

**Day-to-day, seasonal, interannual, and interdecadal
variability of oxygen and nitrite
in the oxygen minimum zone
of the central Arabian Sea**

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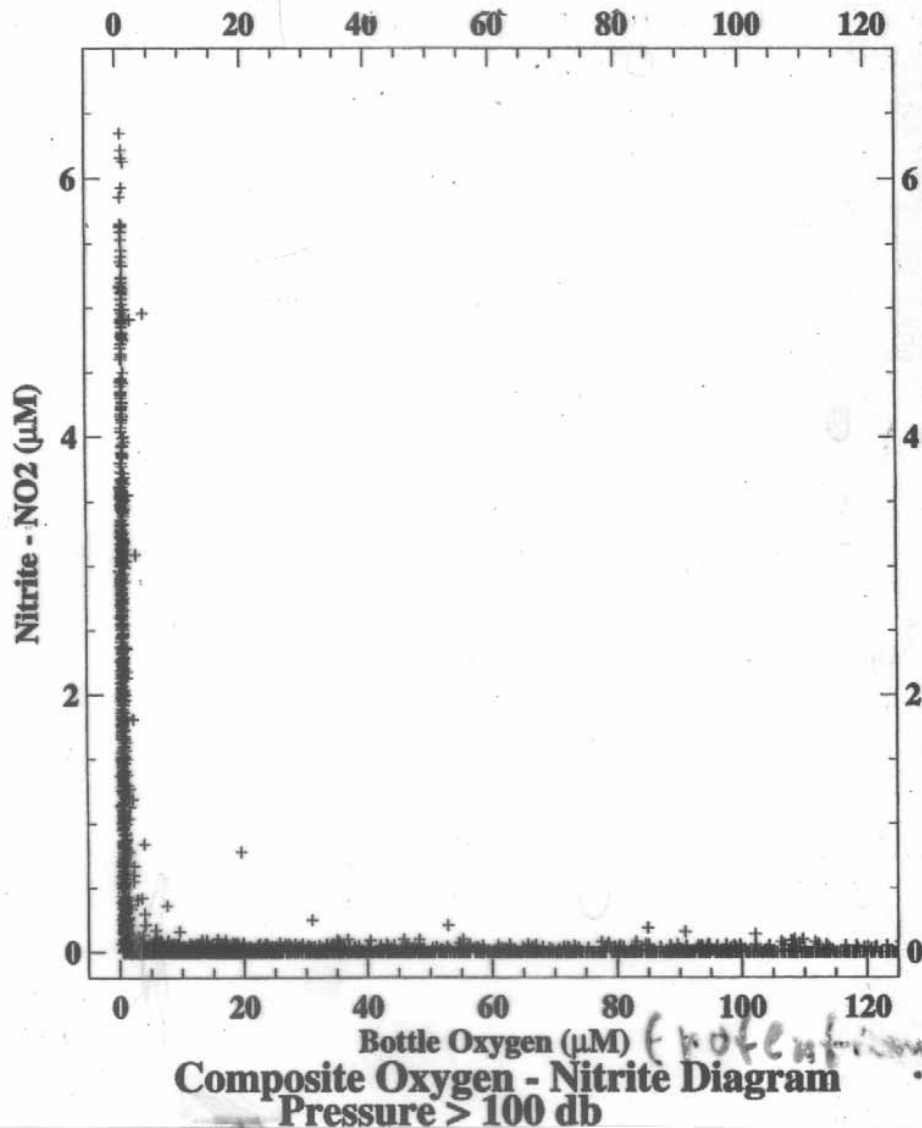
School of Oceanography, University of Washington, Seattle, Washington, U.S.A.

D. Amal Jayakumar

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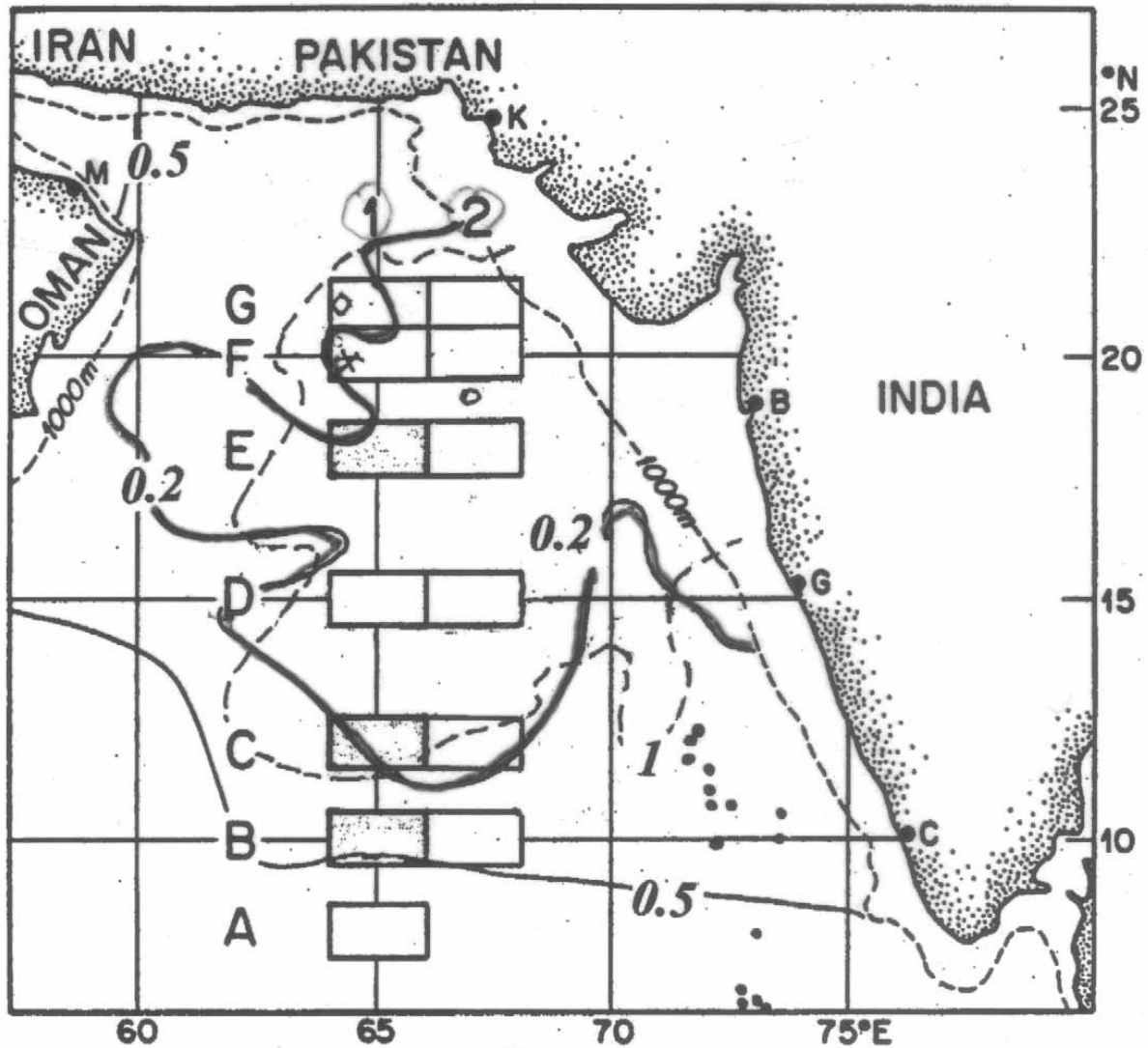
Now at: Department of Geosciences, Princeton University, Princeton, New Jersey,
U.S.A.

JGOFS: Arabian Sea Process Study

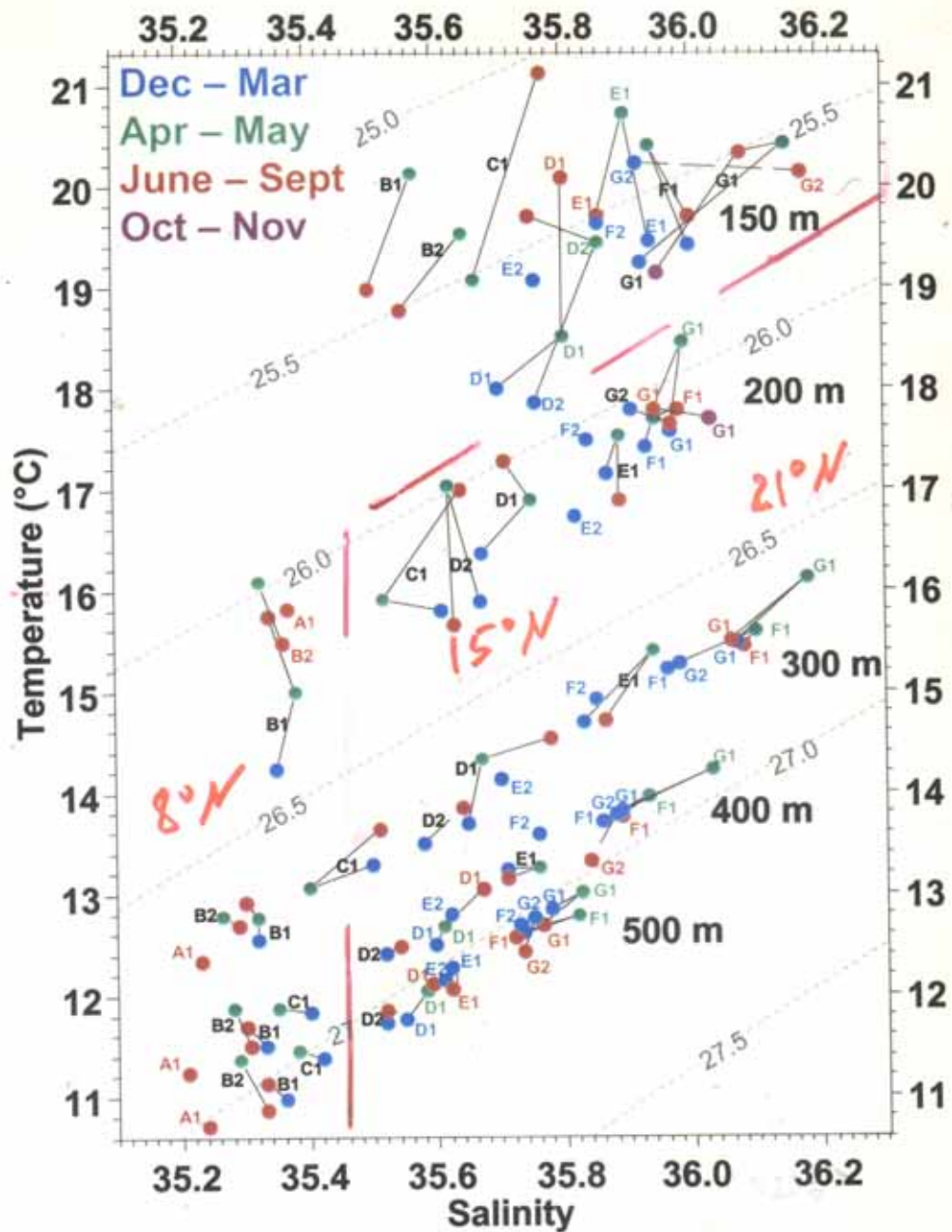


0.10 mol L⁻¹

Composite Oxygen - Nitrite Diagram
Pressure > 100 db



— oxygen, mL L⁻¹, - - - nitrite, μM
 200 m (Wyrтки 1971) column maximum (Naqvi 1991)



Seasonality in the OMZ

Salinity

300-500 m: Salinity (and temperature) highest during the SI

Oxygen

200-500 m: Among 15 significant differences between seasons,

SWM < NEM by 0.04 mL L^{-1} ($n = 6$)

SWM < SI by 0.11 mL L^{-1} ($n = 4$)

SWM < FI by 0.115 mL L^{-1} ($n = 2$)

SWM > SI by 0.11 mL L^{-1} ($n = 1$)

Nitrite

Concentrations highest during the NEM

MEDIAN FOUR-DECADAL CHANGES AND TRENDS (200-500 m)

OXYGEN

	mL L ⁻¹	uM
OMZ: 15°-20°N (F1 only) (significant)	-0.12	-5.3*
F2 & 21°N (significant)	+0.09	+4
8°-12°N: (not significant)	+0.11	+5

*NEM, -0.18 mL L⁻¹; SWM, -0.09 mL L⁻¹ (both significant)

NITRITE IN OMZ

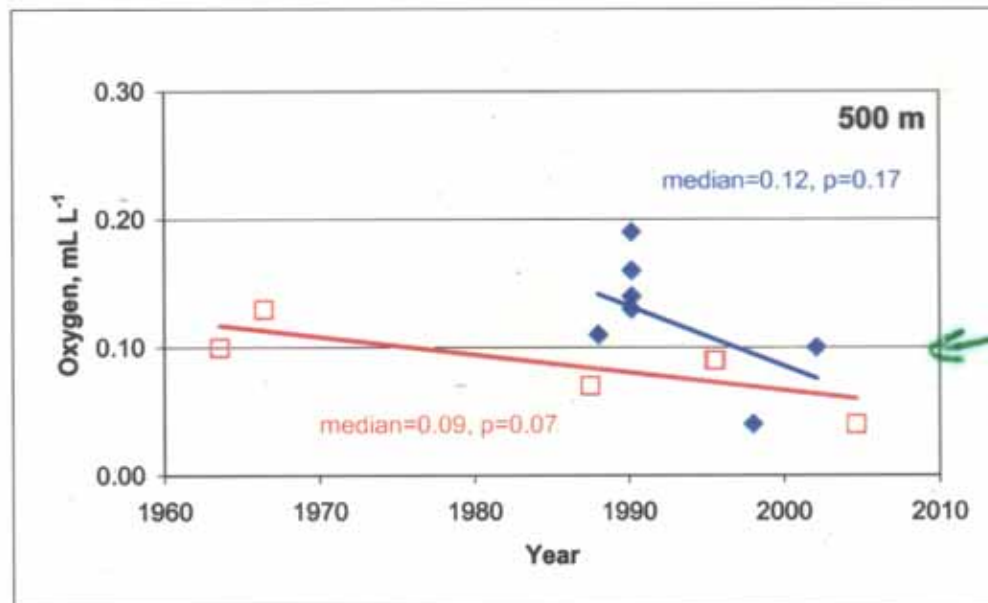
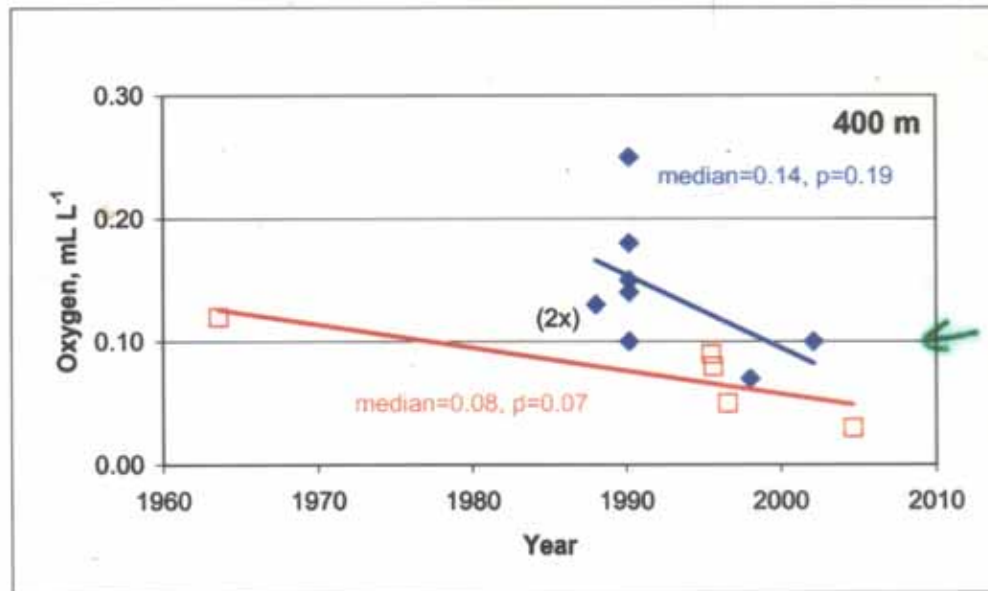
>0.5 uM: positive slopes much more common than negative slopes
 "zero values" (= <0.2 uM): frequency increases with time

SALINITY

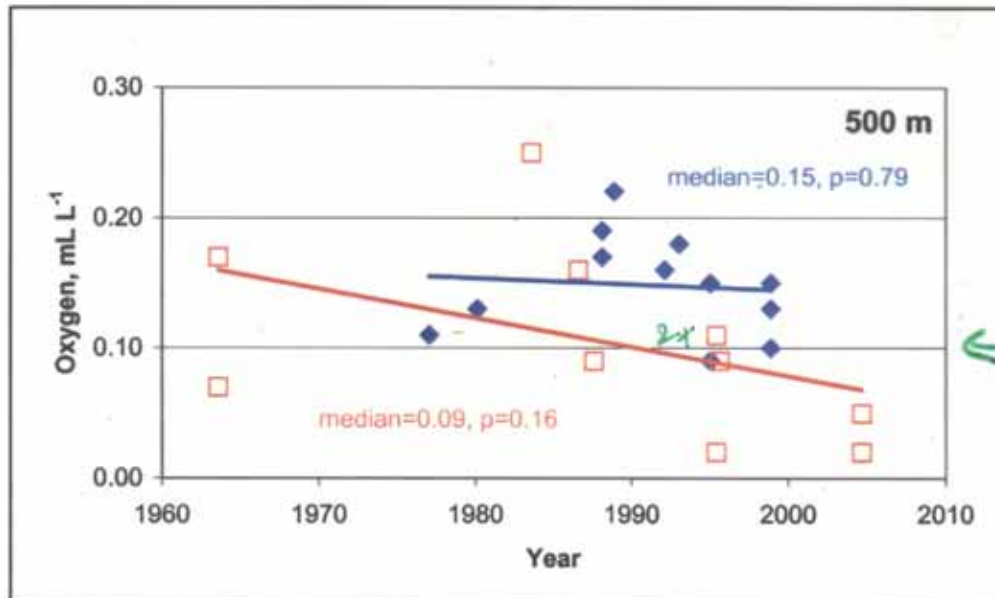
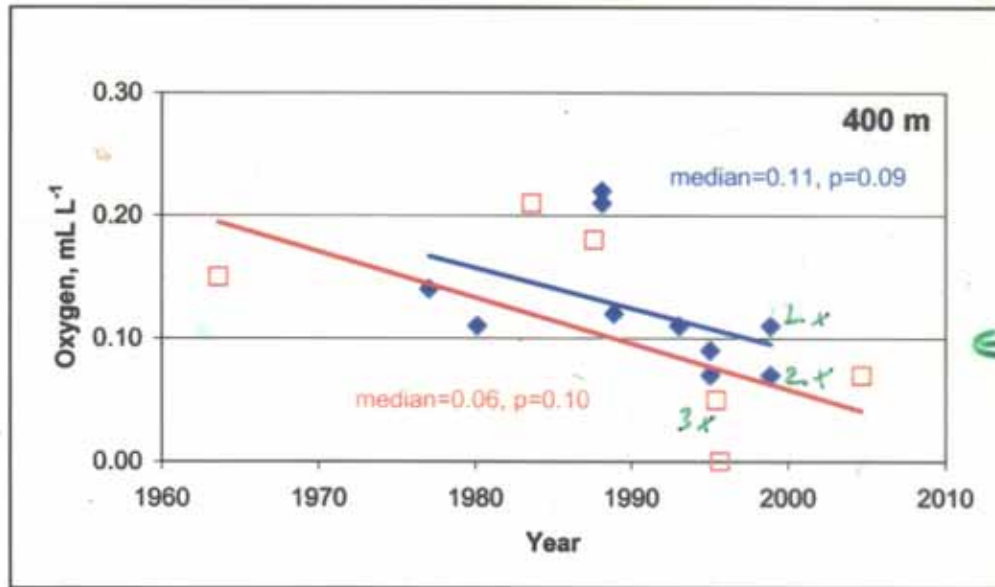
OMZ: NEM & SI: about twice as many positive as negative slopes
 SWM: number of positive and negative slopes about equal

D-boxes (15°N, 150-500 m):	D1 (65°E)	-0.12
	D2 (67°E)	-0.24
18°-21°N: (10 of 15 depths significant)		+0.14
8°-12°N: (nearly all slopes positive)		+0.12

Oxygen Box F1: 20°N, 65°E, Dec-Mar; Jun-Sep

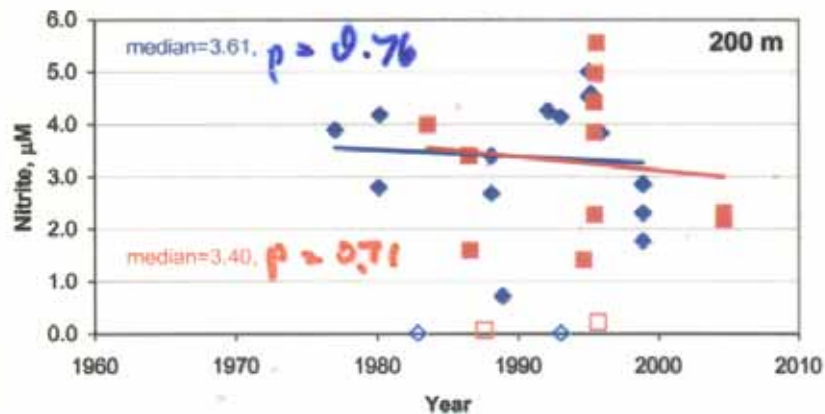


Oxygen Box D2: 15°N, 67°E, Dec-Mar; Jun-Sep

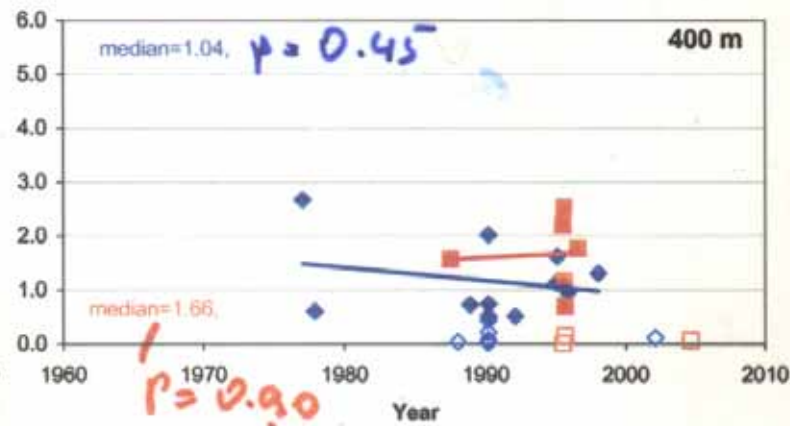
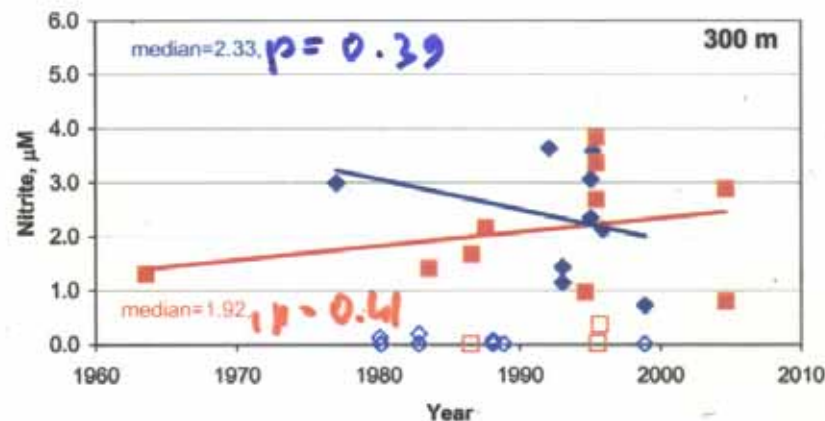
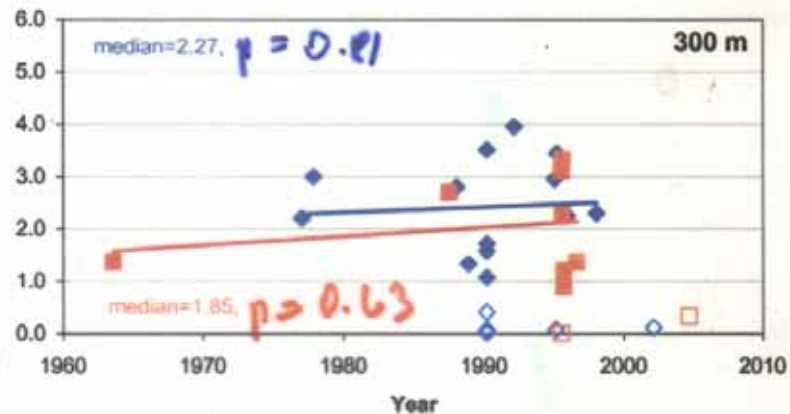


Nitrite ≥ 0.5 , Dec-Mar; Jun-Sep

Box D2: 15°N, 67°E

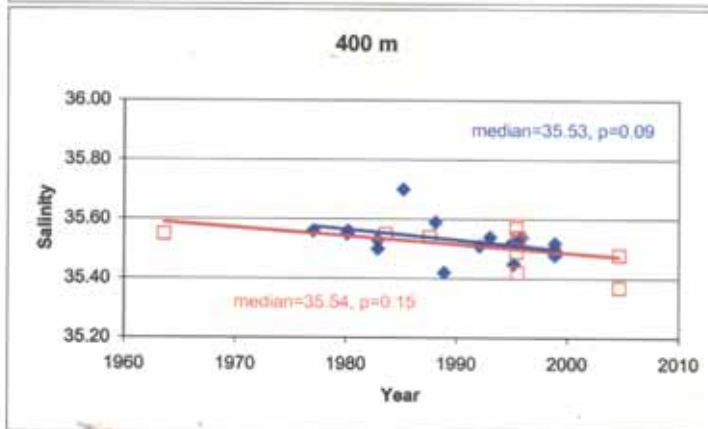
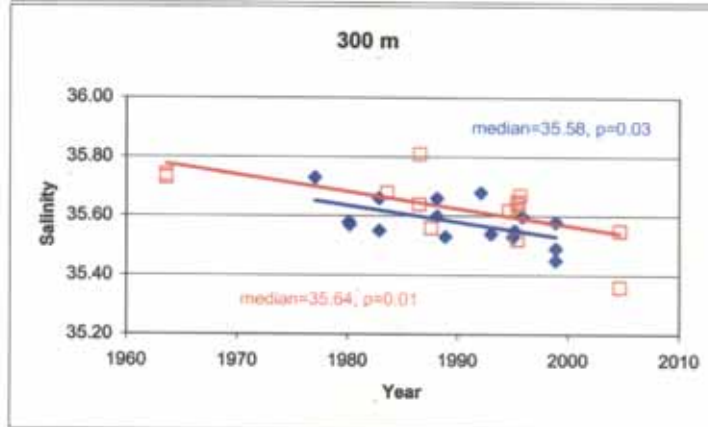
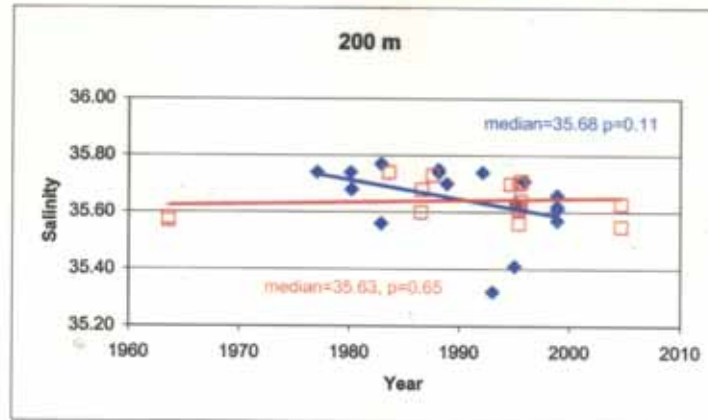


Box F1: 20°N, 65°E



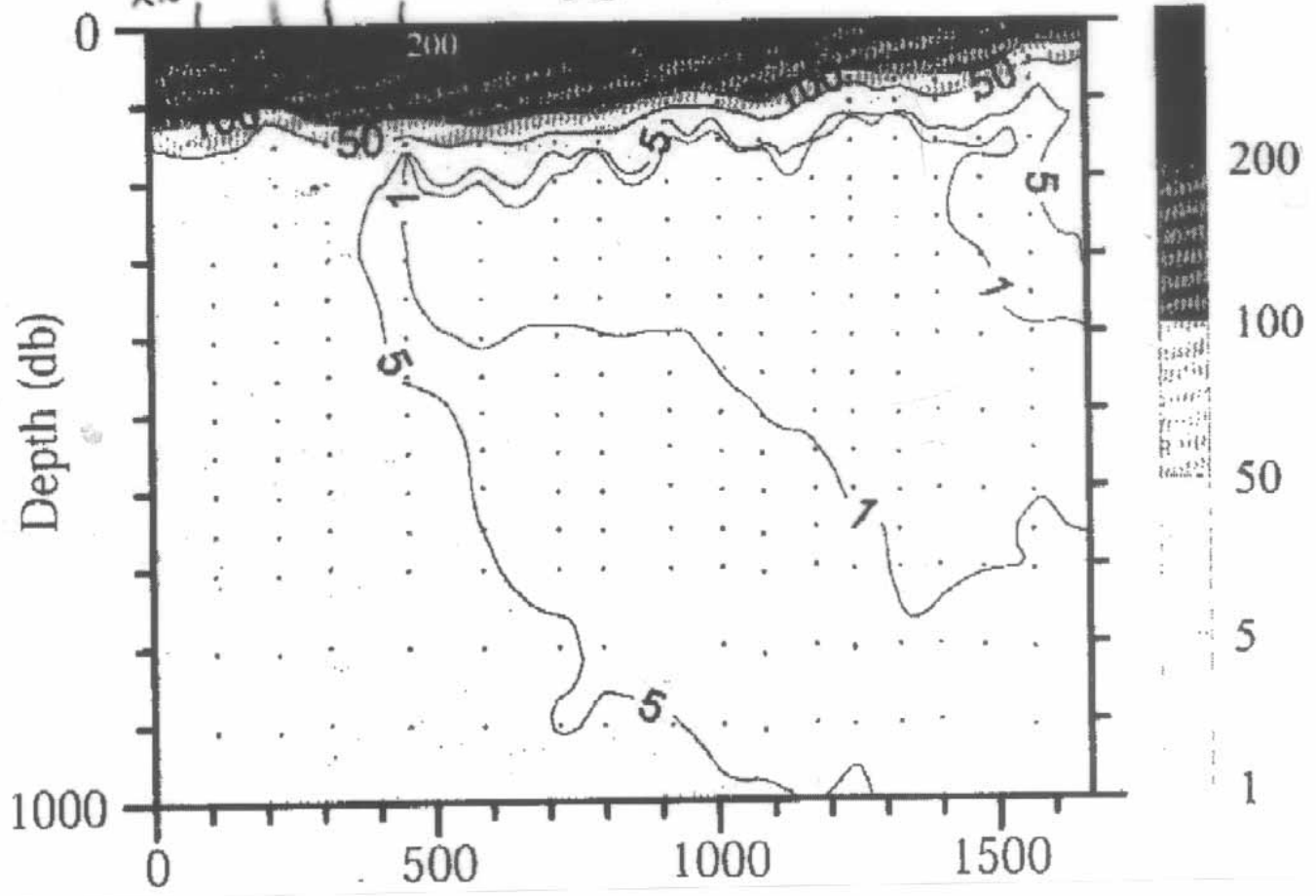
Regressions based only on data values ≥ 0.5 ; data points < 0.5 are plotted as open symbols (data values < 0.5 are NOT included in the medians listed on the graphs)

Salinity Box D2: 15°N, 67°E, Dec-Mar; Jun-Sep



515 : 13
14

Dissolved Oxygen (μM) TN039



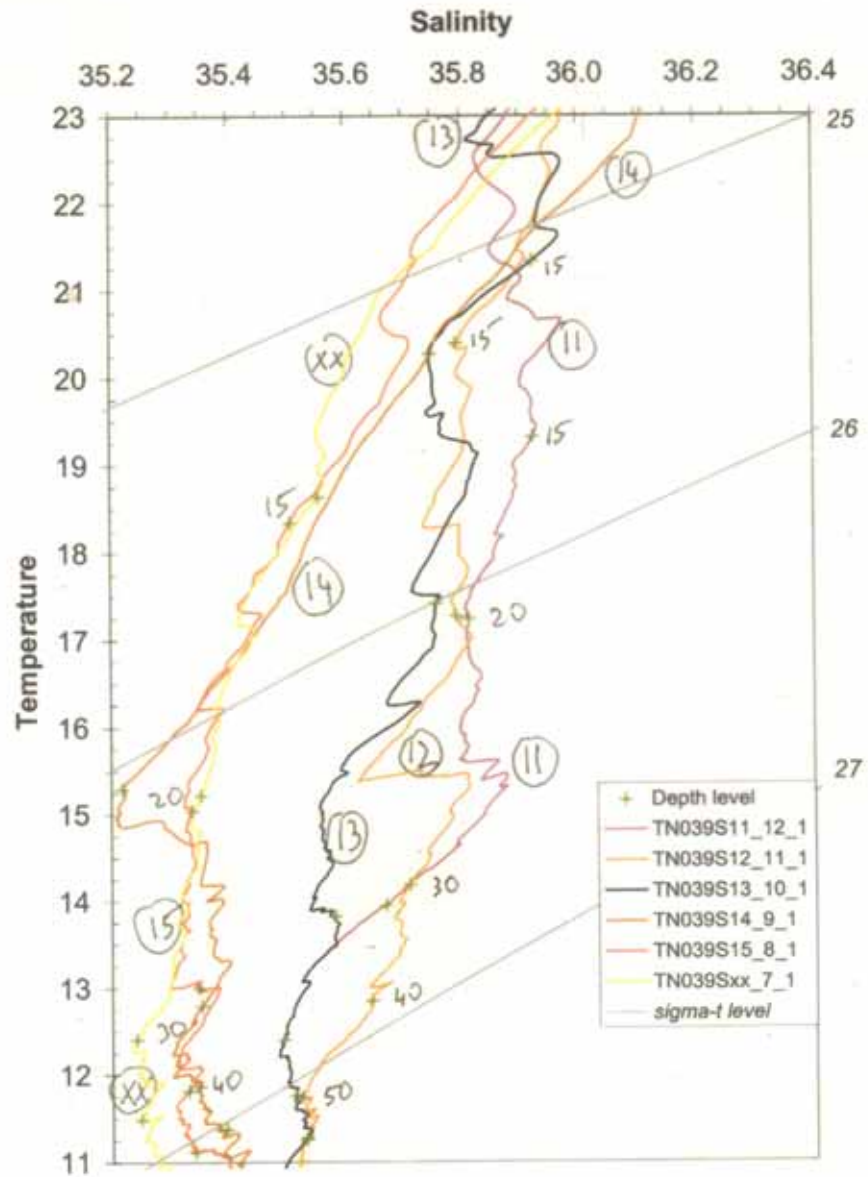


Fig. 4c

Summarizing Questions

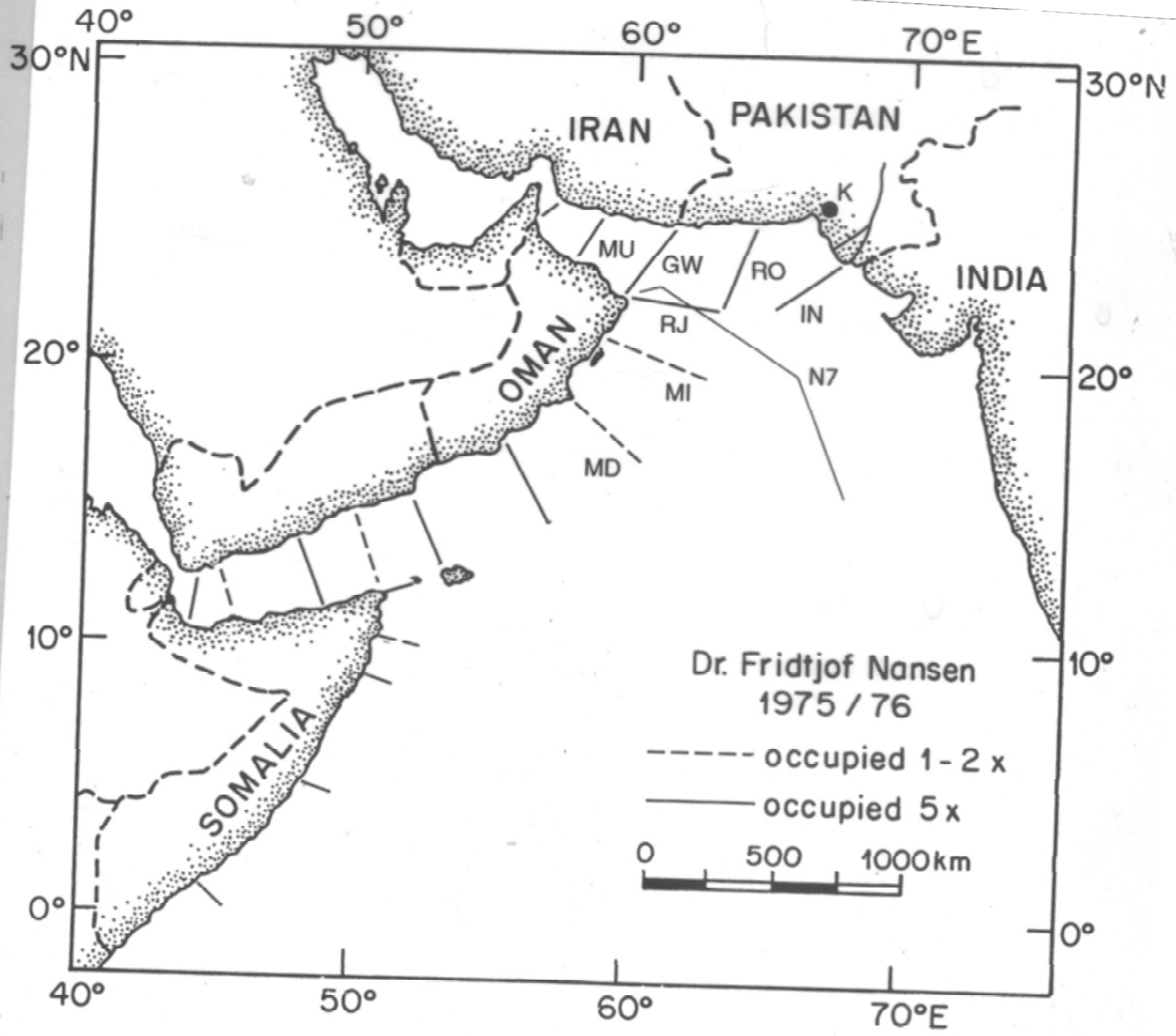
What is the circulation that maintains fairly constant interannual mean fields of hydrography and oxygen at 200-500 m in the face of marked seasonal change?

Who is going to study the mesopelagic zone toward budgets of salinity and oxygen, without which the OMZ cannot be well understood?

**Winter-time subduction and ventilation
of the upper pycnocline in the northernmost Arabian Sea**

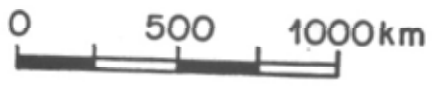
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School of Oceanography, Box 357940, University of Washington,
Seattle, WA 98195-7940, U. S. A.

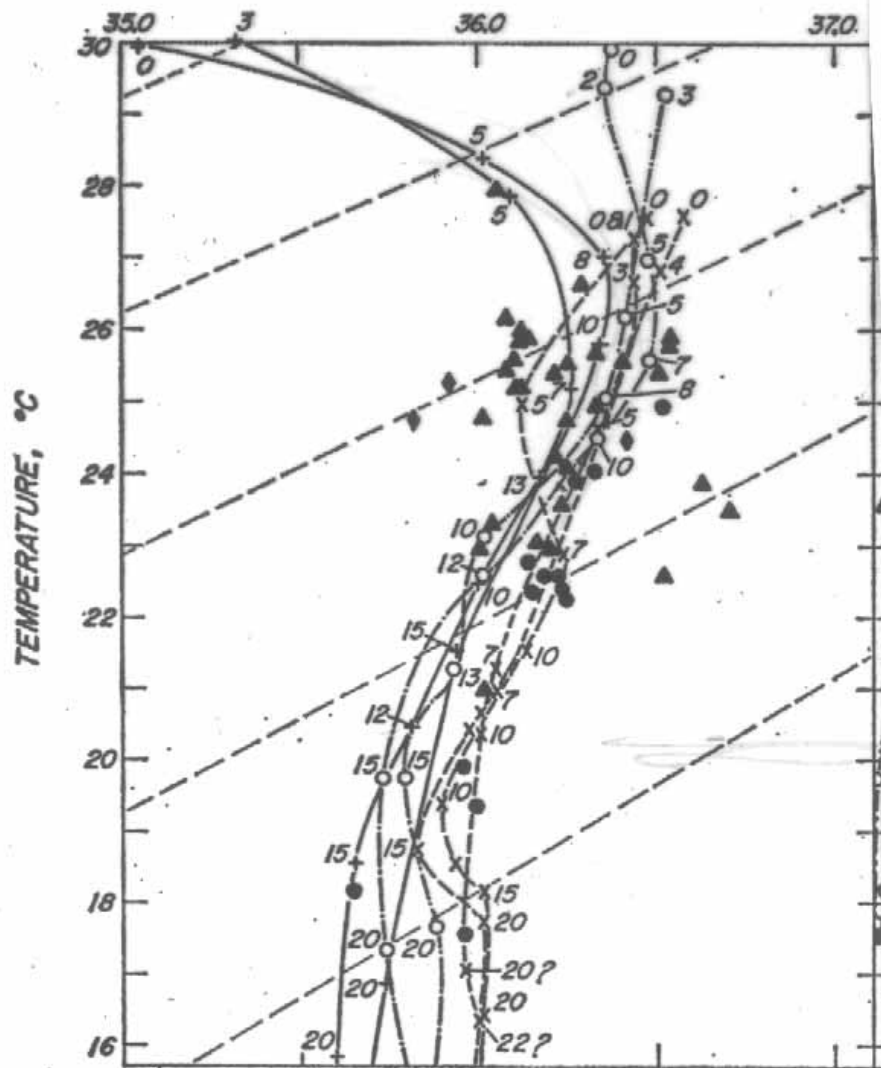


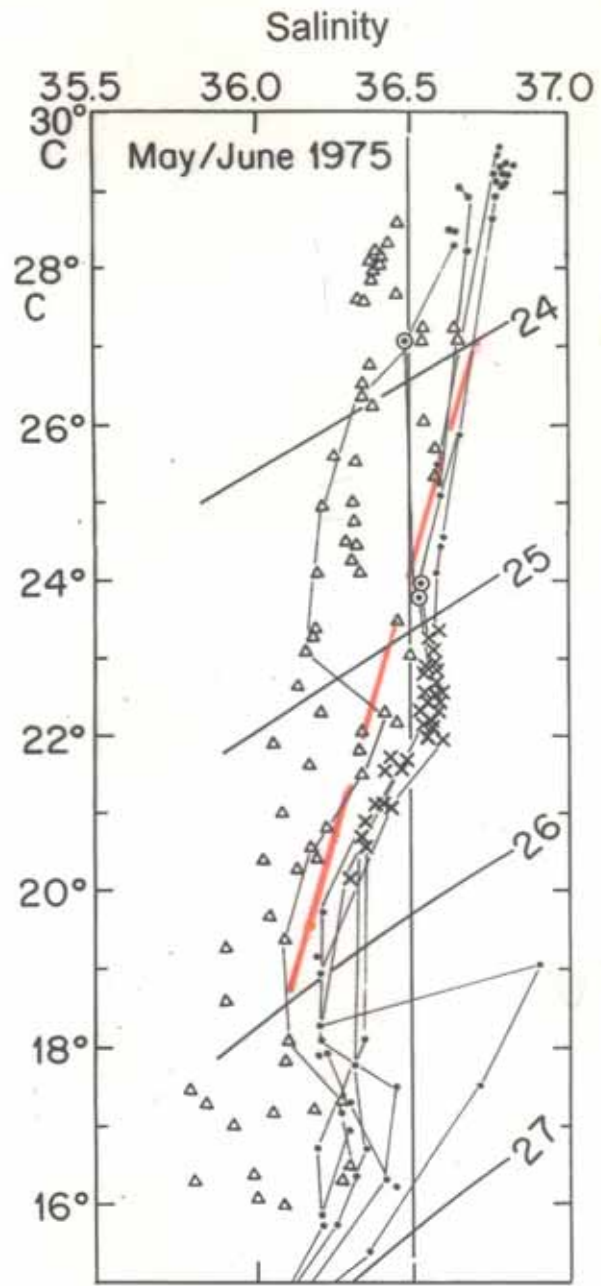
Dr. Fridtjof Nansen
1975 / 76

- occupied 1-2 x
- occupied 5 x



SALINITY

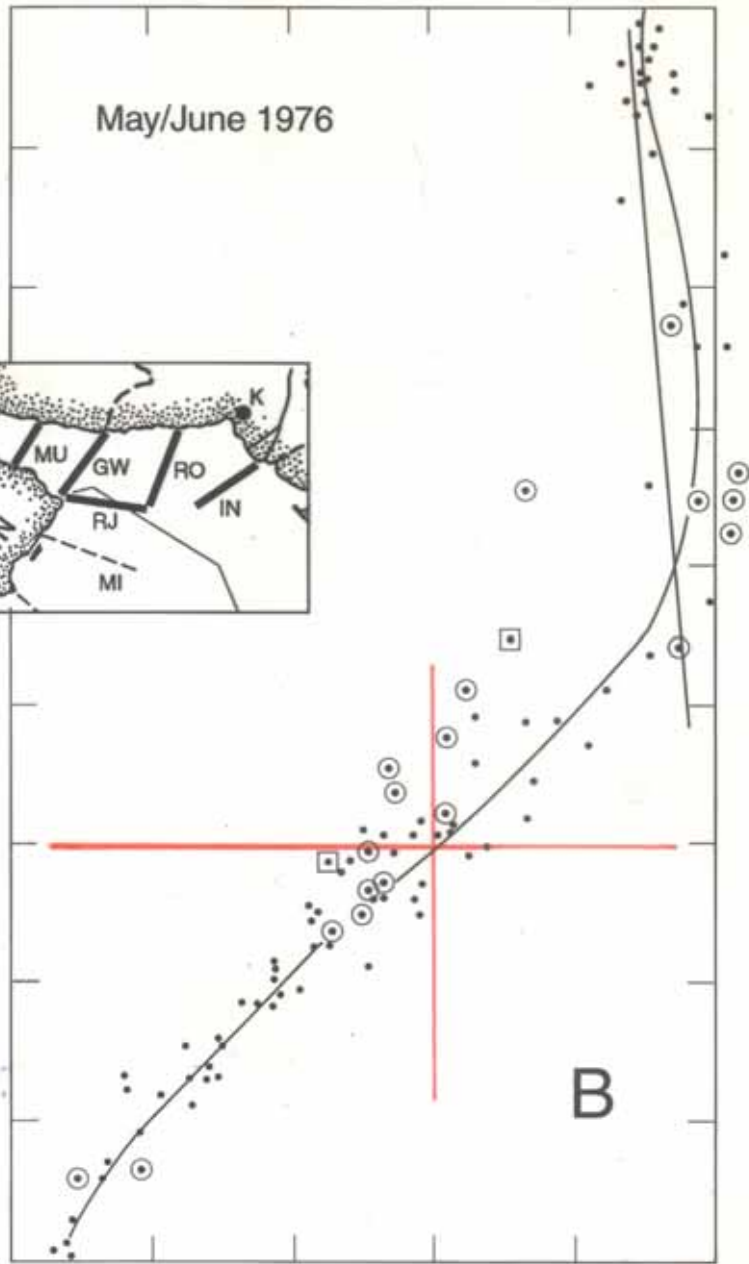
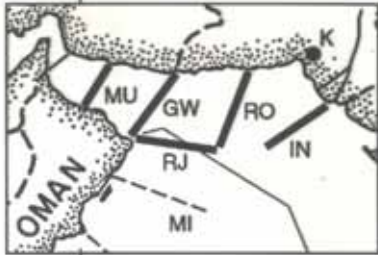




O₂ mL L⁻¹

0 1 2 3 4 5

May/June 1976



Handwritten blue scribbles.

