

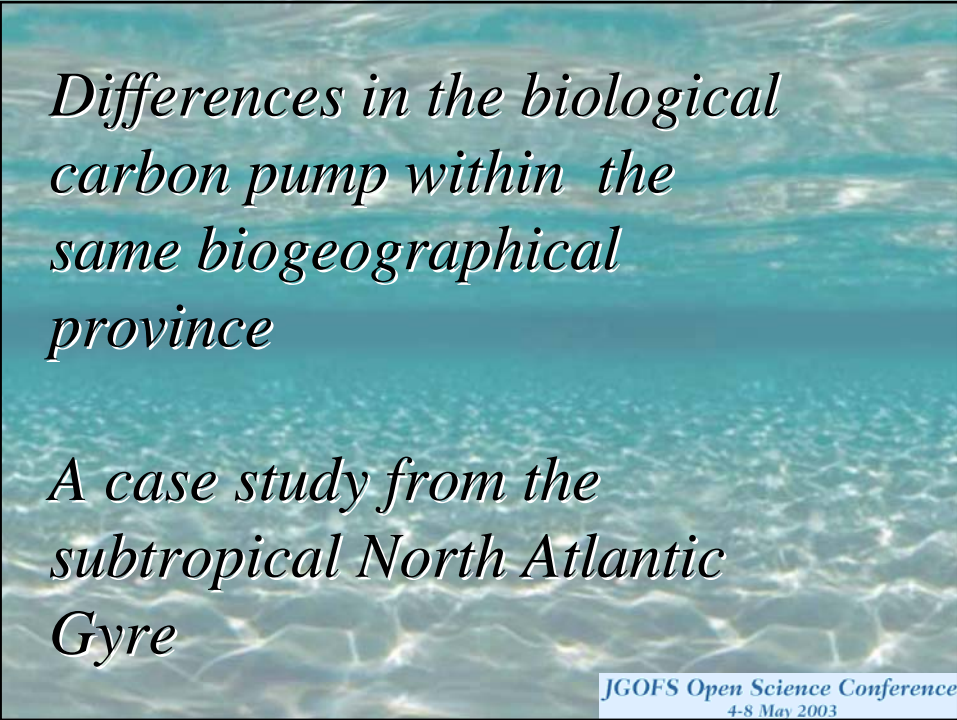


Commentary to Richard Lampitt:

*'Linking Surface Ocean
and the Deep Sea'*

Susanne Neuer

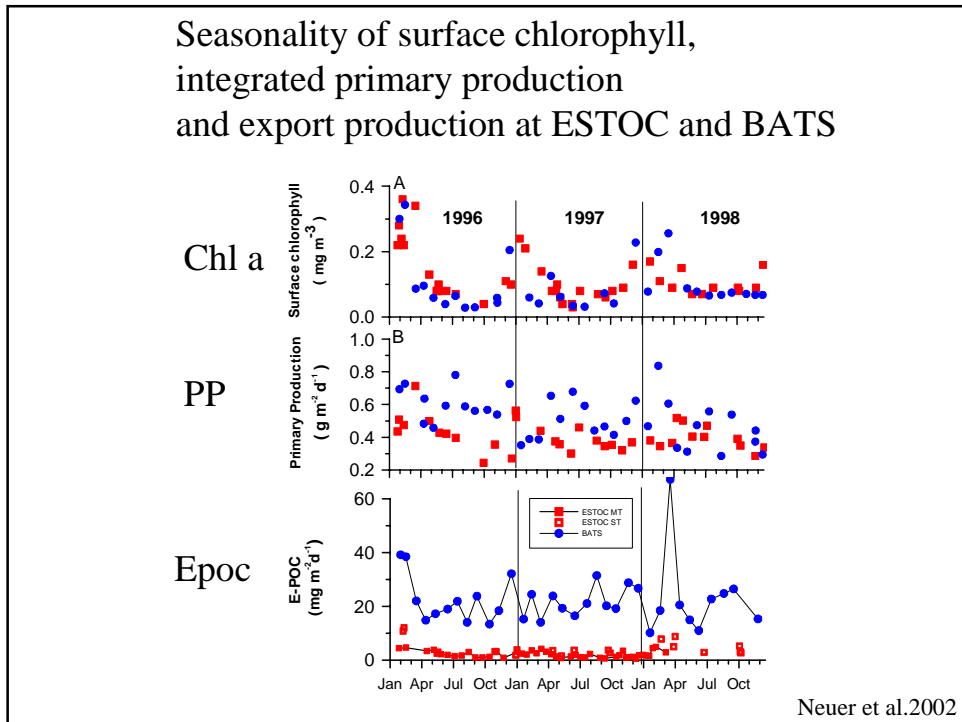
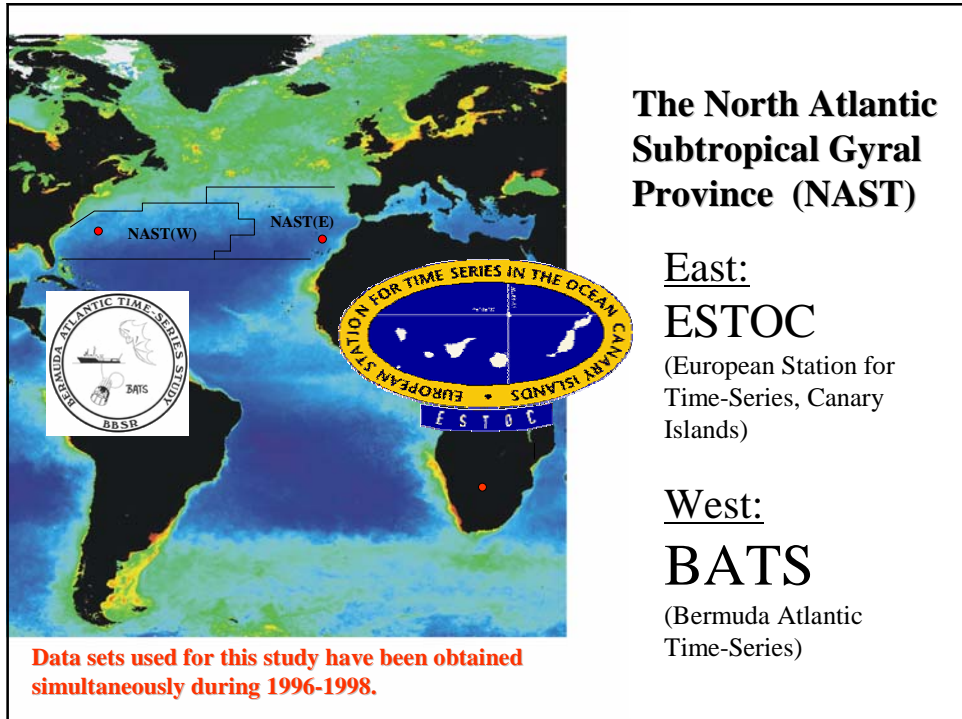
JGOFS Open Science Conference
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*Differences in the biological
carbon pump within the
same biogeographical
province*

*A case study from the
subtropical North Atlantic
Gyre*

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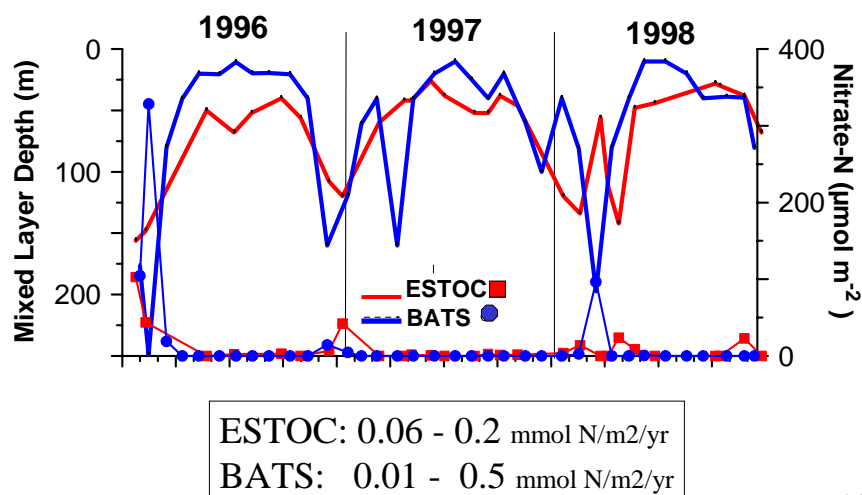
Yearly integrated PP, E_{POC} and ER (E_{POC}/PP) for ESTOC and BATS

	PP $\text{mol C m}^{-2} \text{ yr}^{-1}$		E_{POC} $\text{mol C m}^{-2} \text{ yr}^{-1}$		ER	
	BATS	ESTOC	BATS	ESTOC ^a	BATS	ESTOC ^b
1996	16.3	11.9	1.4	0.24 / 0.16	0.086	0.017
1997	13.3	12.0	1.3	0.16 / 0.16	0.098	0.013
1998	13.9	11.7	0.7	-- / 0.20	0.050	0.017
AVG	14.5	11.9	1.1	0.2	0.08	0.016

^aShallow moored/surface tethered trap. Surface tethered trap value of 1996 and 1997 composite of both years ^b Mean of moored and surface tethered traps.

Neuer et al.2002

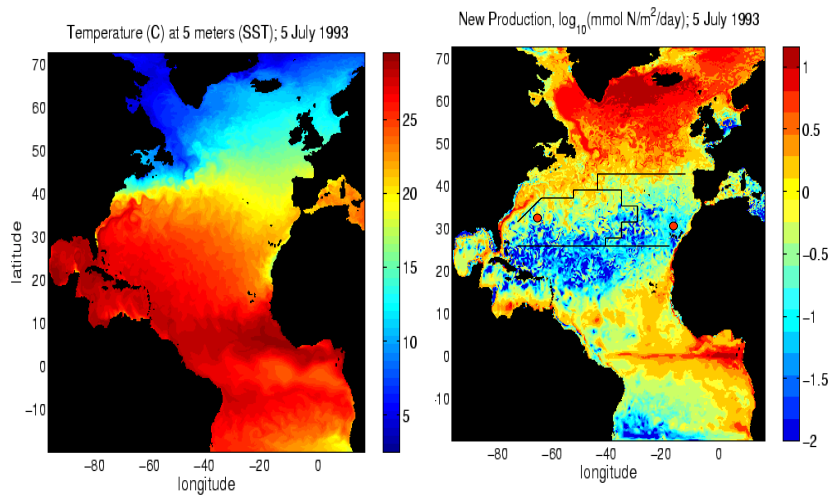
Mixed layer depth and Nitrate-N input at ESTOC and BATS



Neuer et al.2002

Nutrient budgets at BATS and ESTOC diagnosed from an eddy-resolving 0.1 degree resolution simulation of the North Atlantic (after McGillicuddy et al. in press)

	BATS	ESTOC
New Production (mol N m⁻²yr⁻¹)	0.63	0.04
Convection	0.37	0.00
Vertical diffusion	0.10	0.02
Vertical advection	0.12	0.02
Horizontal advection	0.04	0.00
Horizontal diffusion	0.00	0.00
Vertical velocity (m yr ⁻¹)	-31	-30



Snapshots of temperature and new production in a 0.1 degree resolution simulation of the North Atlantic

(McGillicuddy et al., GBC, in press)

Conclusions

ESTOC (NAST-E) has comparable surface chlorophyll and primary production than BATS (NAST-W), but new (export) production is significantly lower.

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Conclusions

Lower input of new nutrients does not necessarily result in lower PP per se but influences the removal efficiency (export ratio) of biologically produced carbon into the ocean's interior.

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Conclusions

Primary production and surface chlorophyll alone are insufficient to constrain the amount of carbon export in the subtropical ocean.

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References

Neuer, S., R. Davenport, T. Freudenthal, G. Wefer, O. Llinás, M-J. Rueda, D. K. Steinberg and D. Karl. 2002. Differences in the biological carbon pump at three subtropical ocean sites. *Geophys. Res. Lett.*, 29, 32-1 to 32-4.

McGillicuddy, D.J., Anderson, L.A., Doney, S.C., and M.E. Maltrud. Eddy-driven sources and sinks of nutrients in the upper ocean: results from a 0.1 degree resolution model of the North Atlantic. In press, *Global Biogeochemical Cycles*.

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