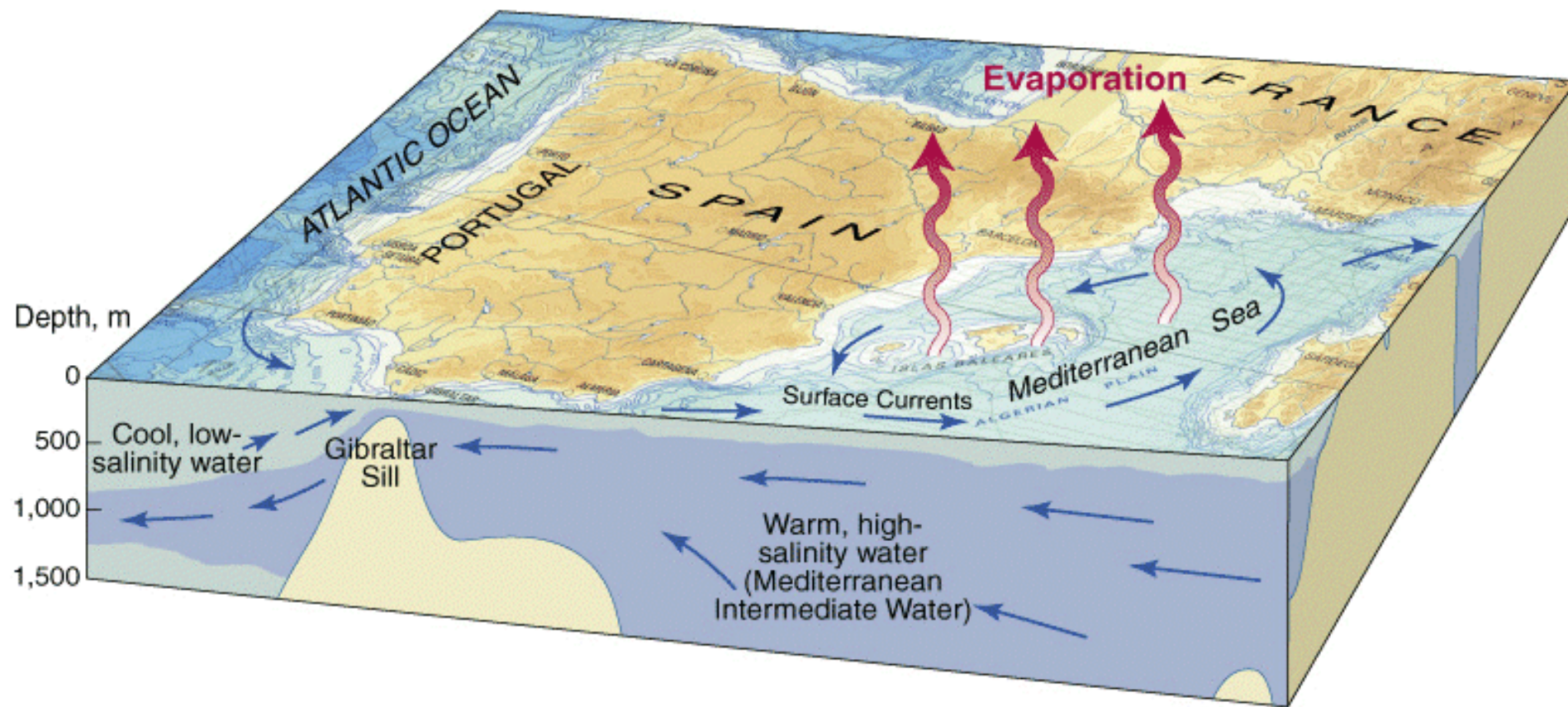


- I: ZONAL PRESSURE GRADIENT EXISTS  
II: NO ZONAL PRESSURE GRADIENT

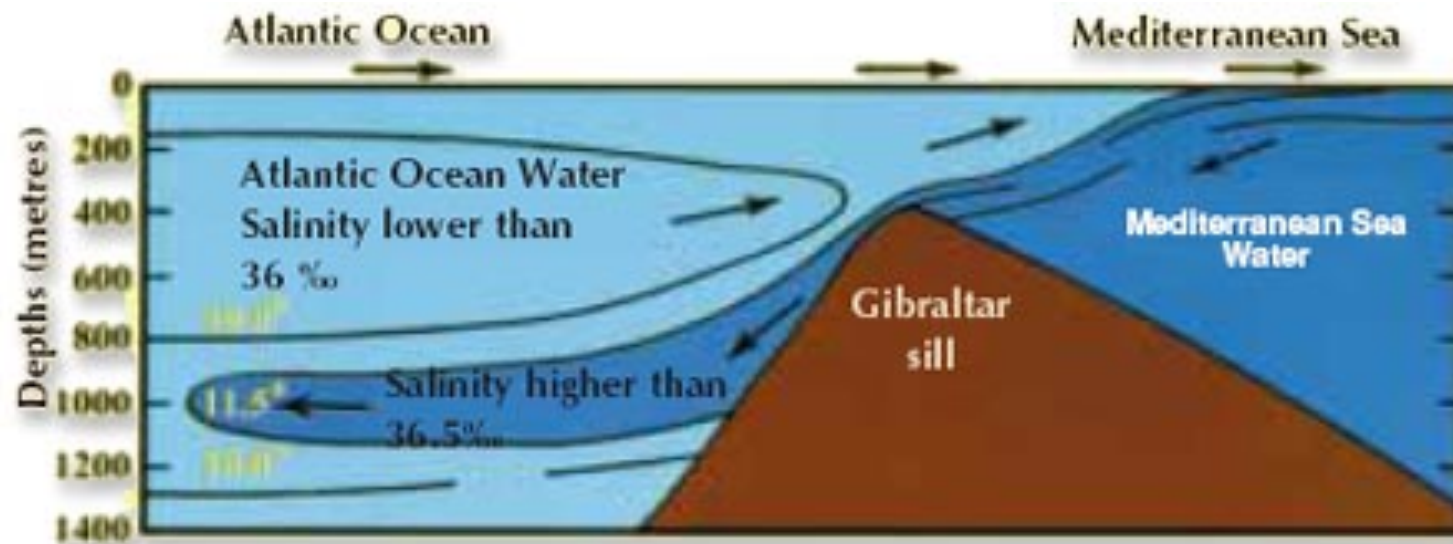


# As propriedades da água do Atlântico

# Componente do Mar Mediterraneo



## Componente do Mar Mediterraneo



## M-Eddies (Mediterranean Eddies)

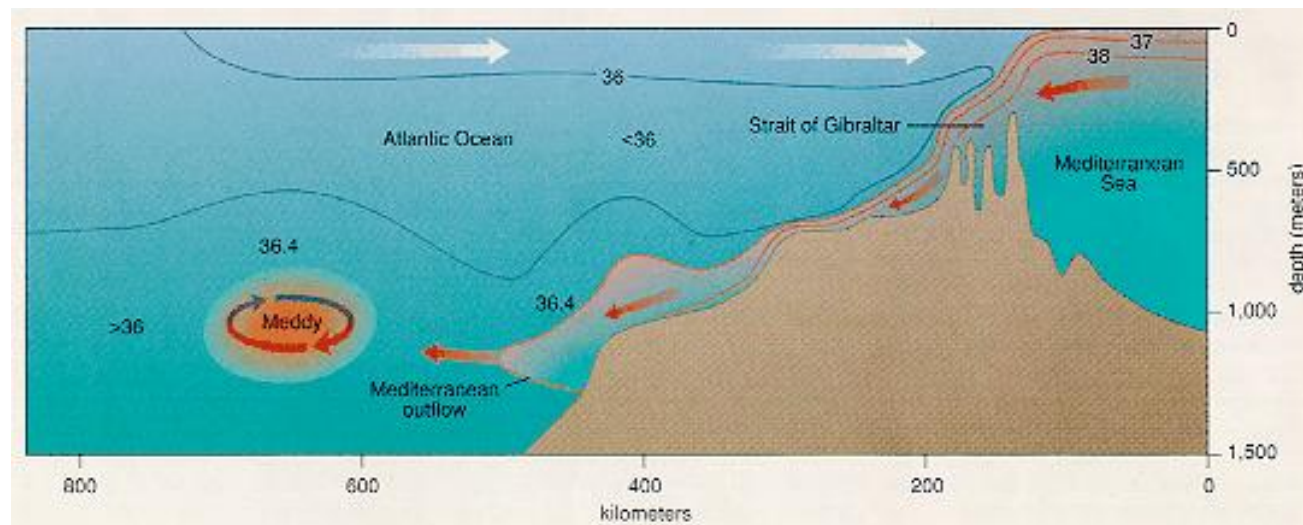


Figure 1a

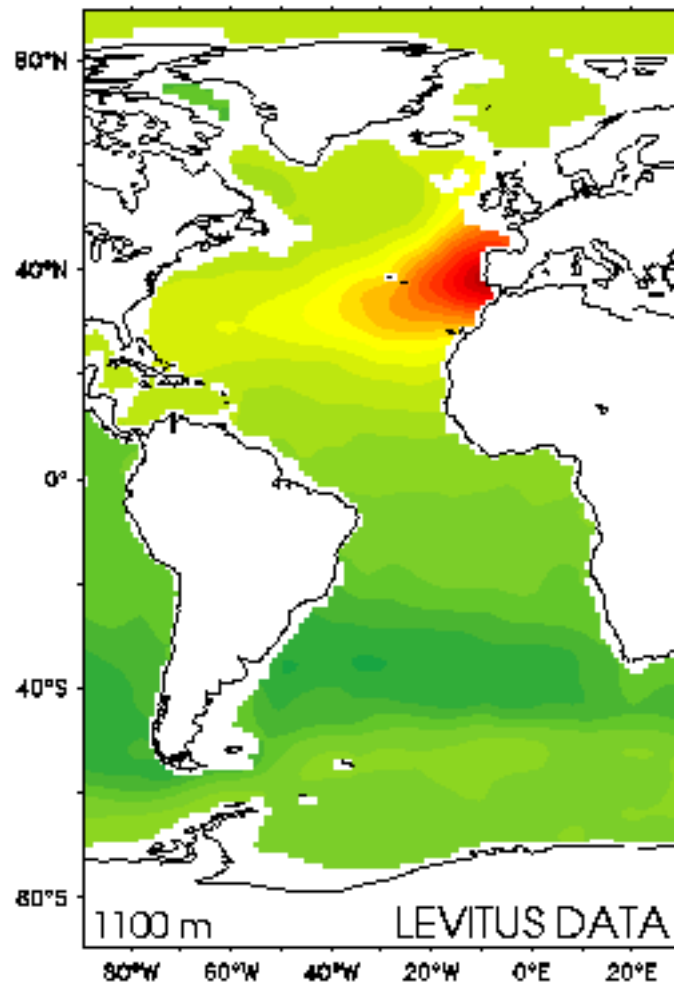
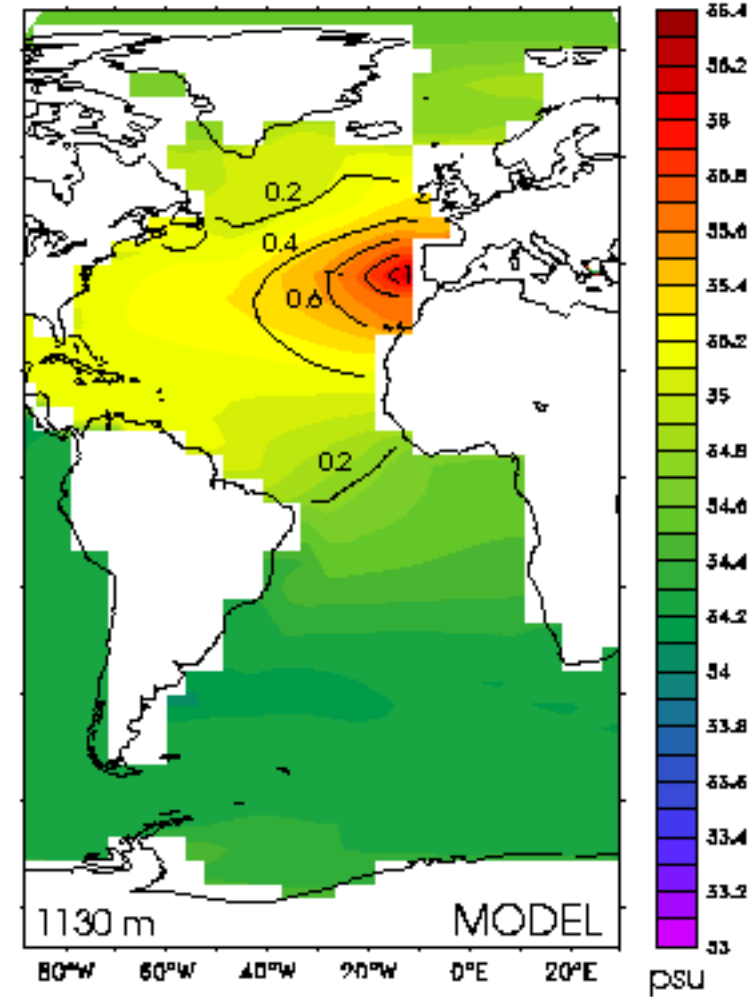
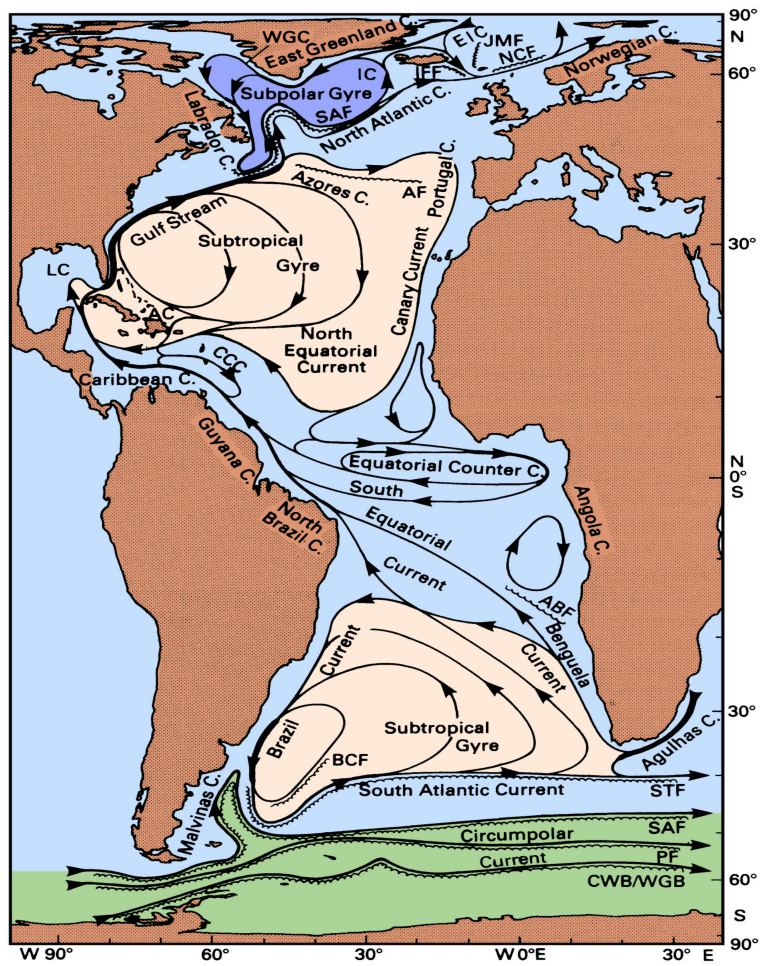
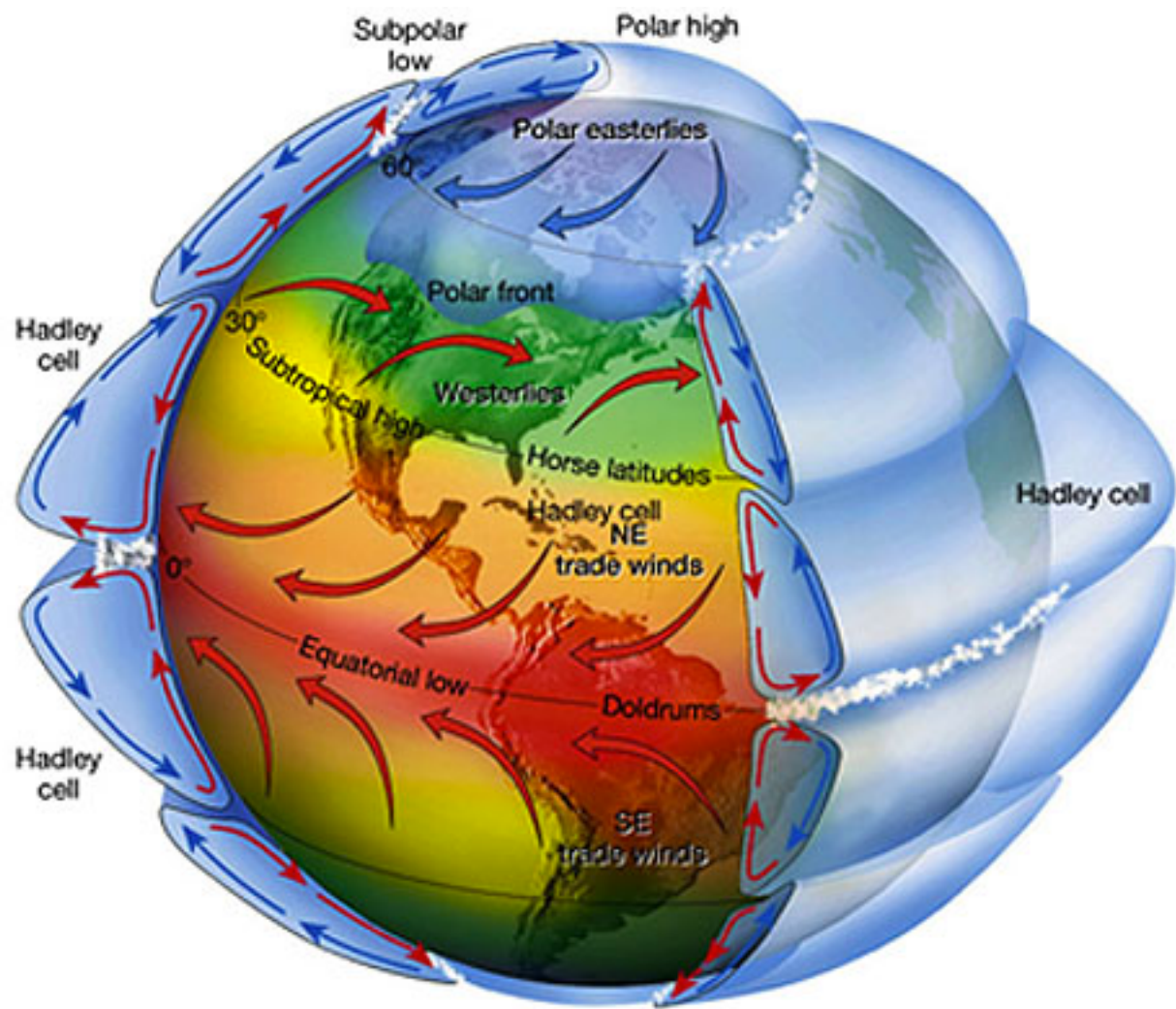


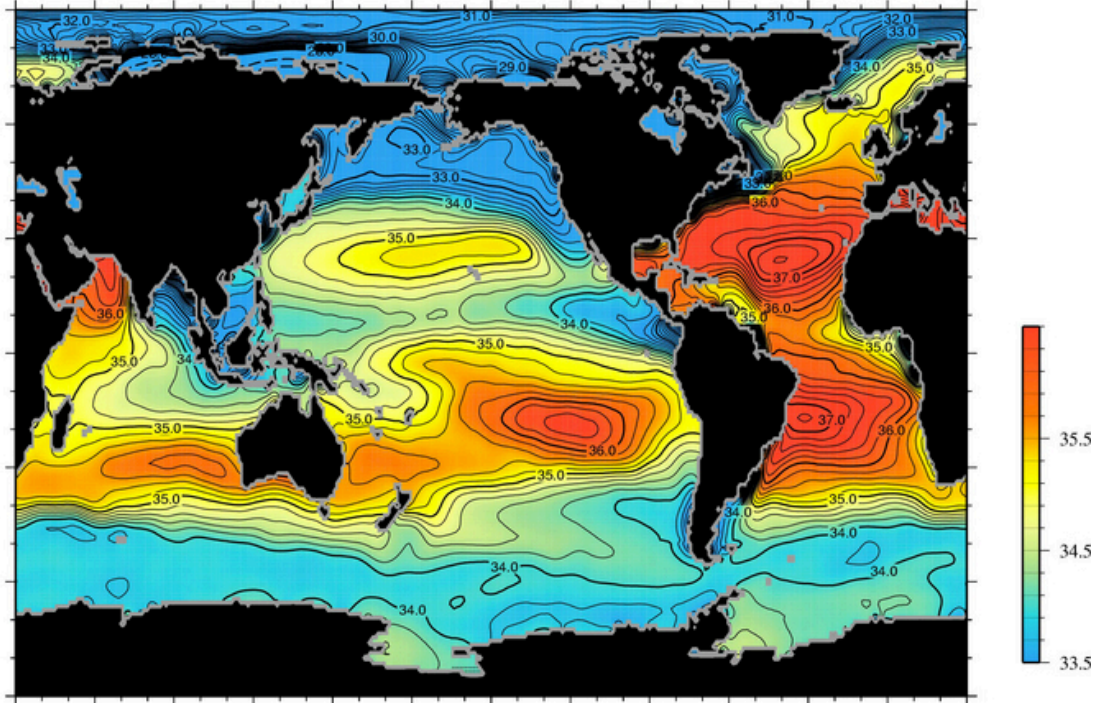
Figure 1b



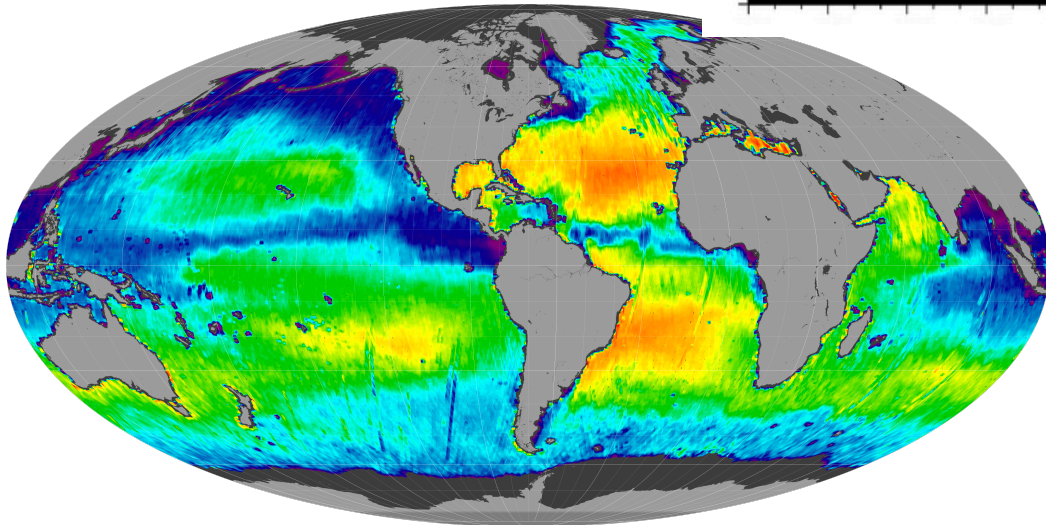




## Historical Surface Salinity (Ship/Buoy)

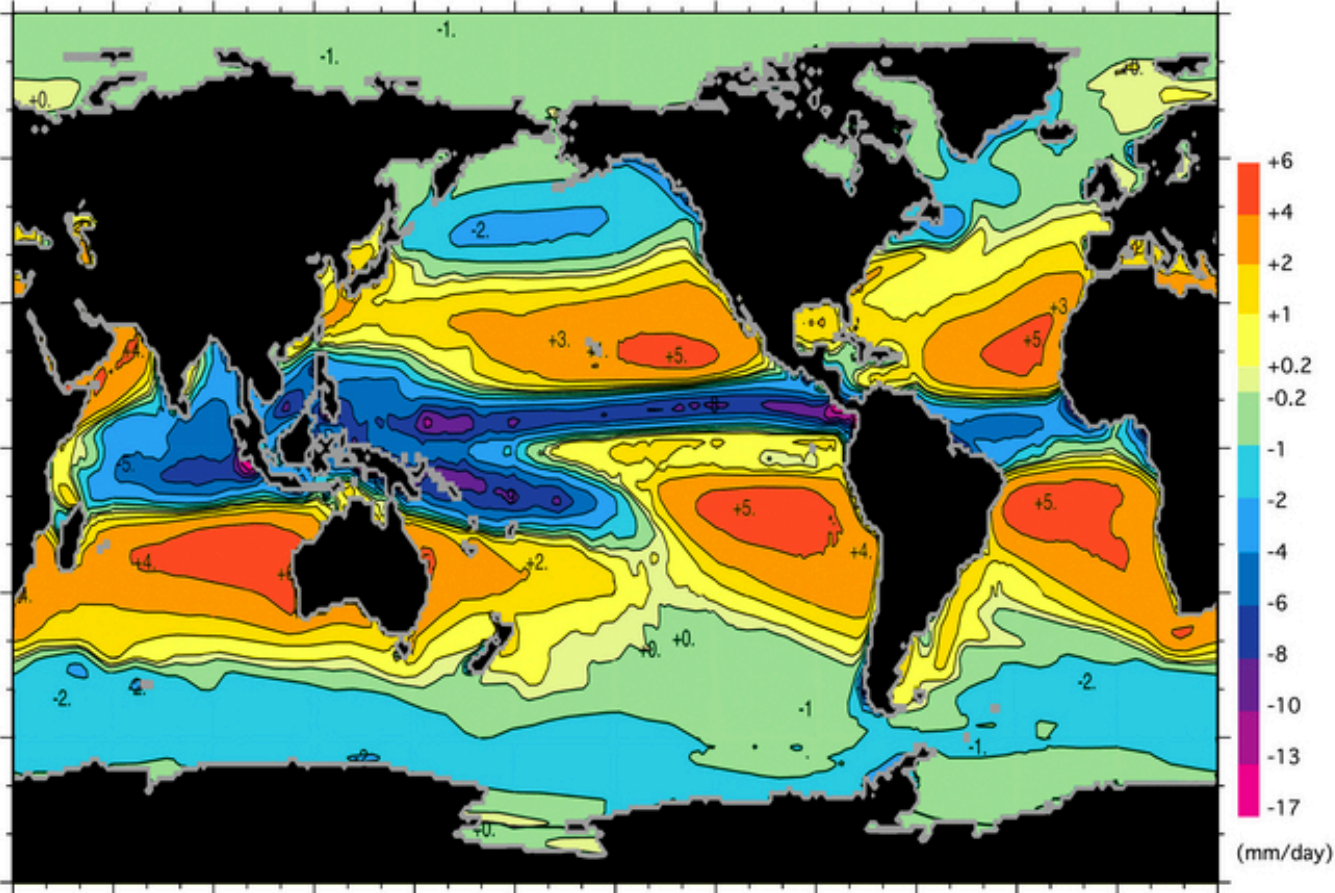


SMOS Satellite data

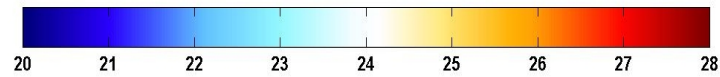
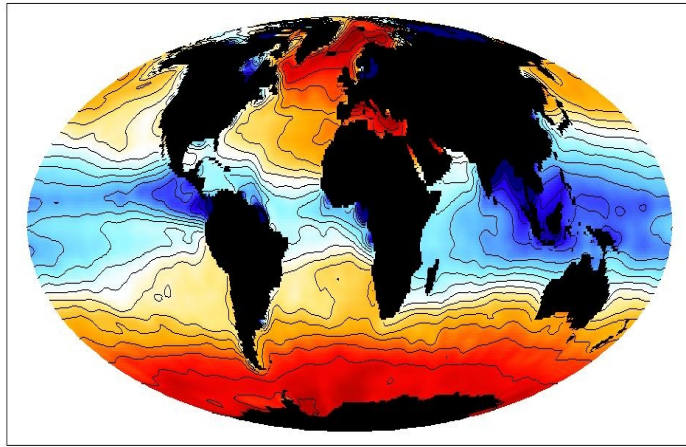




# Average Evaporation minus Precipitation

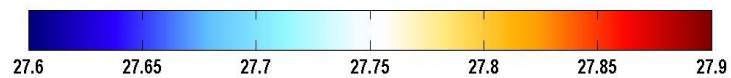
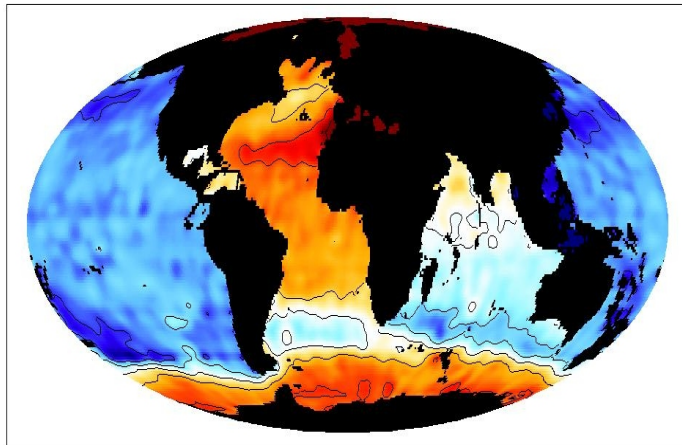


Levitus surface density

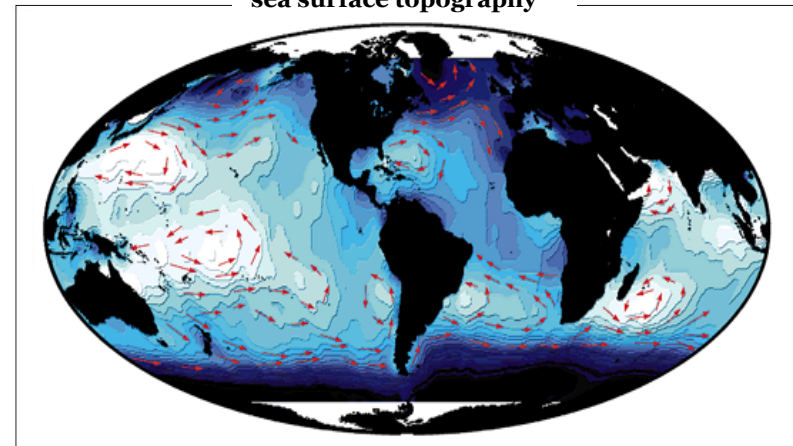


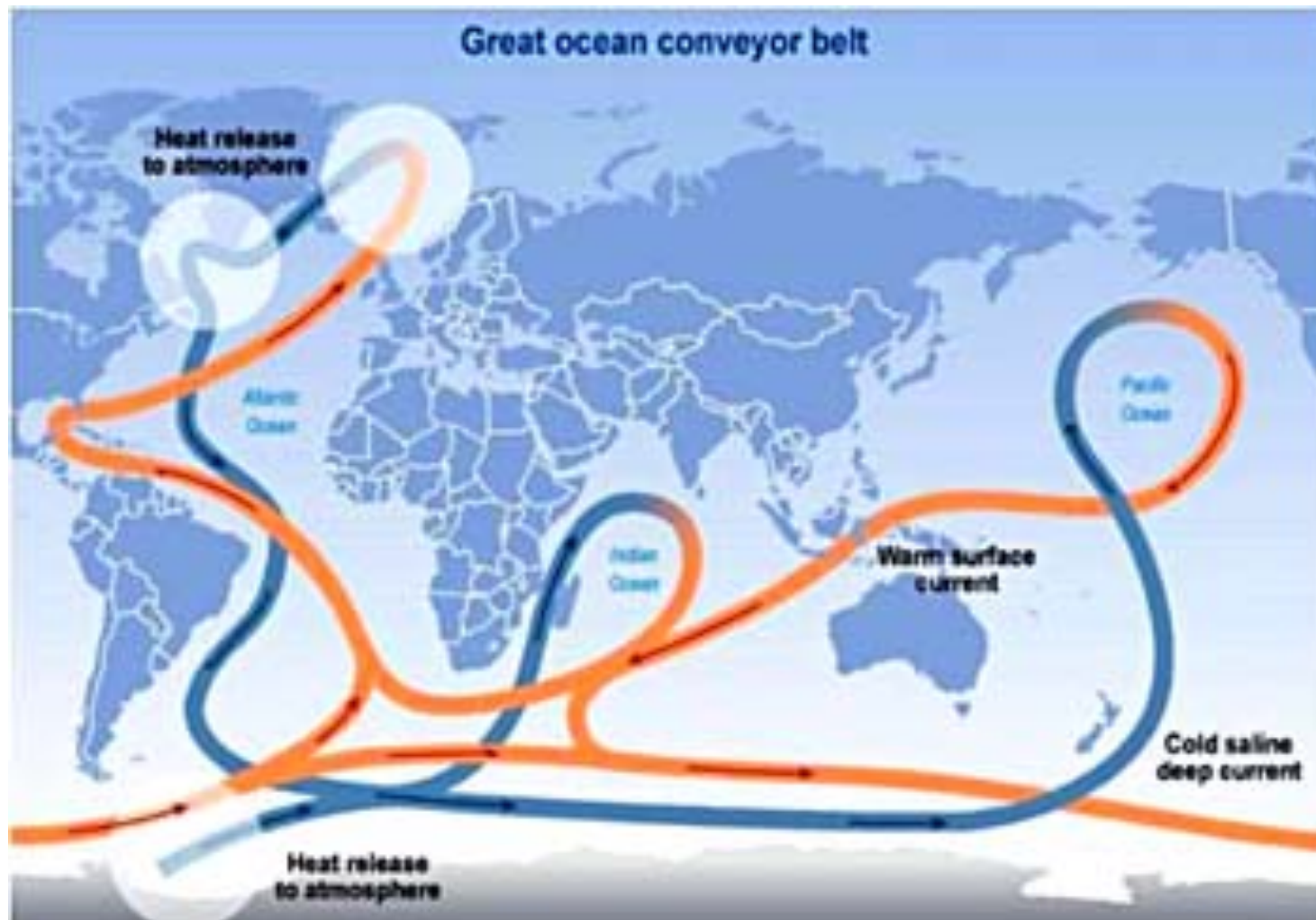
# O Atlantico é especial !

Levitus density 2000 m



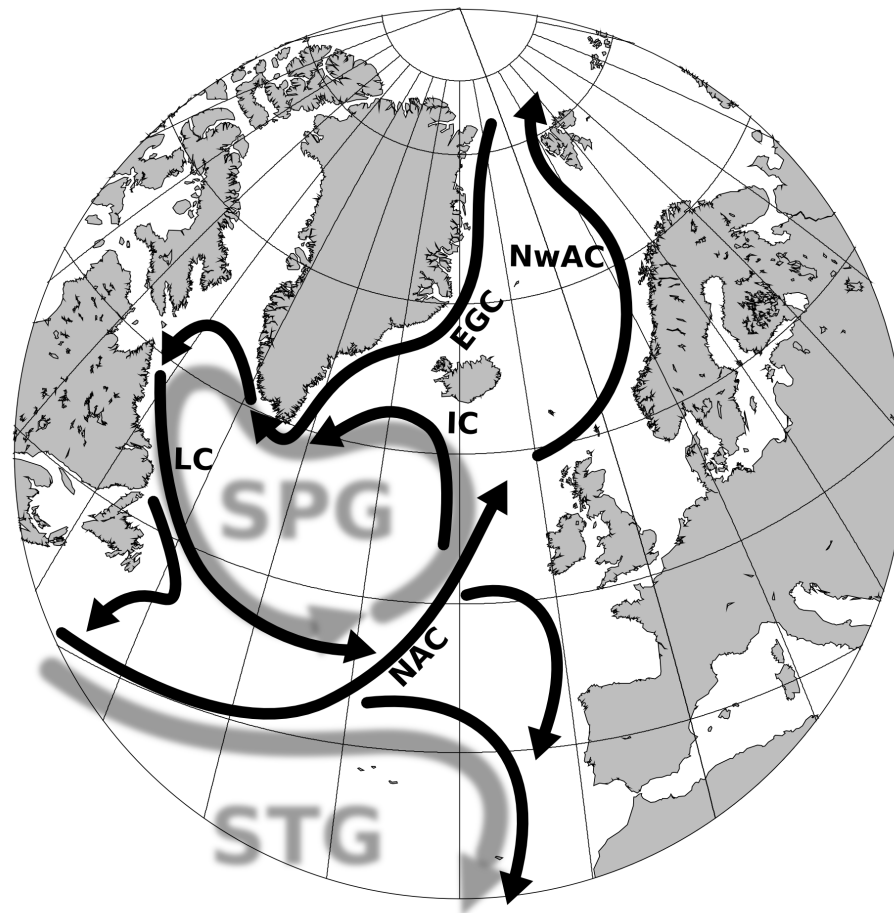
sea surface topography

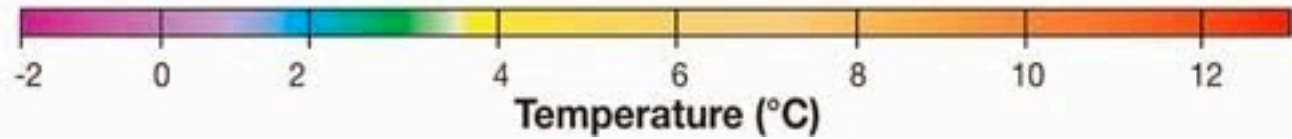
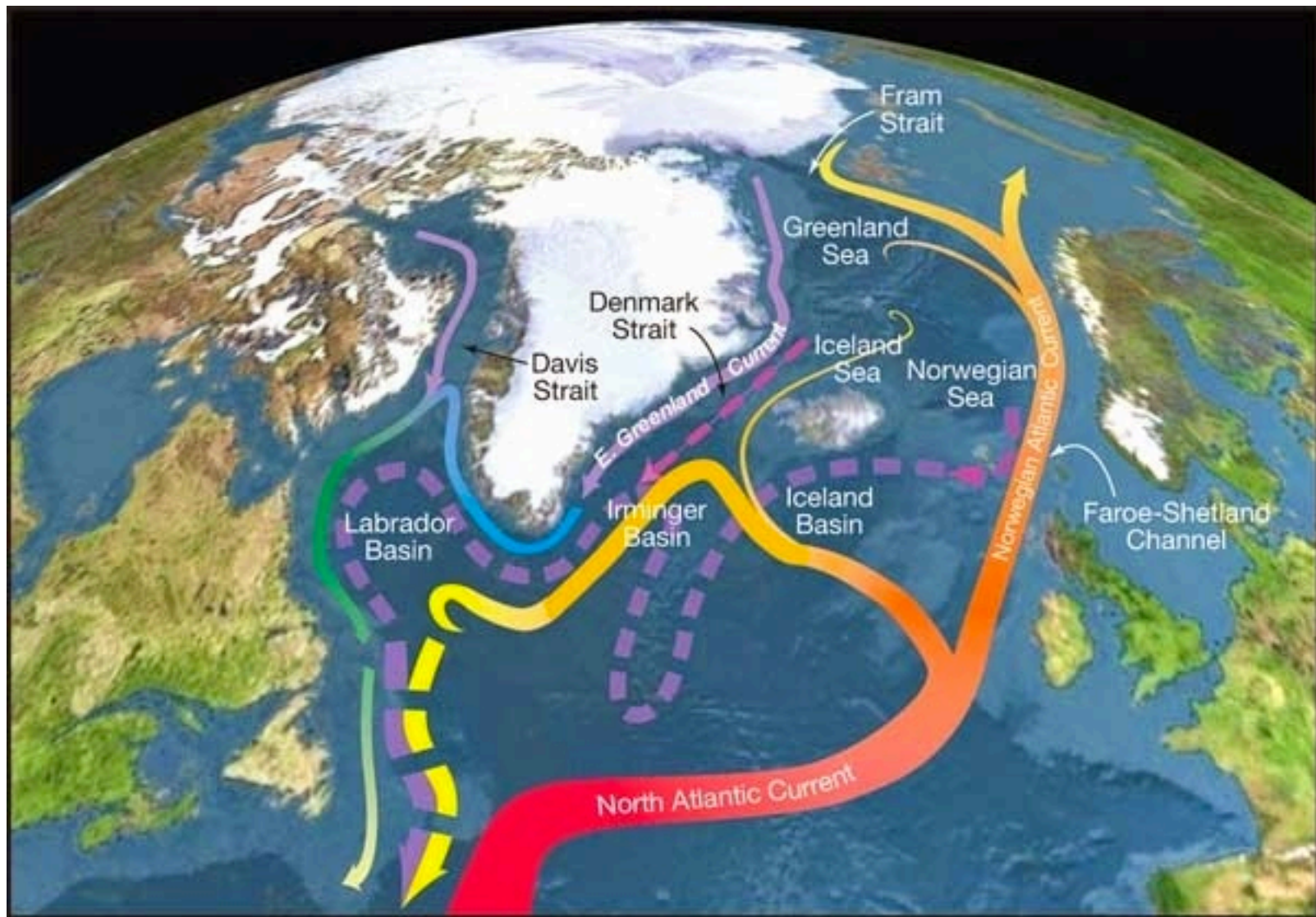




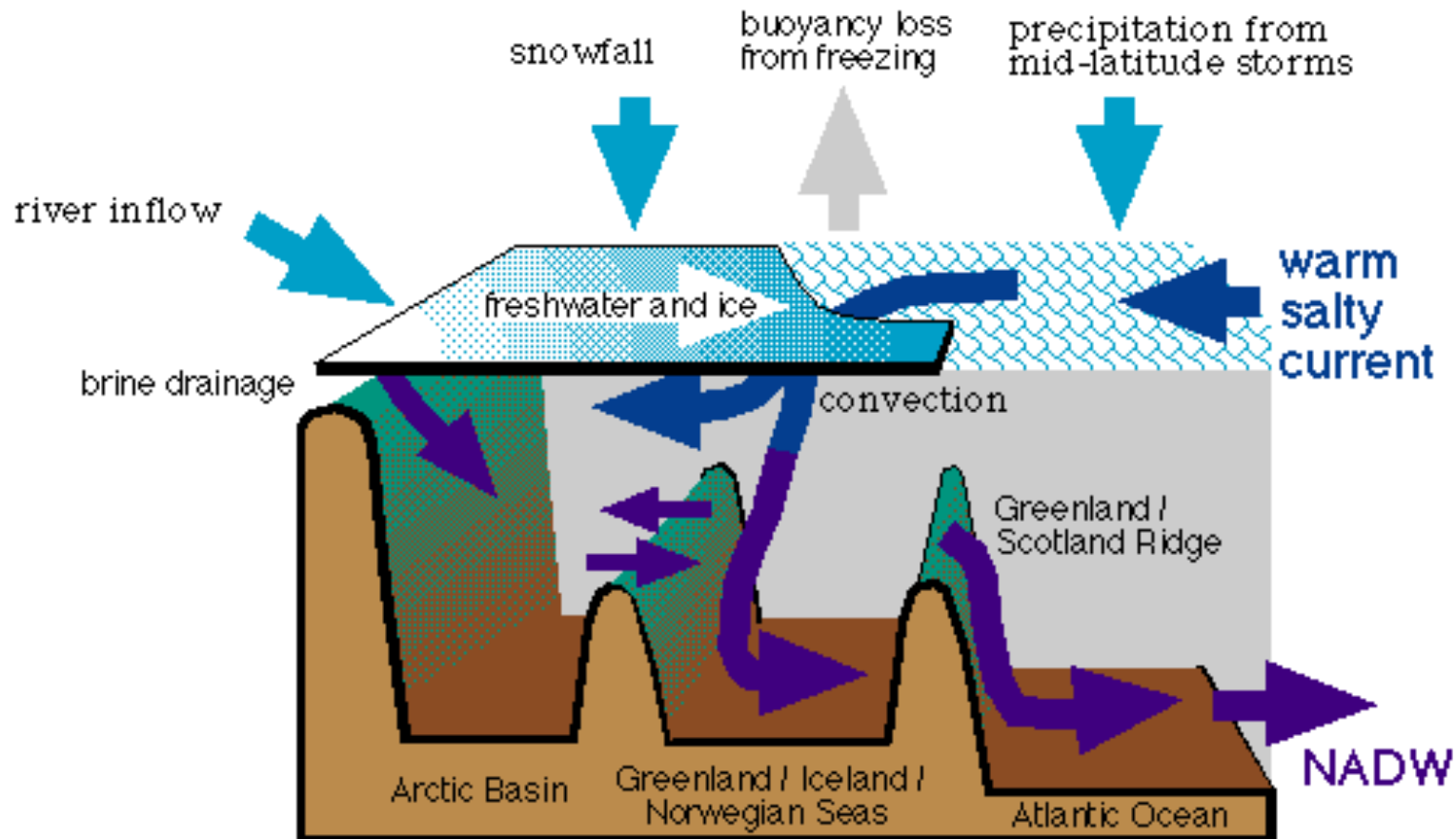
## Giro SubPolar do Atlântico Norte:

- Corrente do Atlântico Norte -> Corrente da Islândia -> Corrente Leste da Groelândia (que é uma Corrente de Contorno Oeste) e Corrente do Labrador.

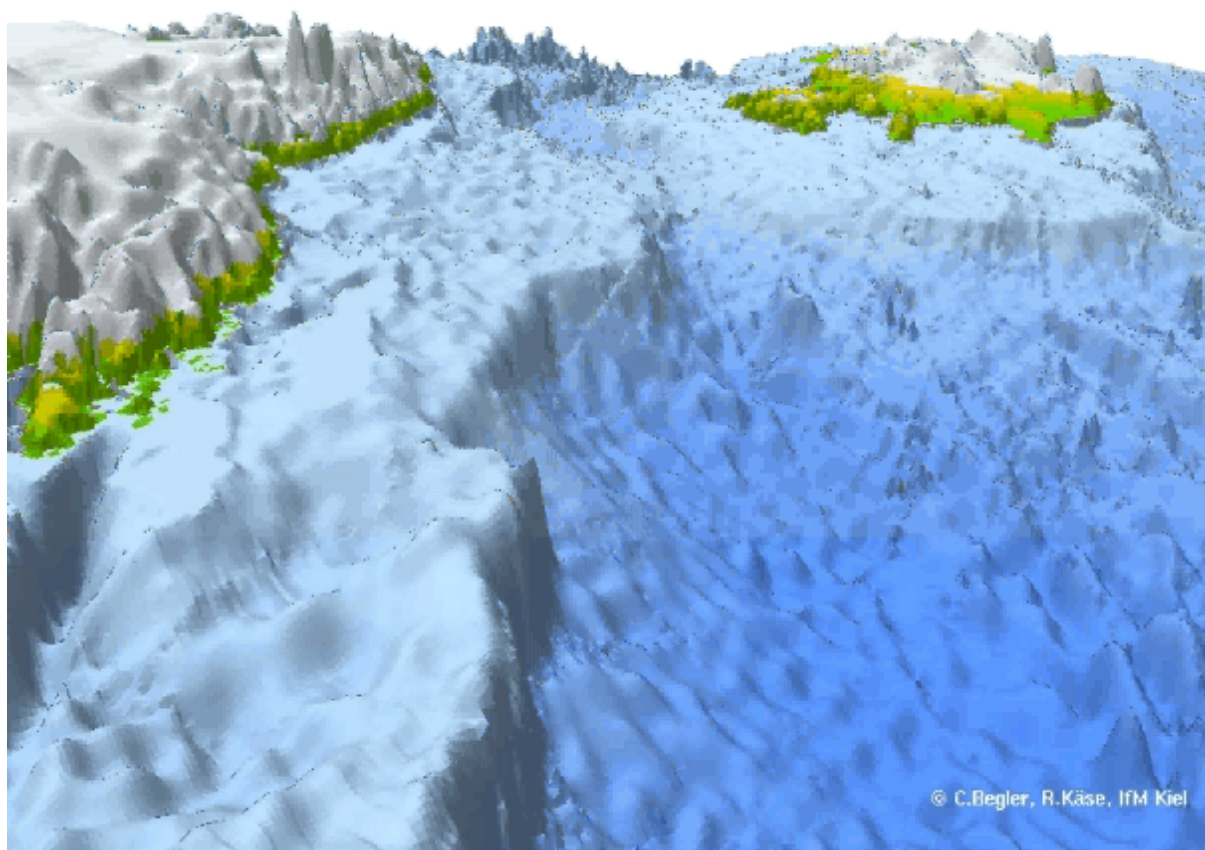


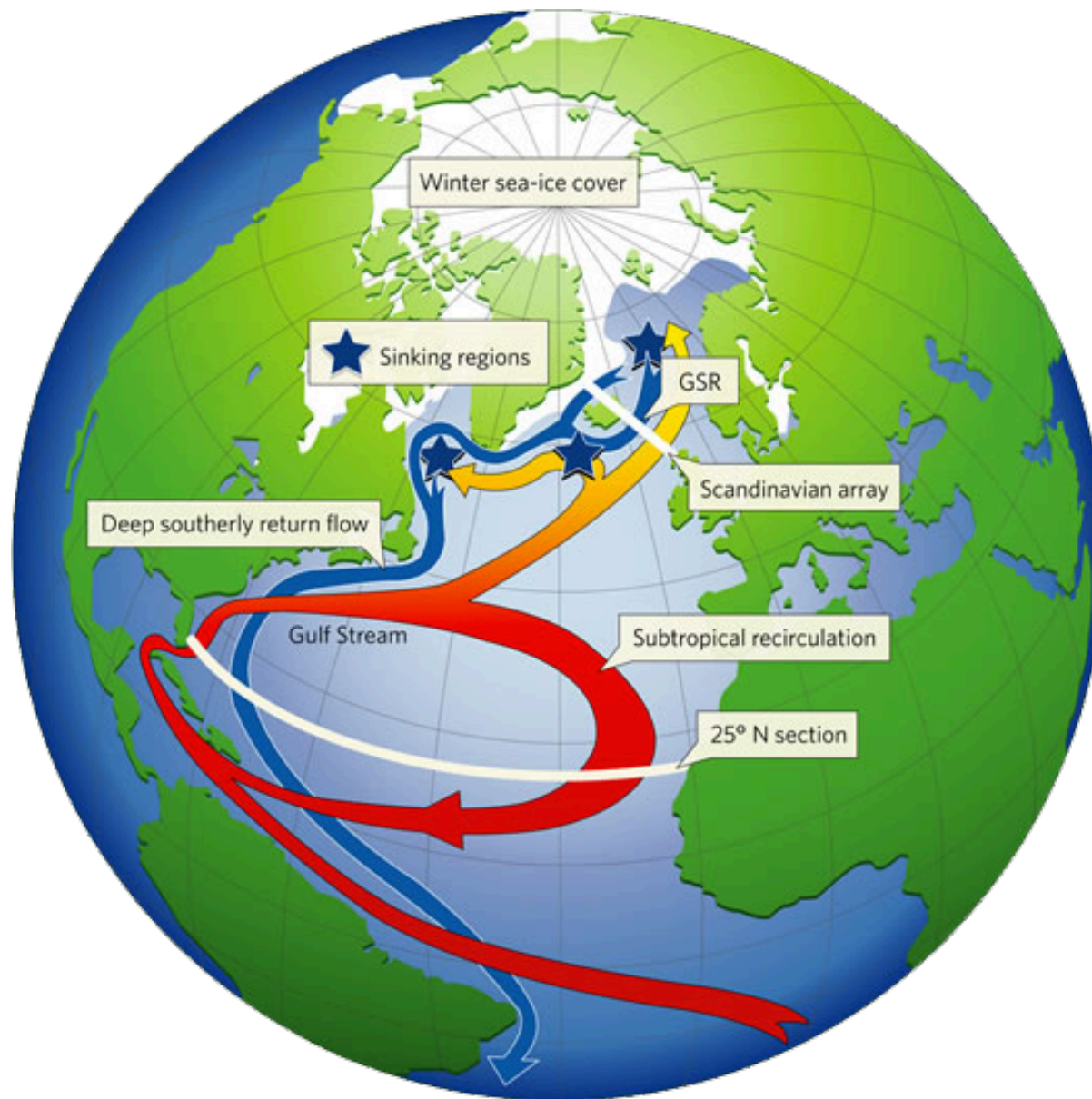


## Mecanismos envolvidos na formação da APAN (NADW)



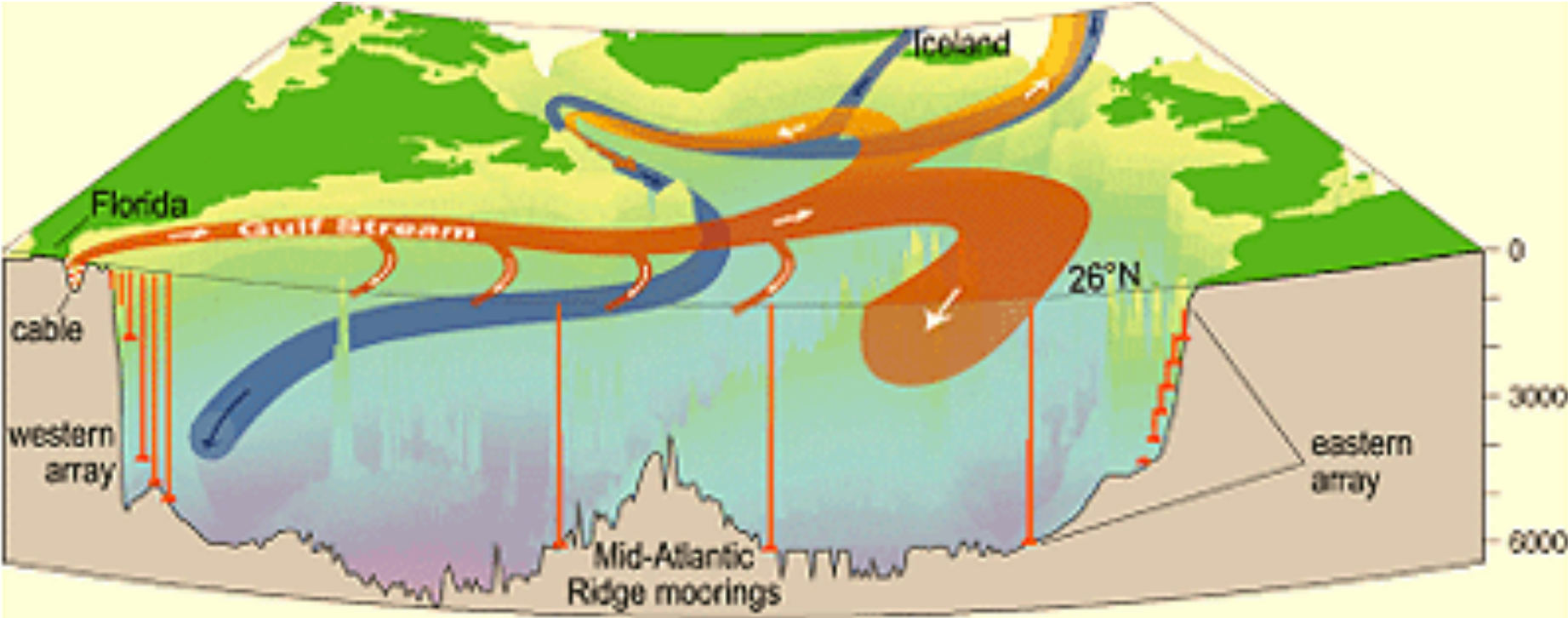
## Formação de águas densas no entorno da Groelândia





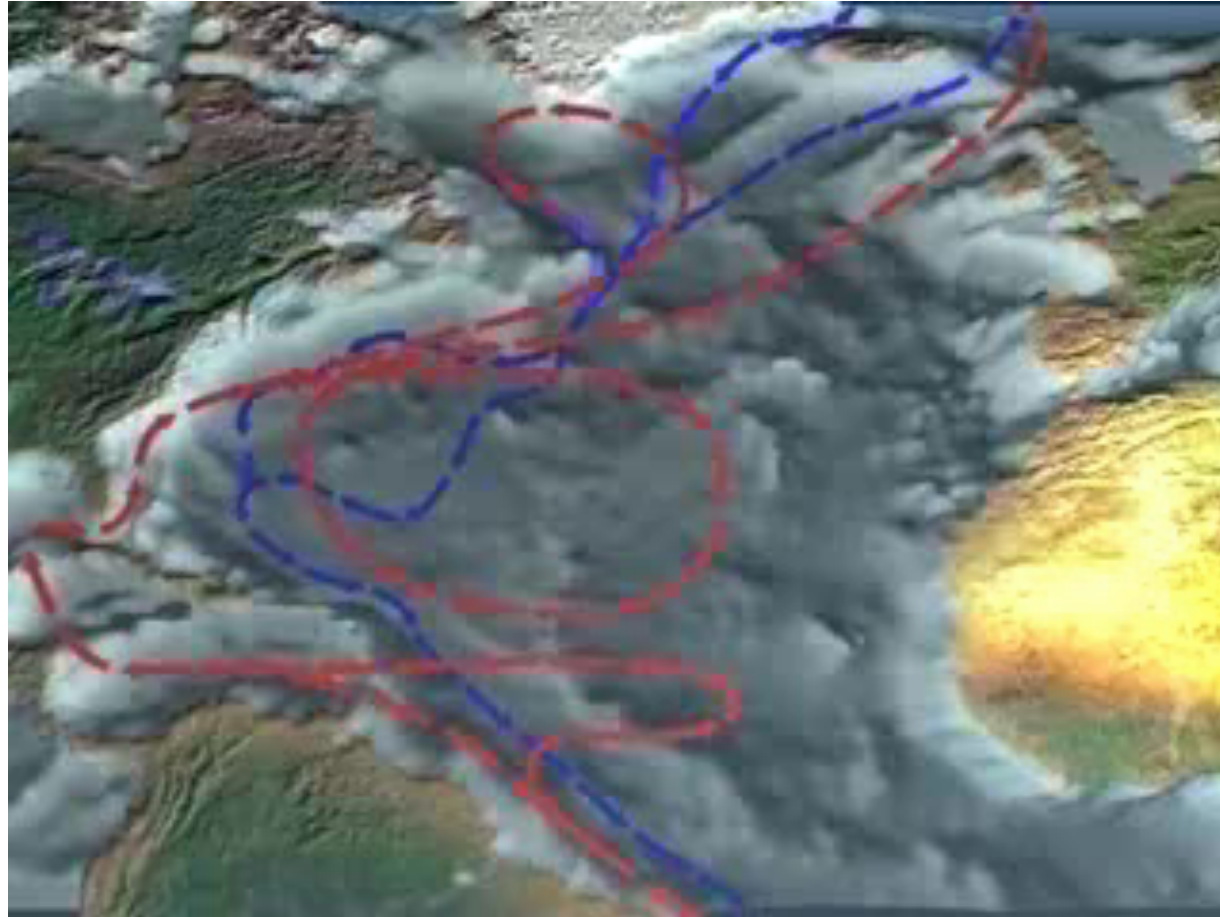


# Observando a AMOC

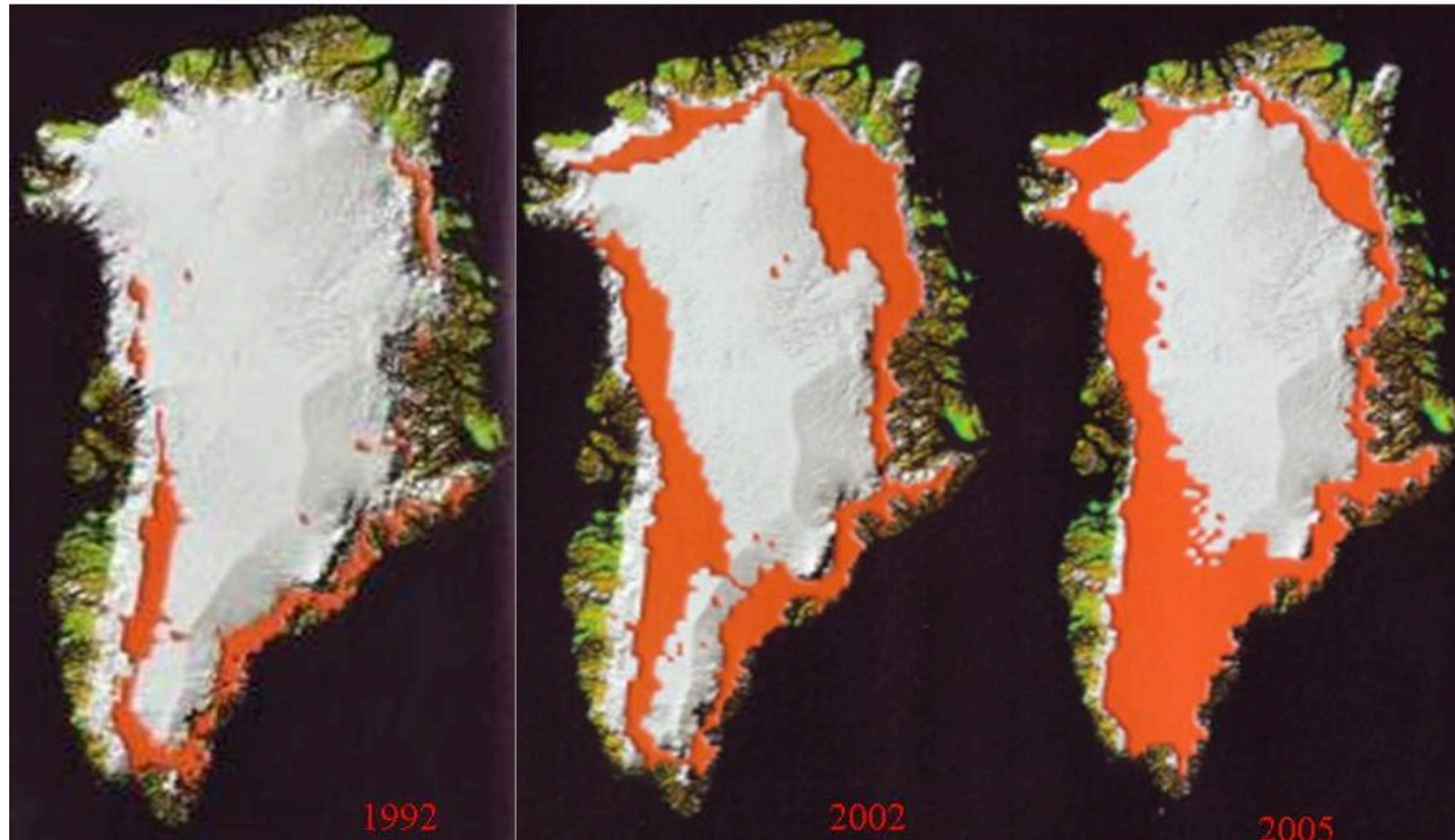




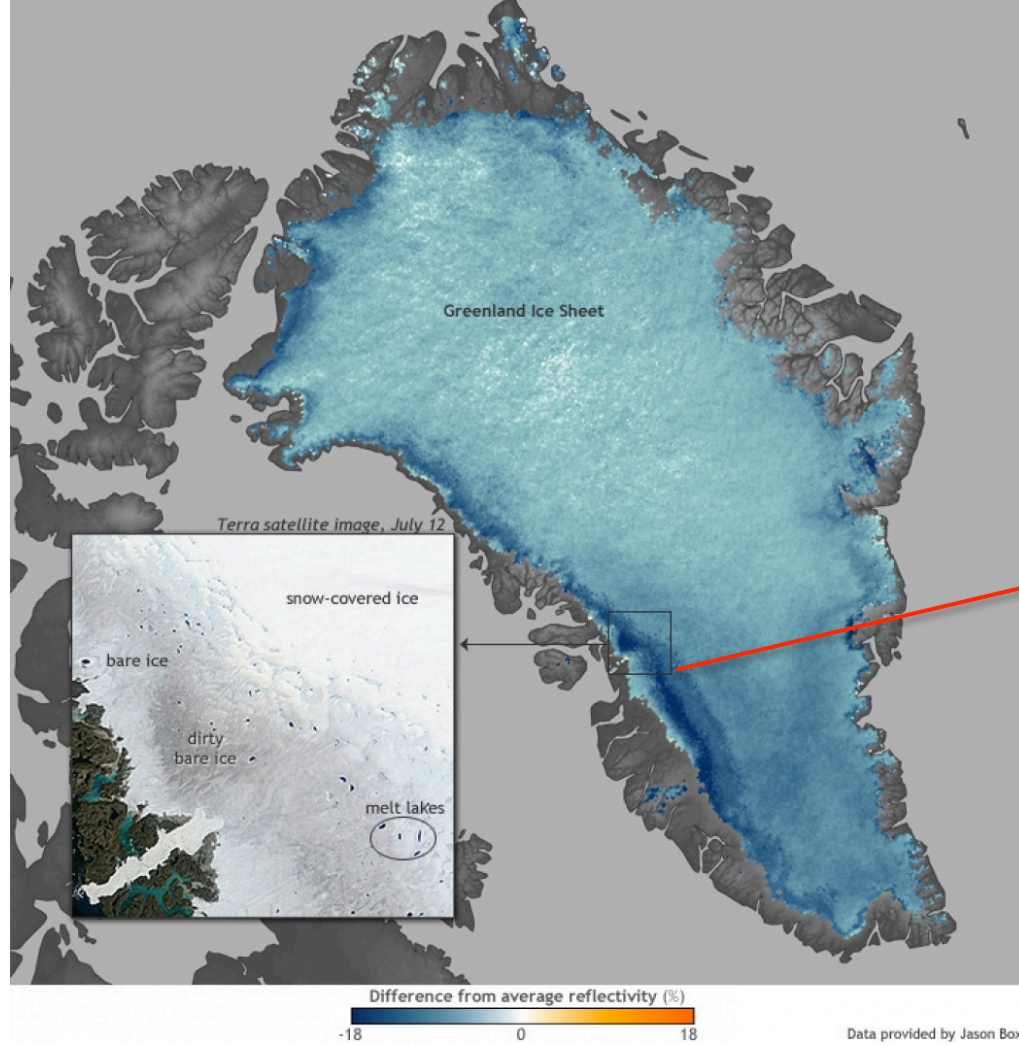
# A Geografia e o Clima



## Surface melting on Greenland is expanding

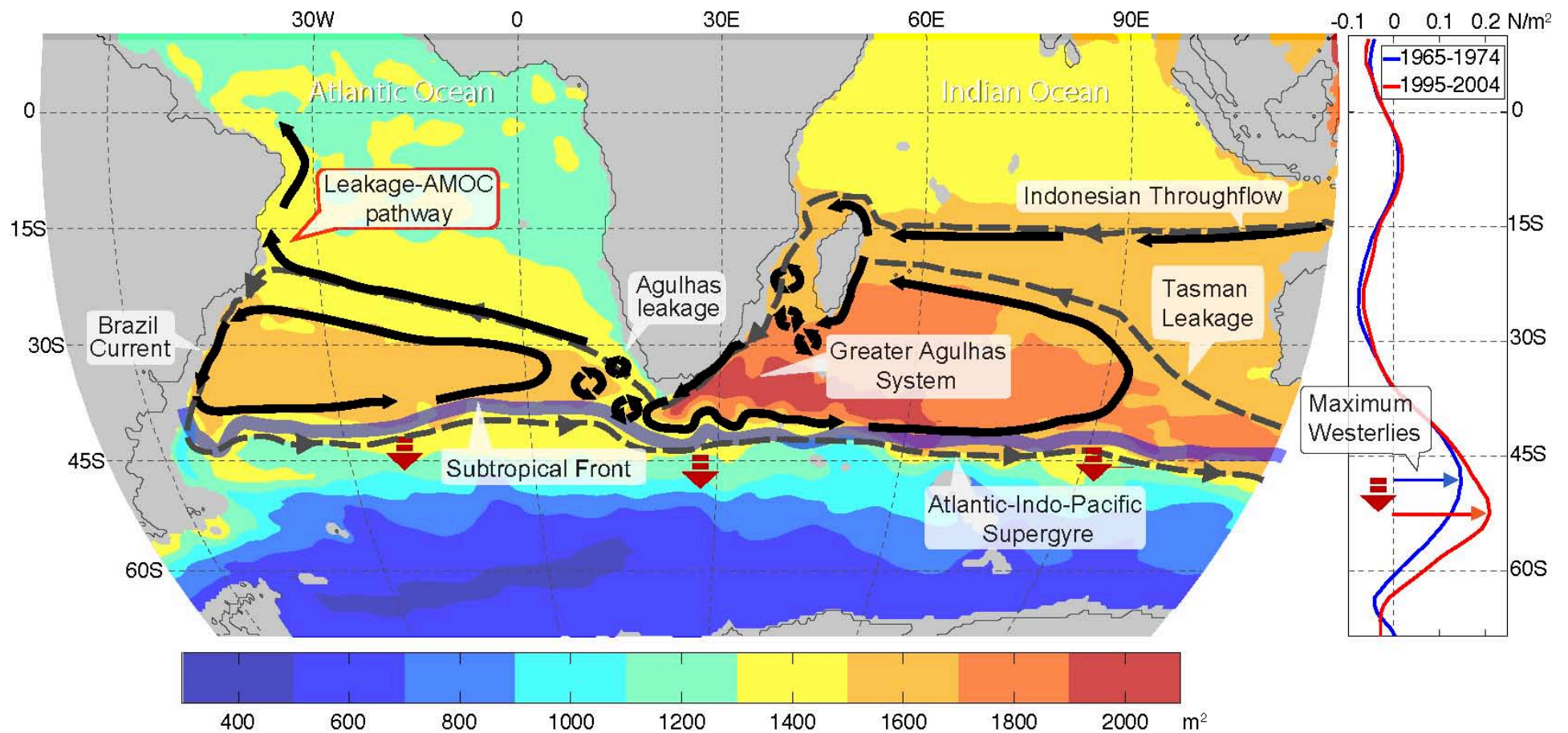


ice sheet reflectivity, June-August 2012 compared to 2000-2011 average

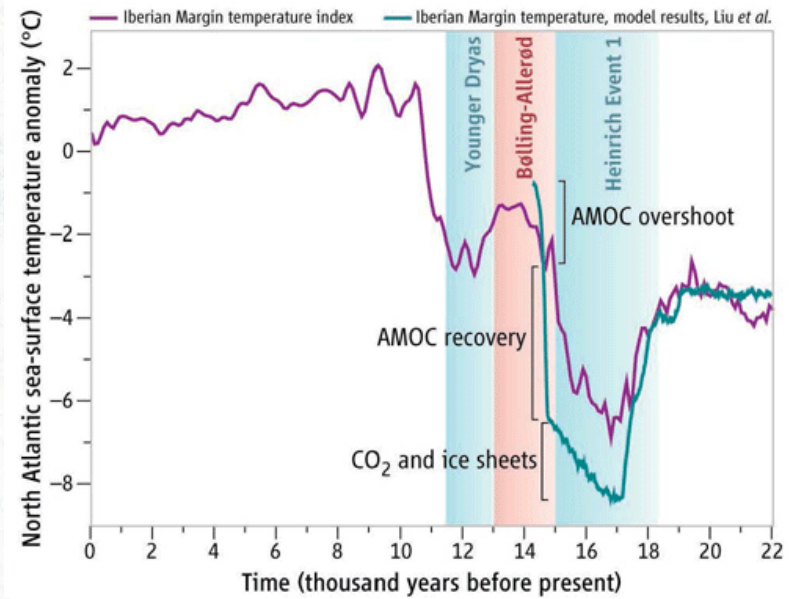


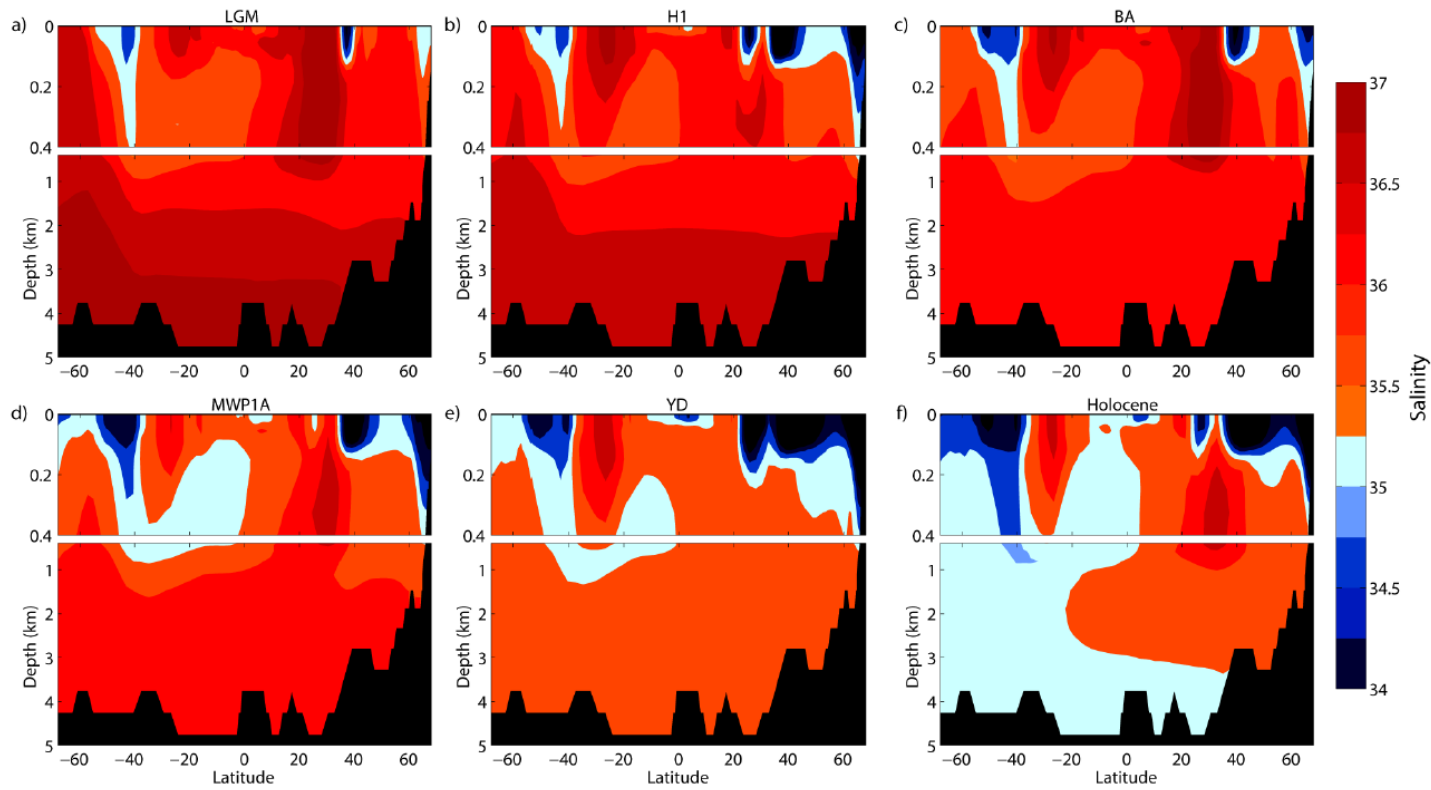
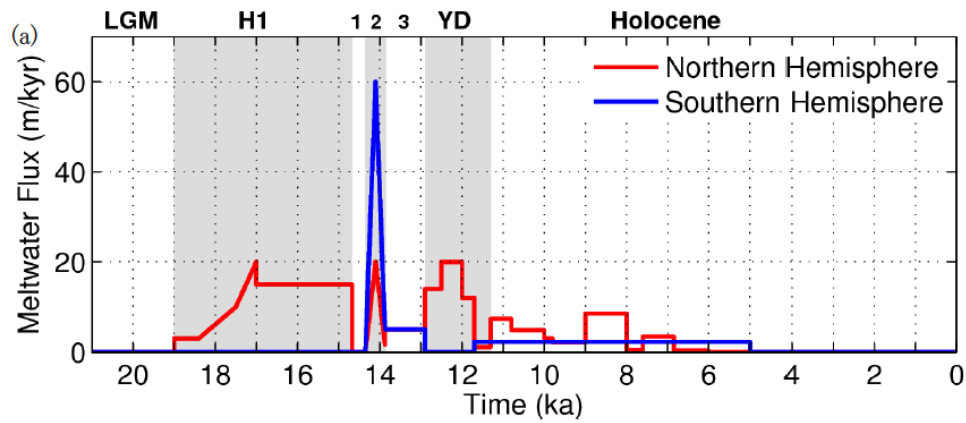
Data provided by Jason Box.

## Intensificação do Vazamento das Agulhas ?!



Beal et al, Nature





Fonte: Marson, Wainer, Mata and Liu (2014)