

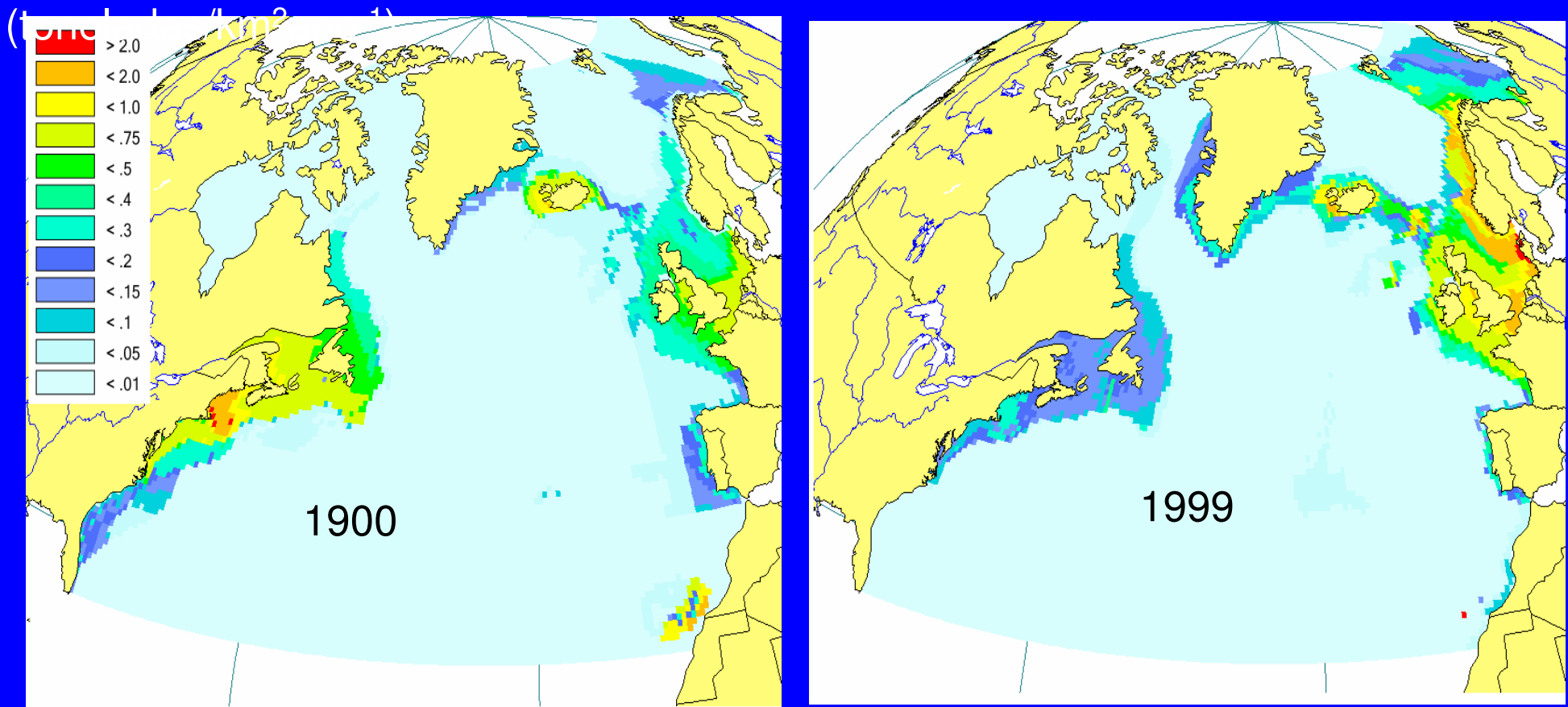
Pesca e produtividade

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Capturas de peixes demersais (toneladas/km²ano⁻¹) no Atlântico Norte em 1900 e 1999

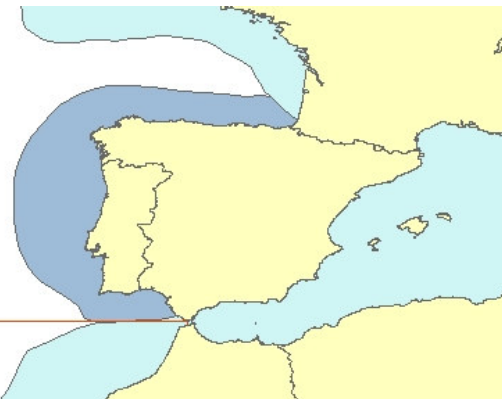
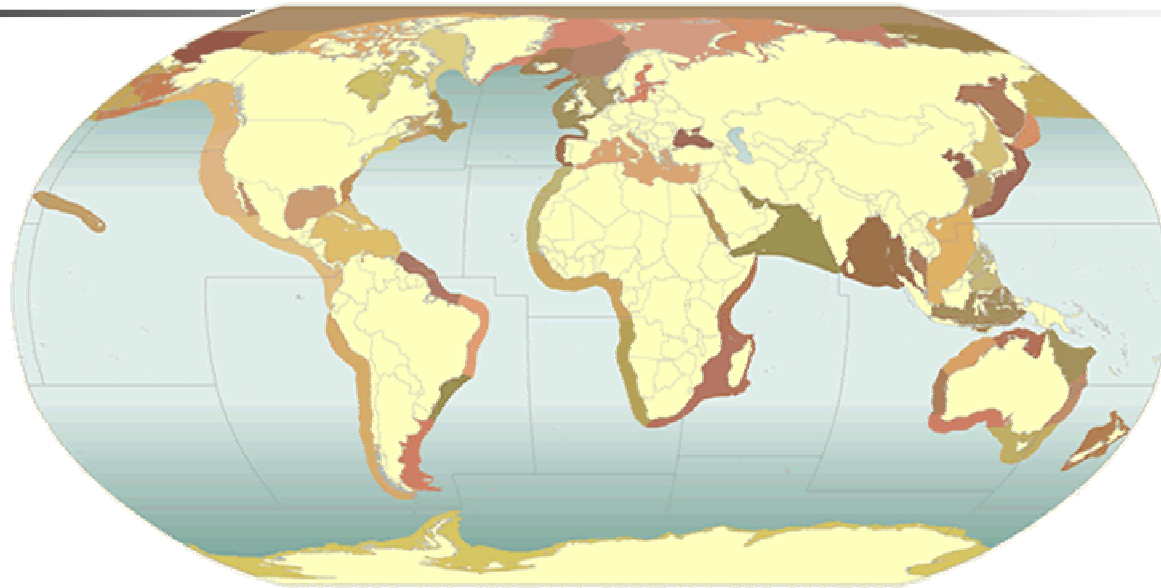


Fonte: Pauly & Maclean. 2003. In a perfect ocean. Island Press, 175p.

Produtividade: espécies comerciais principais

- Diferenças entre espécies e regiões
- 12 espécies ~50% da capturas mundiais:
 - **Zonas de afloramento:**
 - Sardines (California, Peru, European, South African)
 - Anchovy (Peru)
 - Jack mackerel (Chile)
 - **Atlântico norte:**
 - Atlantic cod
 - Atlantic herring
 - **Pacífico norte:**
 - Pacific salmon
 - Alaska pollock
 - Pacific herring
 - Japanese sardine

Produtividade e ecossistemas marinhos



Area: 303,958 km²

Coral Reefs: 0 % of world

Sea Mounts: 0.0810 % of world

Primary Production: 665 mgC·m⁻²·day⁻¹



Area: 2,529,210 km²

Coral Reefs: 0 % of world

Sea Mounts: 0.4770 % of world

Primary Production: 406 mgC·m⁻²·day⁻¹



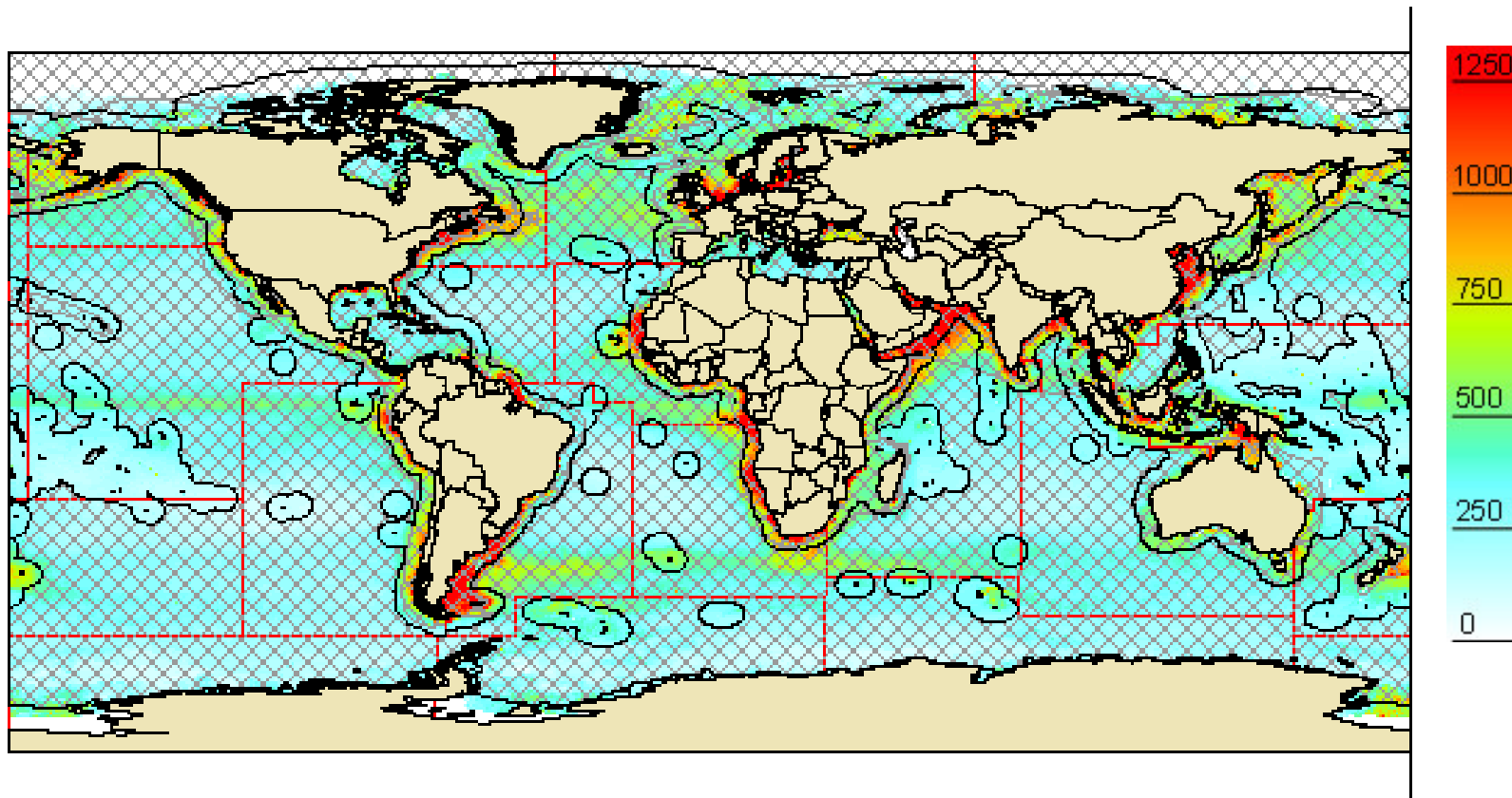
Area: 1,125,327 km²

Coral Reefs: 0.01 % of world

Sea Mounts: 0.1280 % of world

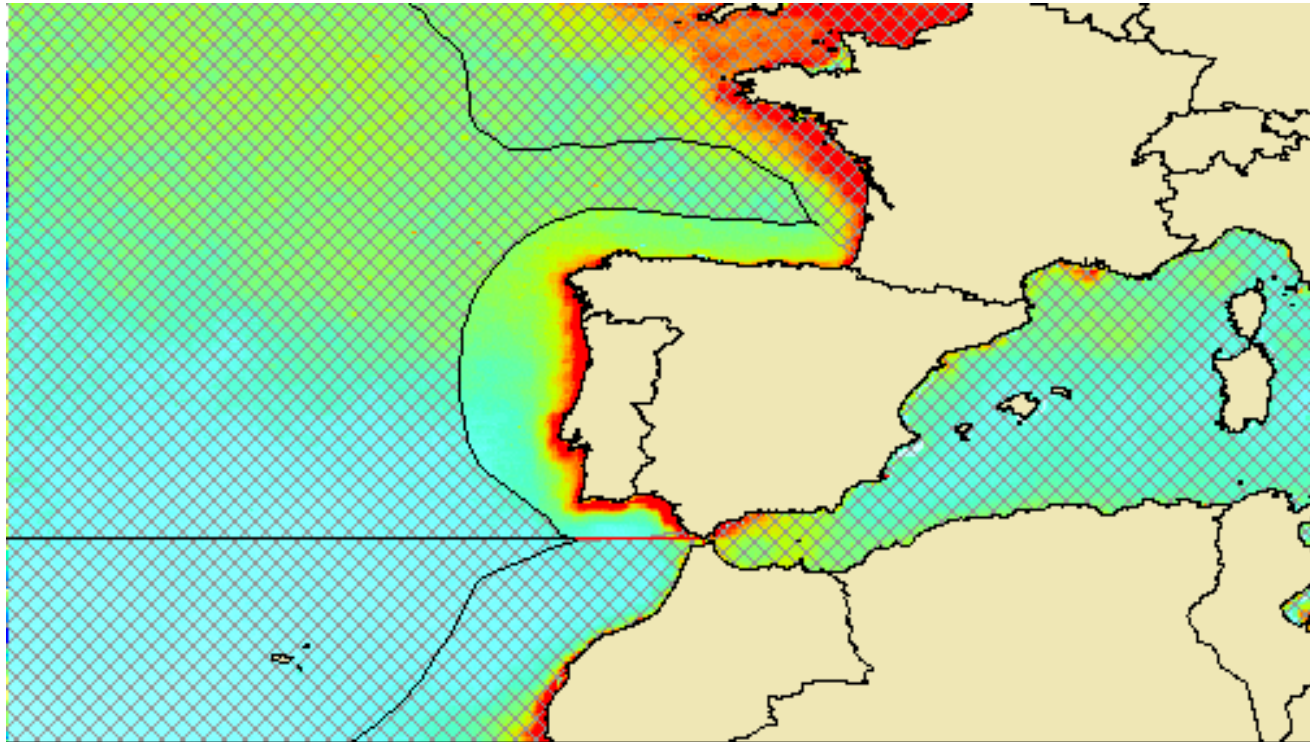
Primary Production: 1198 mgC·m⁻²·day⁻¹

Produção primária (média anual; $\text{mg Cm}^{-2} \text{ dia}^{-1}$)

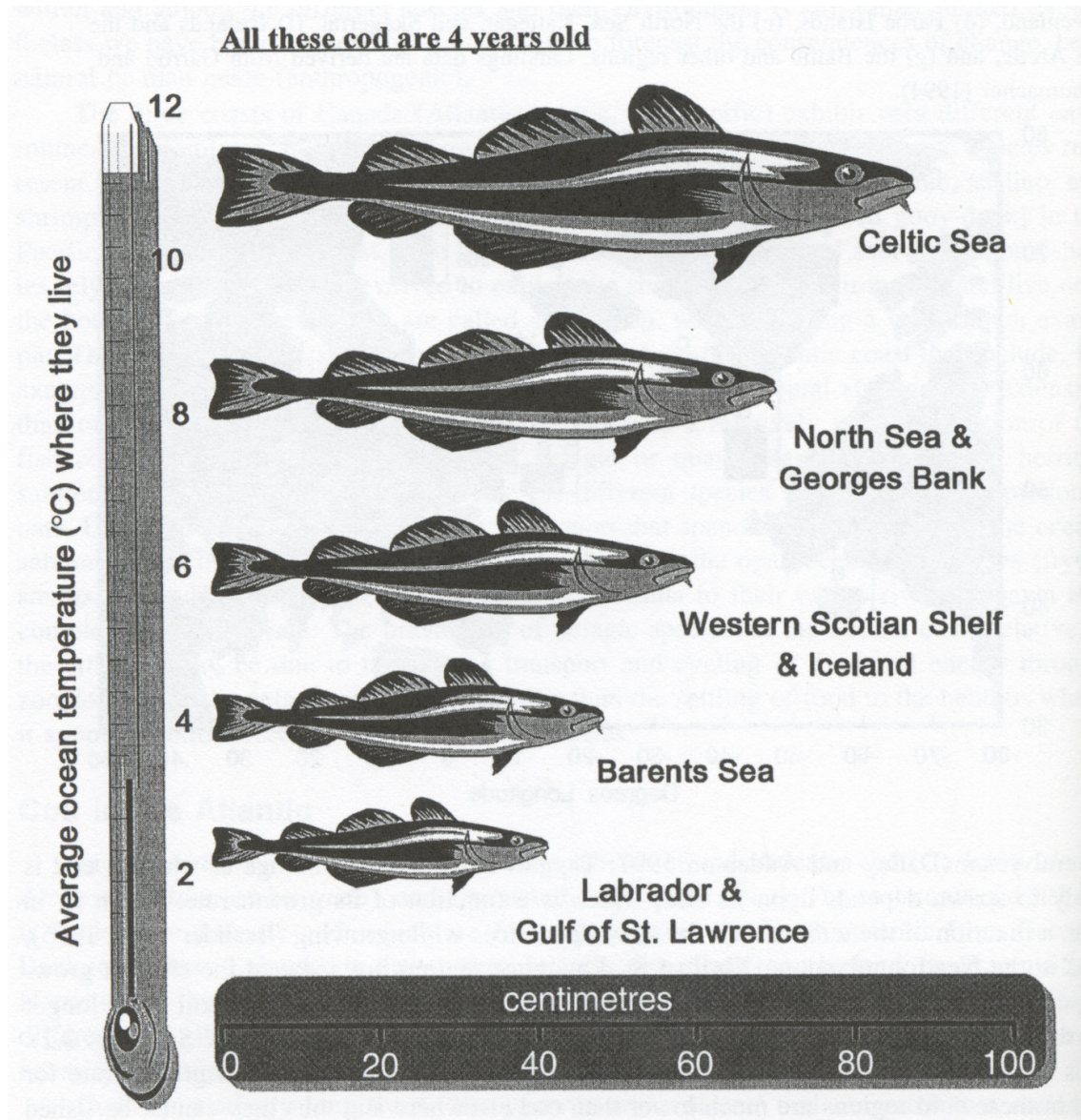


Fonte: www.seaaroundus.org

Produção primária (média anual; $\text{mg Cm}^{-2} \text{ dia}^{-1}$)

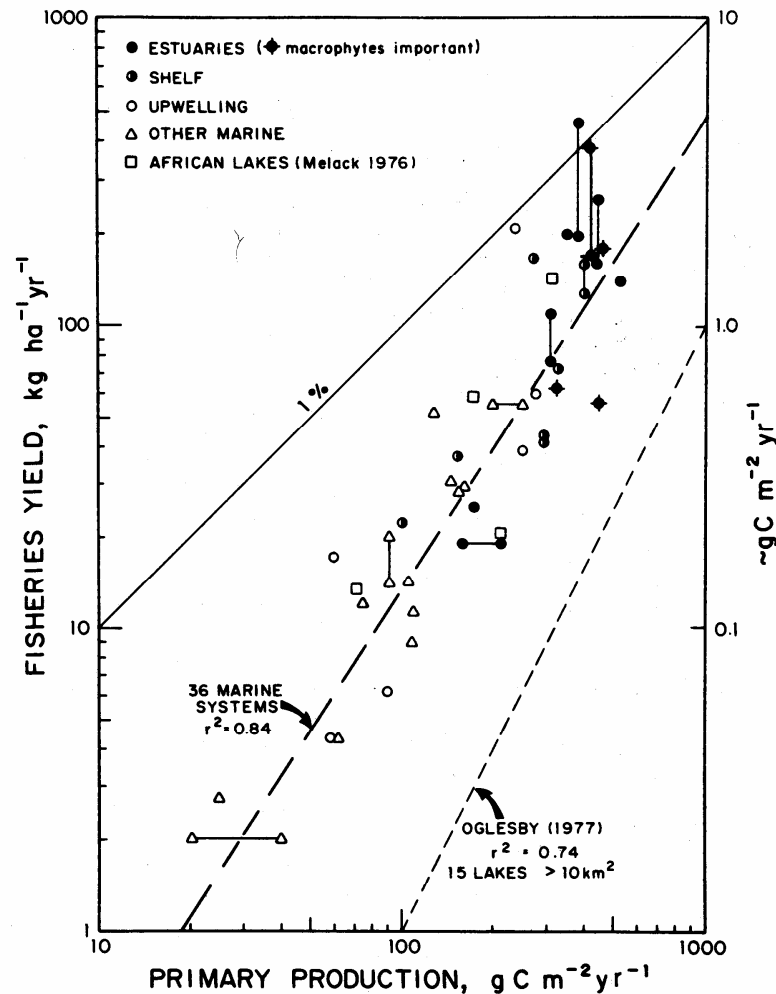


Diferenças em produtividade: efeito de temperatura



Relação entre PP e rendimento (capturas)

8

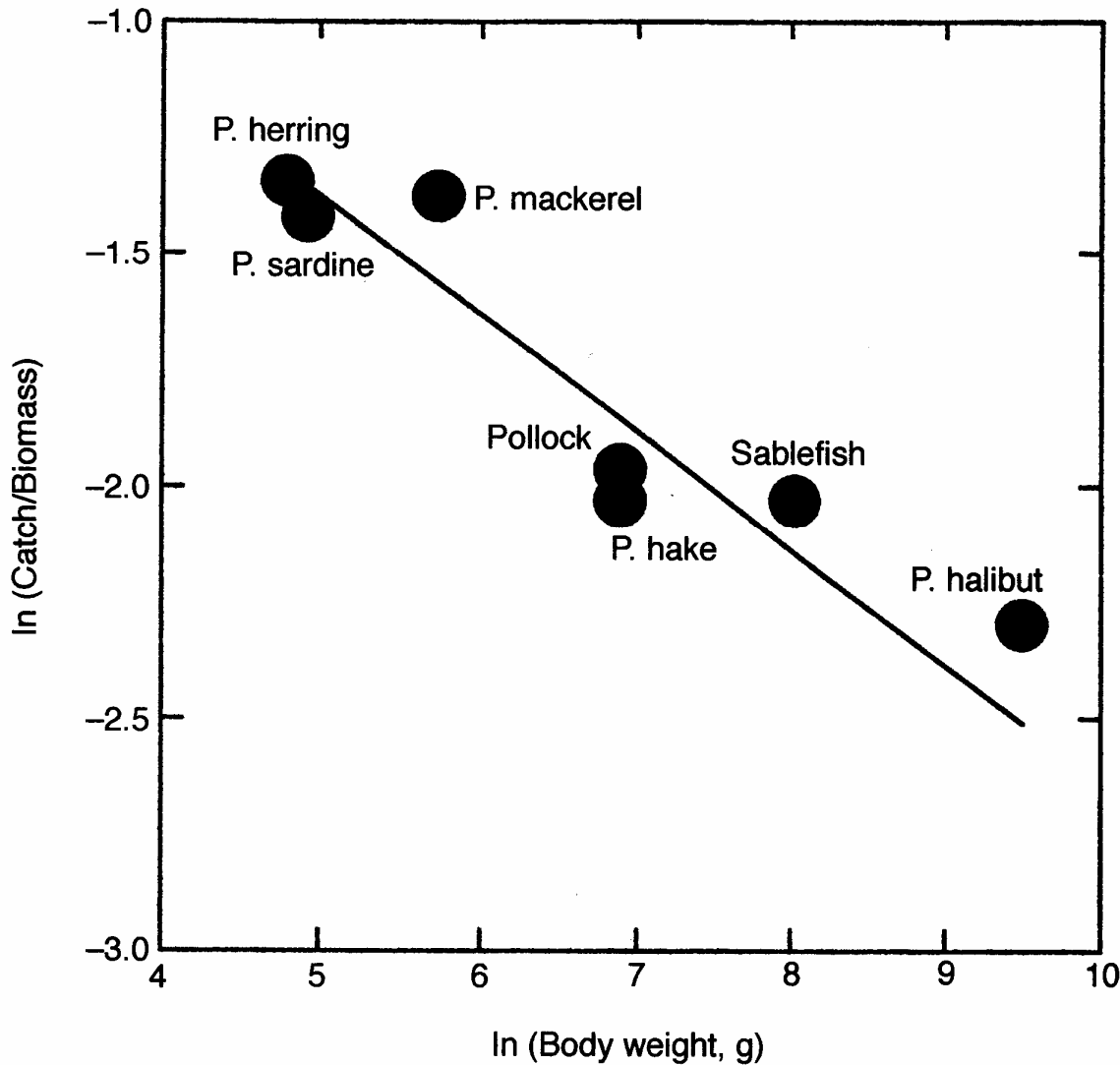


Regressão para sistemas marinhos:

$$FY = 1.55 \log_e PP - 4.49$$

Fig. 6. Fisheries yield (FY) per unit area as a function of primary production (PP) per unit area in a variety of estuarine and marine systems compared with the regression obtained by Oglesby (1977) for large lakes. Regression line for the marine systems is $\ln FY = 1.55 \ln PP - 4.49$. A summary of regressions relating gross plankton production from O₂ changes to fish harvests from various intensively managed ponds is given by Liang et al. (1981). The fisheries landings have been converted to carbon assuming C is 10% of fresh weight (Gulland 1970). Data sources for marine systems given by Nixon (1982) and Nixon et al. (1986b).

Produtividade, rendimento e tamanho



- C/B, ratio:

capturas (C , $t \text{ km}^{-2} \text{ yr}^{-1}$) /
biomassa do stock (B , $t \text{ km}^{-2}$)

Decréscimo com aumento
em tamanho da espécie

$$C/B = 0.8 W^{-0.25}$$

Table 5.1 The relation between primary production and fish production in three different marine habitats.

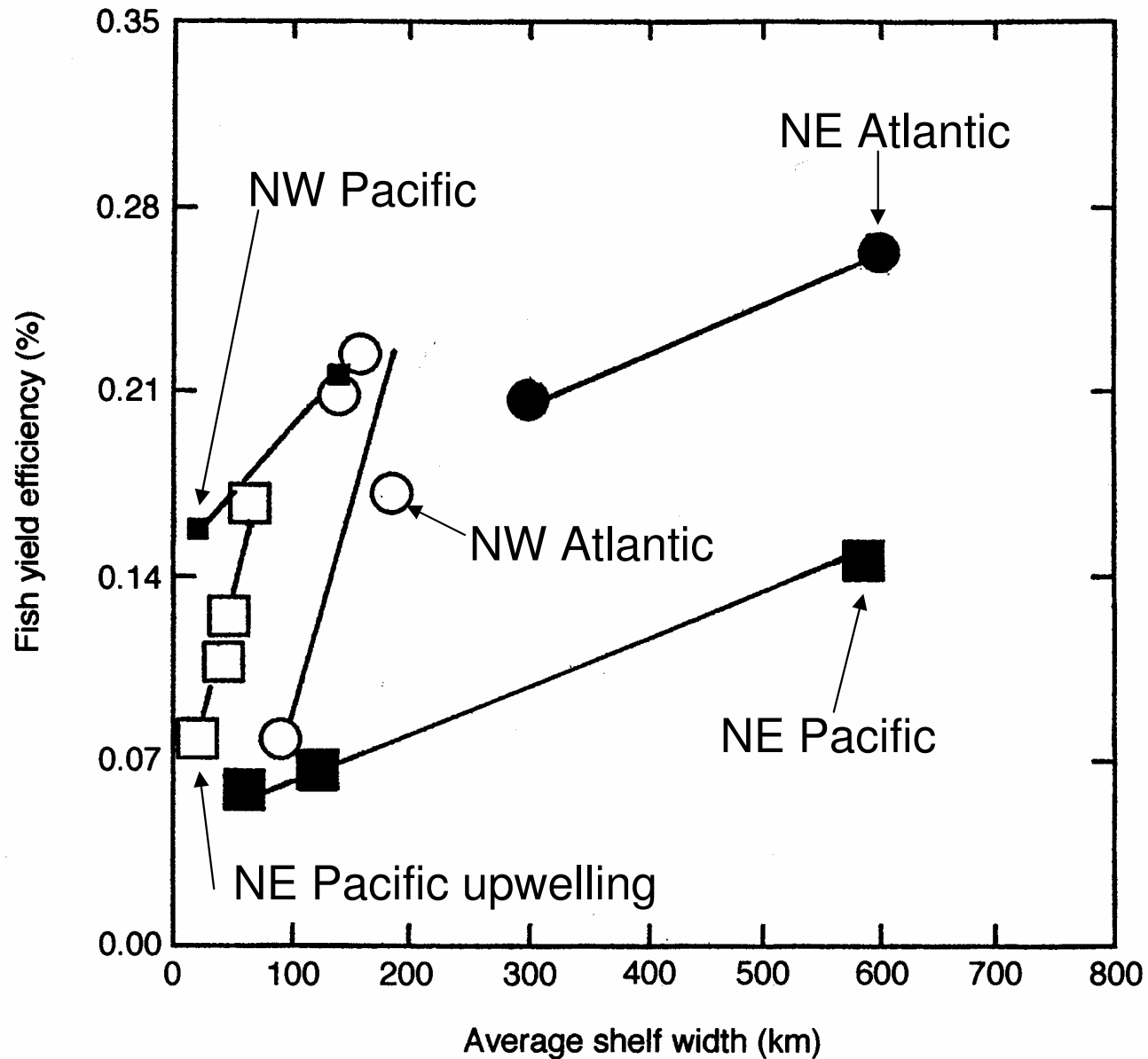
Habitat	Oceanic	Coastal	Upwelling		
Percent ocean area	90	9.9	0.1		
Mean primary productivity (g C m ⁻² yr ⁻¹)	50	100	300	Valores médios mais recentes (detecção remota):	
Total plant production (10 ⁹ tonnes C yr ⁻¹)	16.3	3.6	0.1		Oceanica 123
Number of energy transfers between trophic levels	5	3	1.5*		Costeira 385 Afloramento 398
Average ecological efficiency	10%	15%	20%	(Longhurst et al. 1995. J. Plankton Res. 17: 1245-1271)	
Mean fish production** (mg C m ⁻² yr ⁻¹)	0.5	340	36 000		
Total fish production*** (10 ⁶ tonnes C yr ⁻¹)	0.2	12	12		

* The number of trophic levels in upwelling areas may be 2 (if fish are predominantly herbivores), or 3 as represented in Figure 5.3; 1.5 represents an average value for the number of energy transfers.

** Calculated from equation 5.2, $P = BE^n$.

***Corrected for percent ocean area occupied by each habitat (total area = 362×10^6 km²).

Rendimento em função da PP



Zonas de afloramento (upwelling)

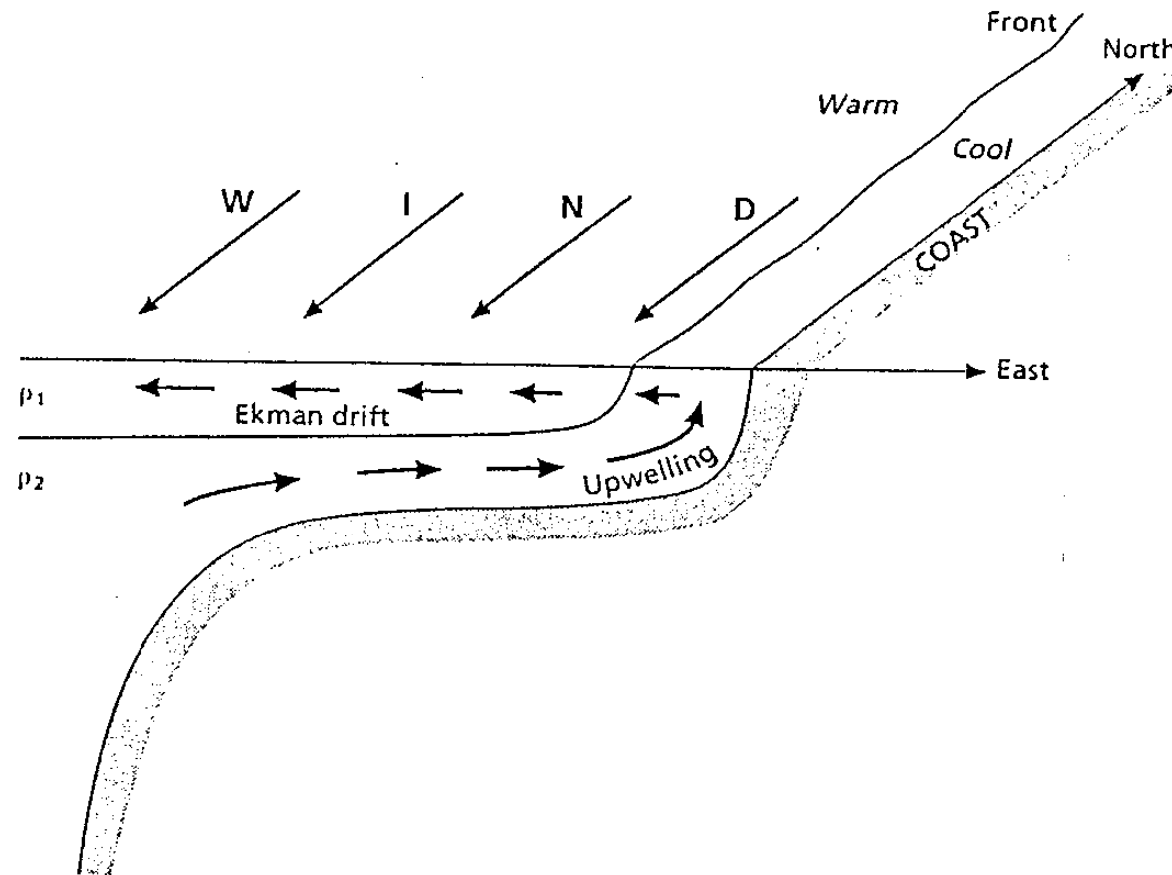
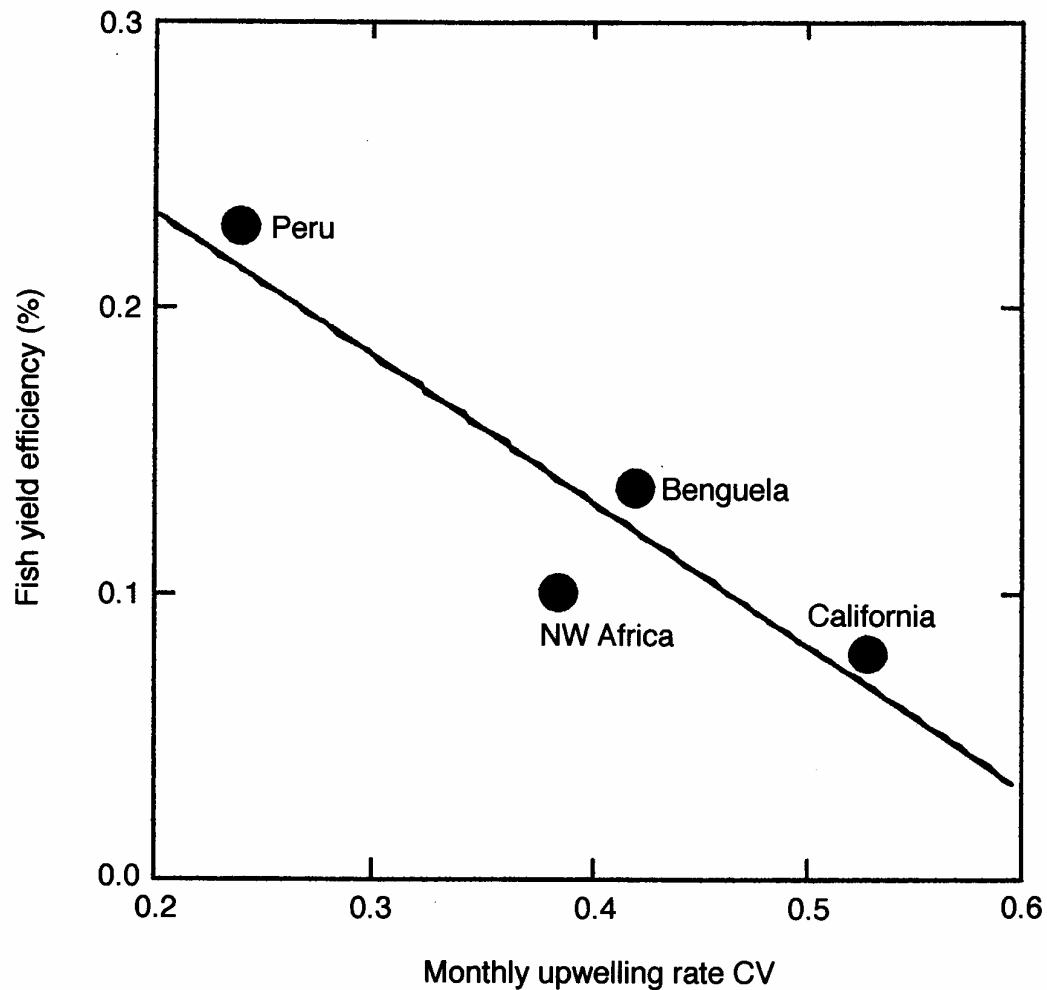


Fig. 5.05 A perspective drawing through an upwelling region illustrating the offshore Ekman drift in the upper layer being replaced near the coast by upward moving water from the lower layer. The upwelling water, usually cool, is separated from the offshore warm water by a surface front parallel to the coast. The wind blows from north to south.

Zonas de afloramento

Peru – afloramento mais constante:
é a zona mais produtiva



Ware. 2000. In:
Harrison and Parsons.
Fisheries
Oceanography
Blackwell Science



Barragem de Aswan (1965): declínio nas capturas

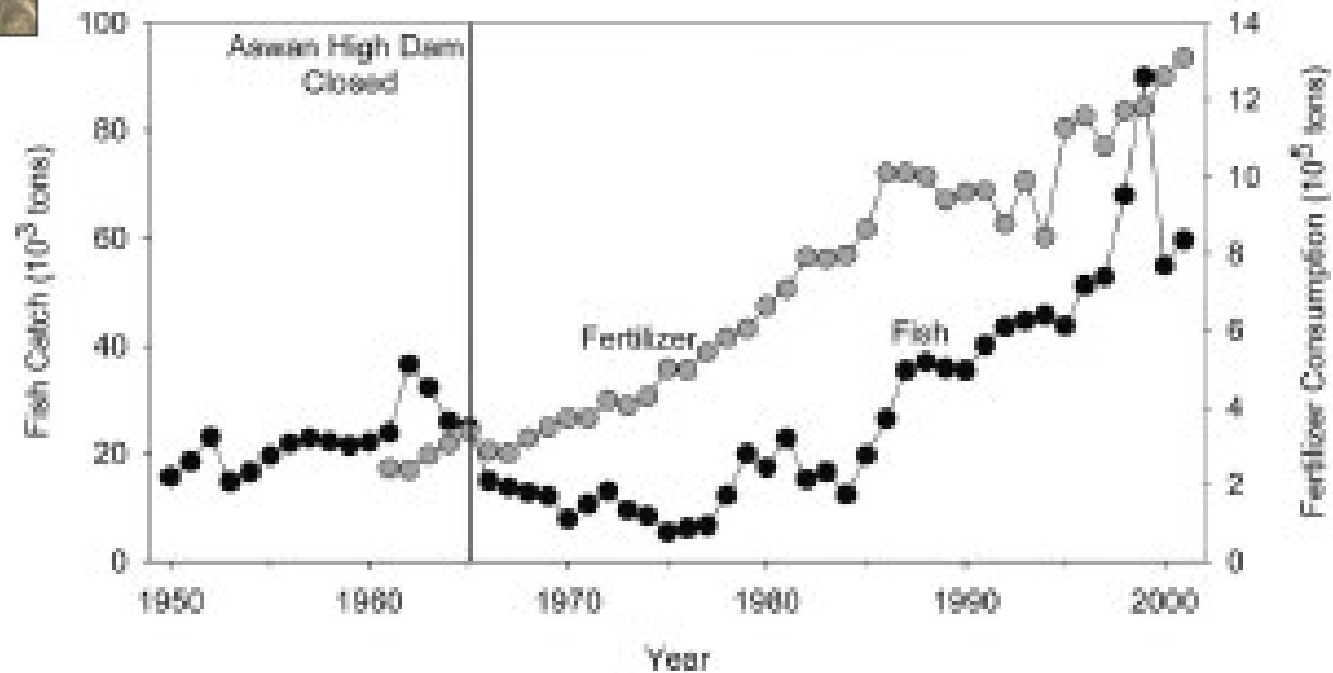
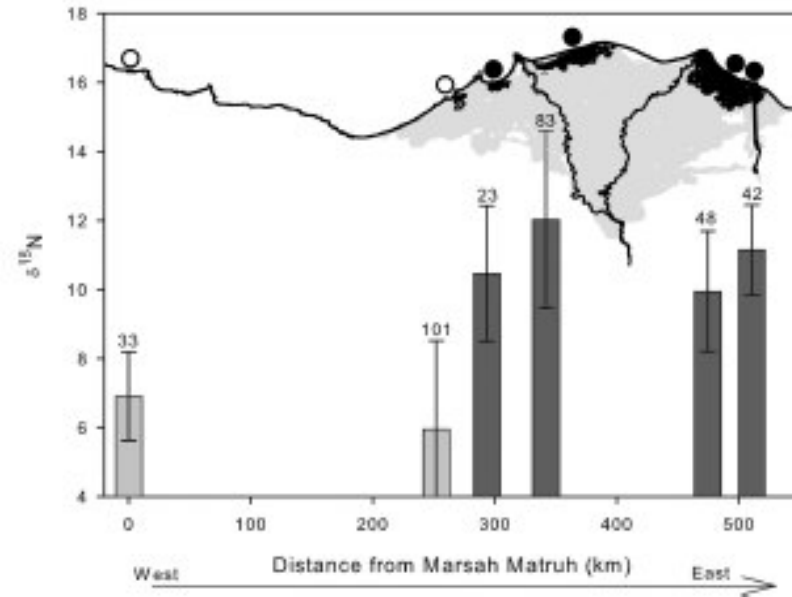
Desde 1980-1985: aumento dramático

Análise de isótopos estáveis de nitrogênio:

60 – 100% da produção resulta de enriquecimento (fertilizantes e esgotos)

Fonte: Oczkowski, A. 2009.

Poluição, produtividade e pescas



Rio Guadiana

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A pesca e o caudal do rio

- estudos indicaram para a existência de uma relação entre o caudal do rio e os desembarques da pesca;
- existiu uma correlação significativa entre o caudal e as capturas de certas espécies, especialmente de **pequenos pelágicos** e de **gamba**;

