

Influence of Warm Core Rings on the
Nutrient Environment of Phytoplankton

by

R. I. Waldhauer, A. F. J. Draxler and I. Desvousges

U. S. Department of Commerce
National Marine Fisheries Service
Northeast Fisheries Center
Sandy Hook Laboratory
Highlands, New Jersey 07732 U.S.A.

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INFLUENCE OF WARM CORE RINGS ON THE
NUTRIENT ENVIRONMENT OF PHYTOPLANKTON

R. I. WALDHAUER and A. F. J. DRAXLER

Observations of nutrient distributions were made on four surveys to study the influence of warm core rings 82A (April, 1982), 82B (late April - early May, 1982), 82B (late June, 1982) and a Gulf Stream feature (late September, 1982) on the transport of nutrient environments of phytoplankton.

In April/May, before the onset of local stratification, nitrate in the slope water entrained around ring 82B was high at the upstream (shelf-ward) end. Phytoplankton activity depleted this supply as the entrained water was wrapped around the ring. Two months later, ring 82B had drifted about 200 km to the southwest. The shelf/slope water was depleted of nutrients following establishment of the seasonal thermocline and all the nitrogen for phytoplankton production must have been supplied from deeper water.

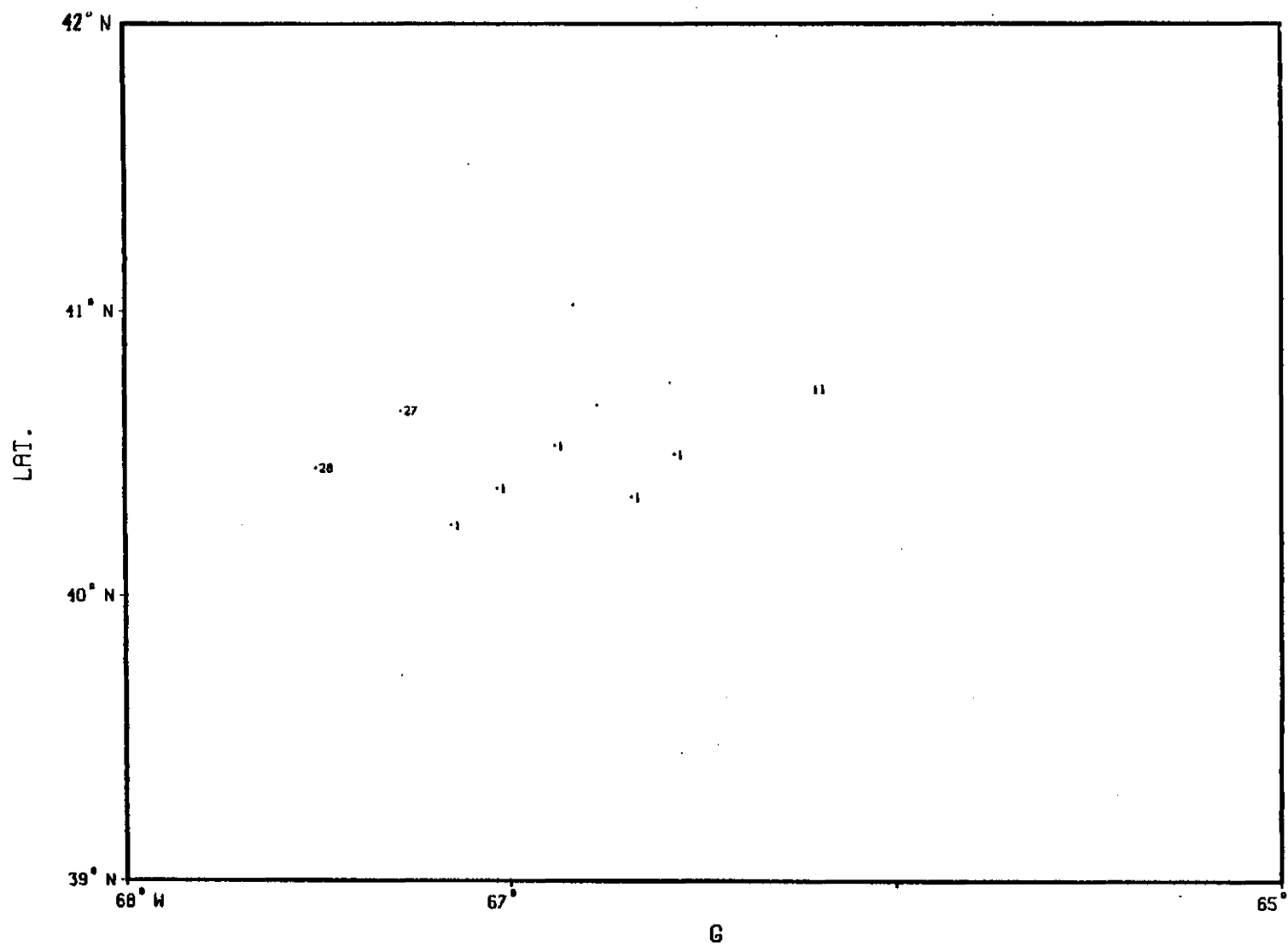
In parallel with the nitrate decline along the axis of the entrainment feature in April/May, there was an increase in the subphotic zone nitrite concentration. By the time of the second visit (AL8207), nitrite concentrations in the mid-water maximum were substantially reduced.

An examination of vertical nitracline excursions on sections normal to the shelf break revealed no evidence of significant forcing of nutrients on to the shelf by rings. Movement of nitrate above 100 m appeared to be associated with the high-velocity regions in all sectors of ring 82B.

AL8204 PART 1

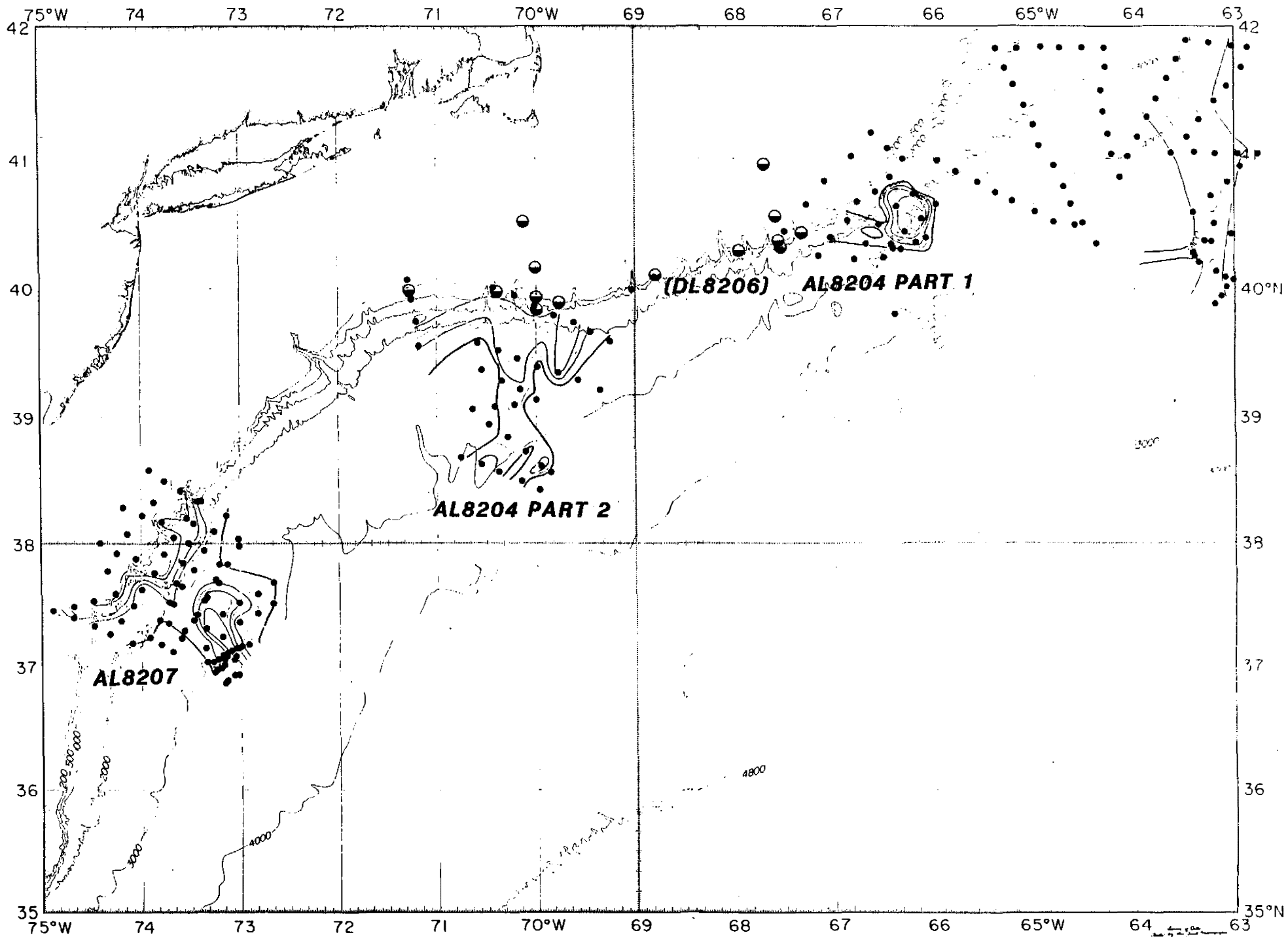
22-28 APRIL 1982



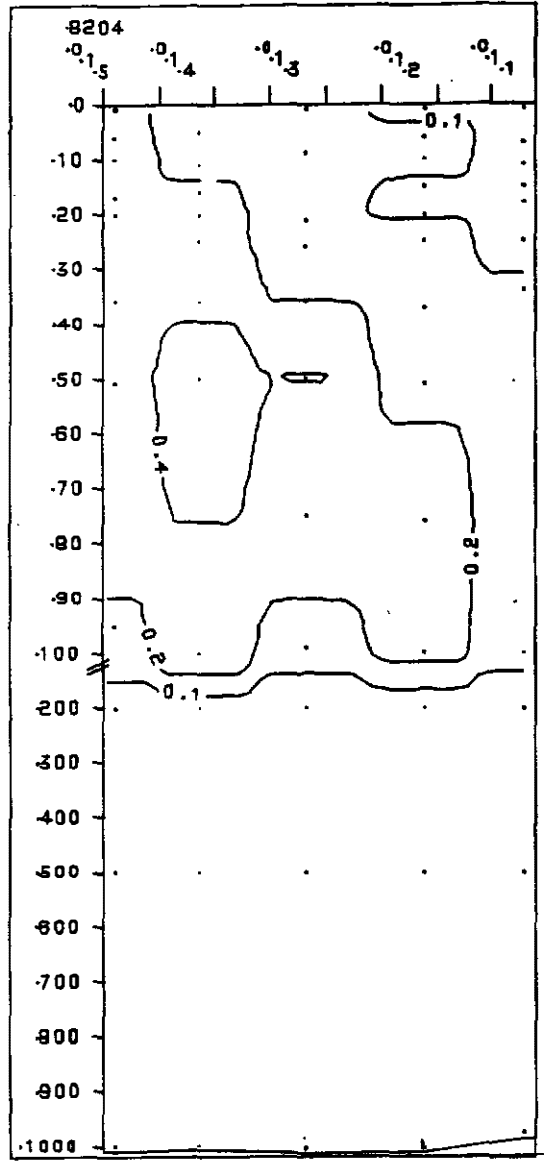
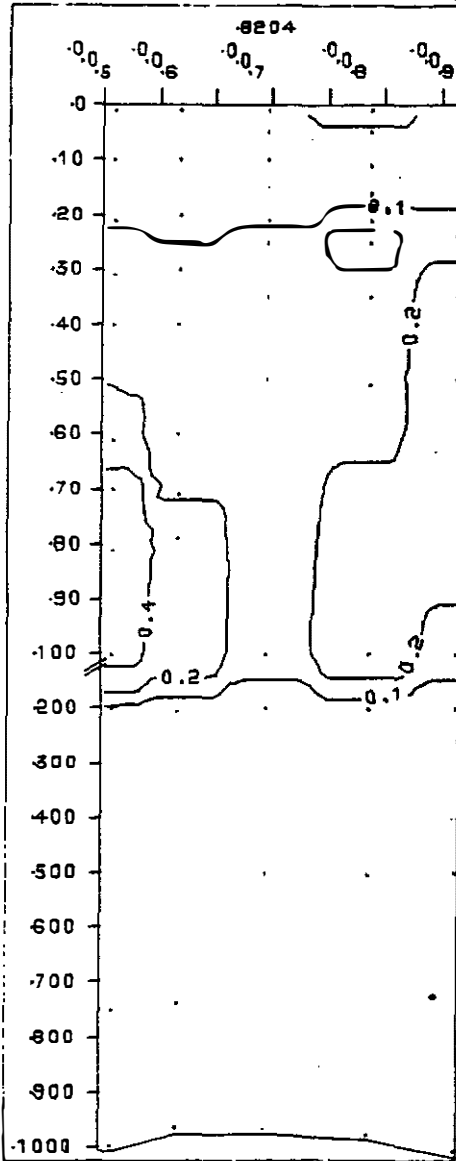
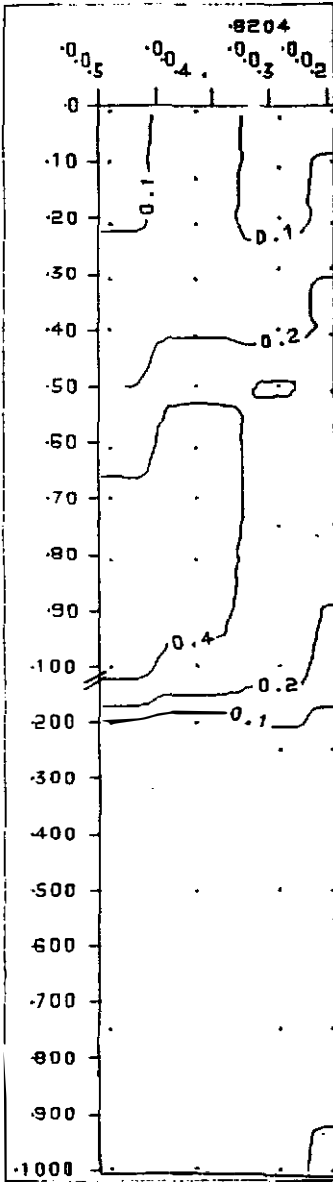


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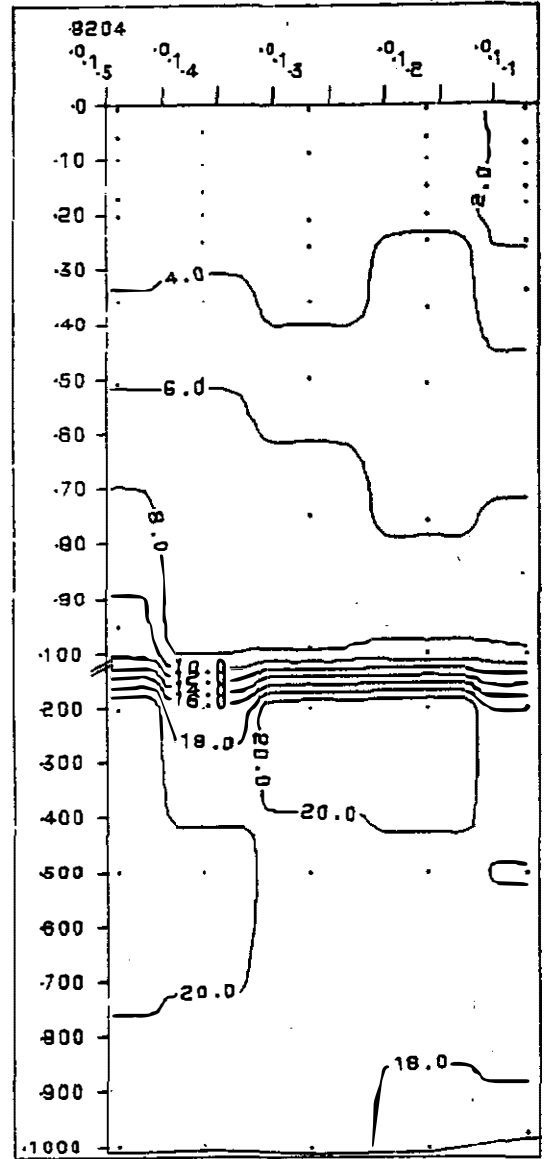
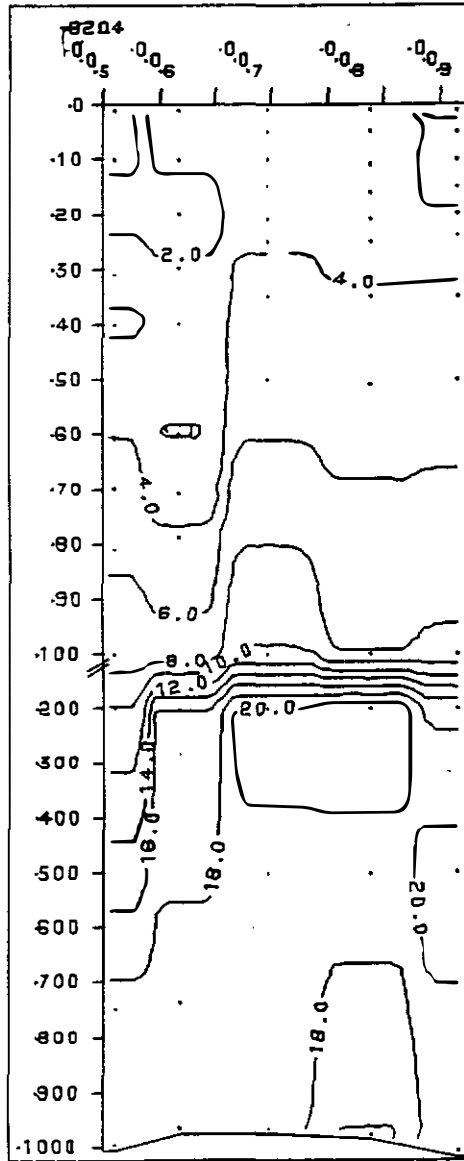
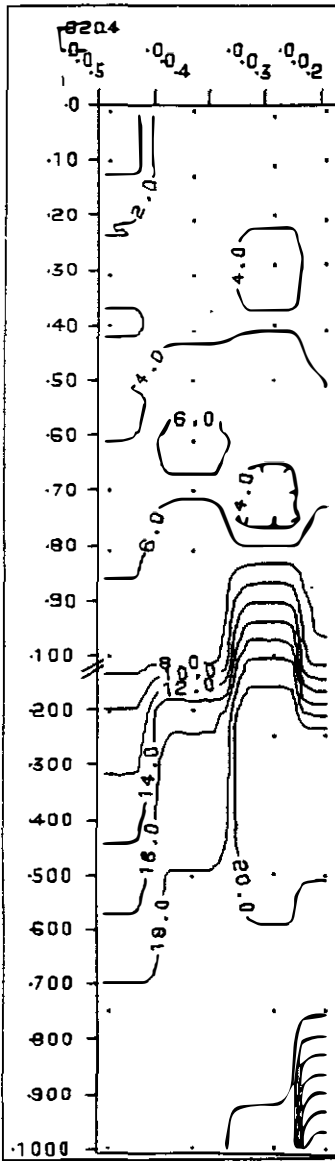
Station Positions



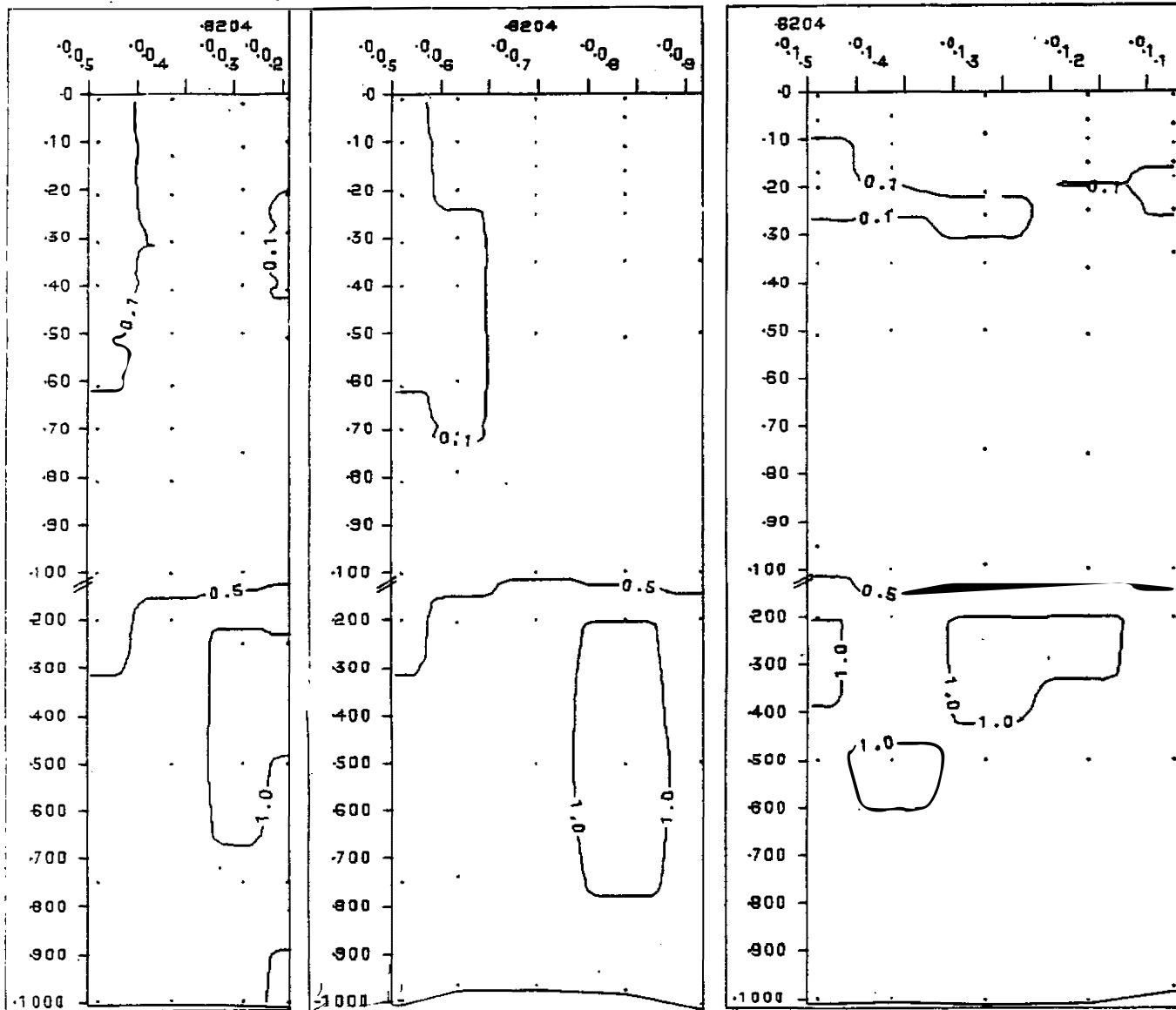
Nitrite (uM)



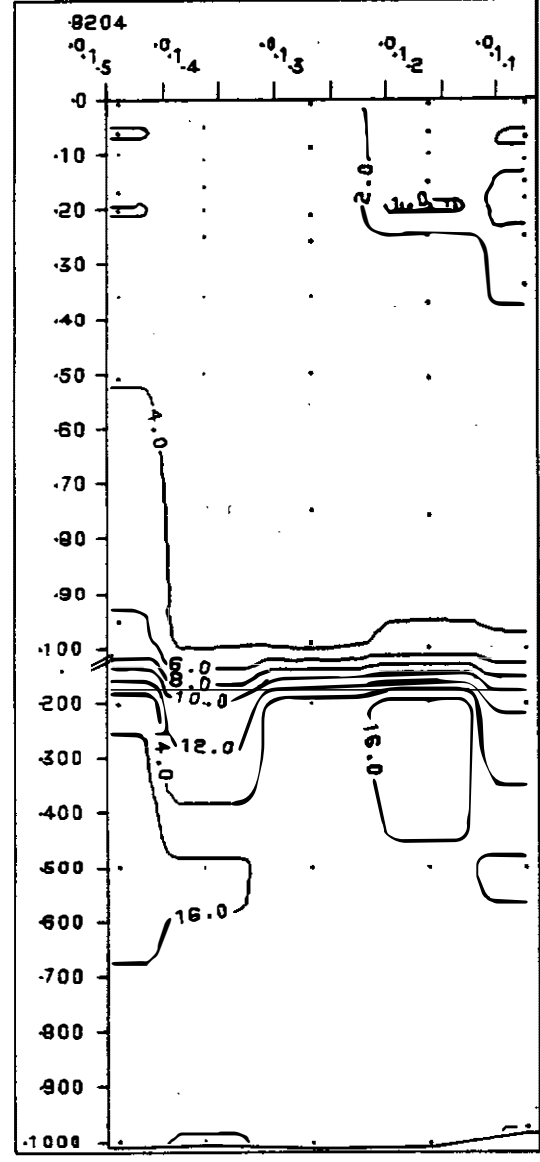
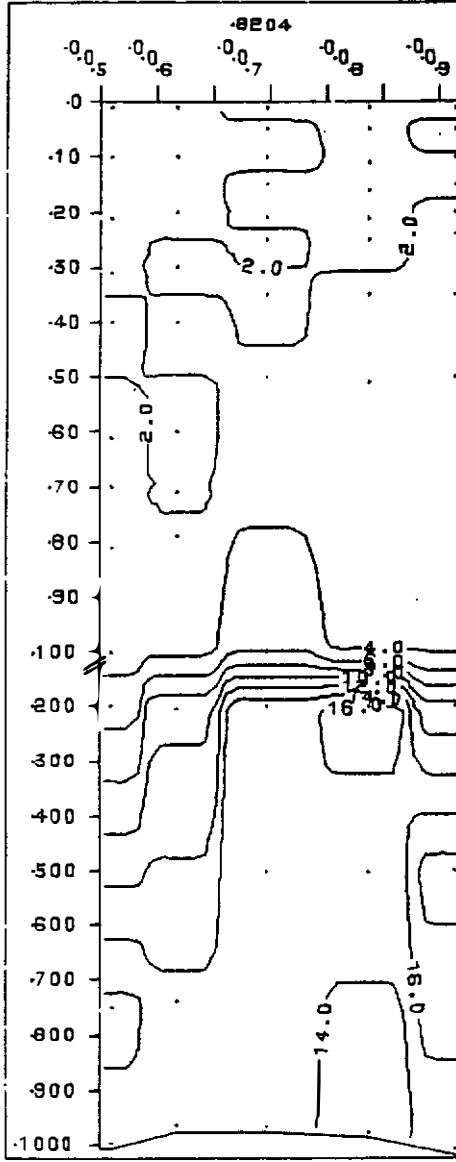
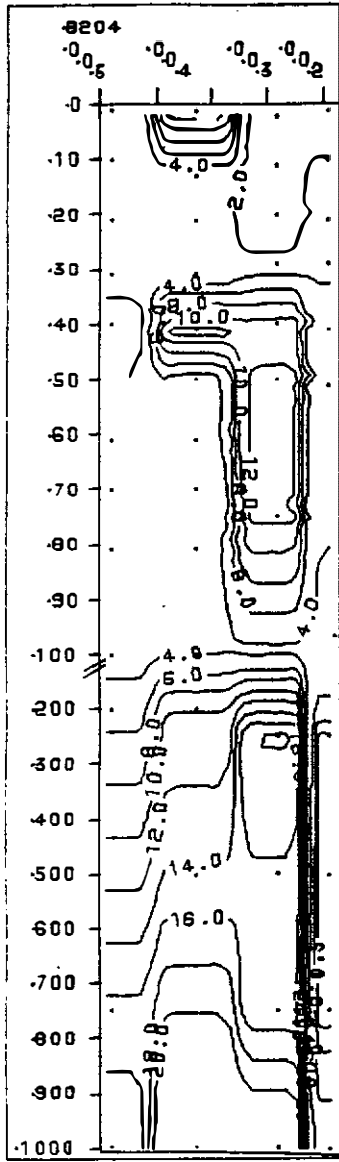
Nitrate (μM)



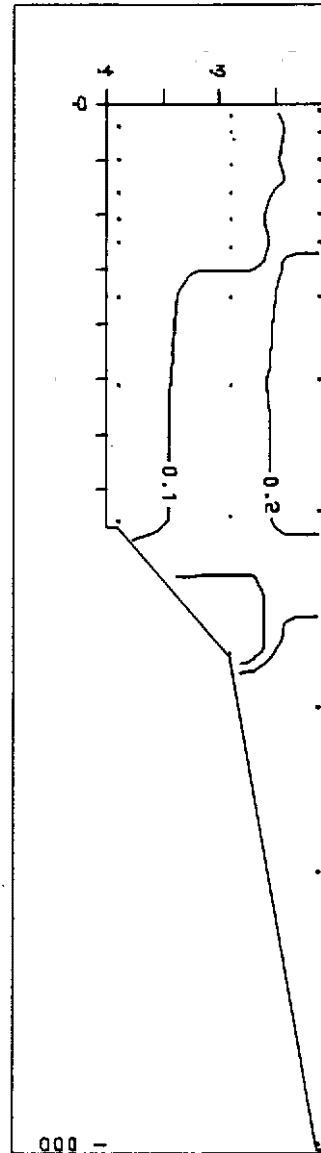
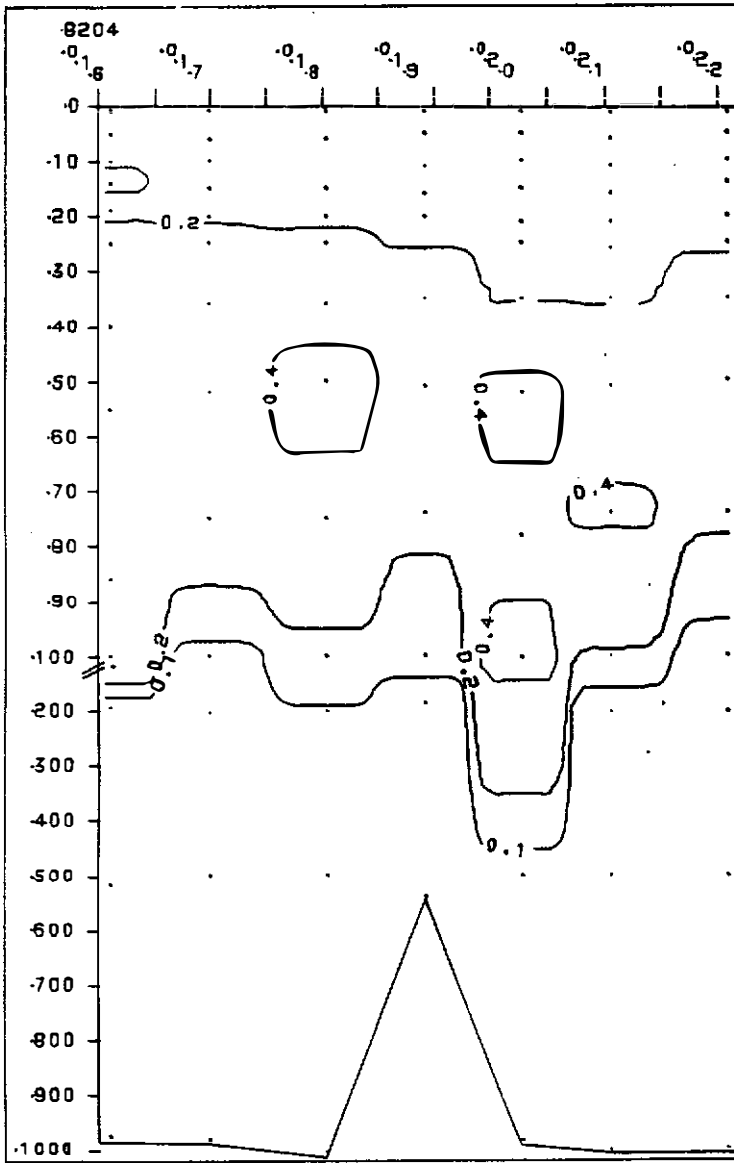
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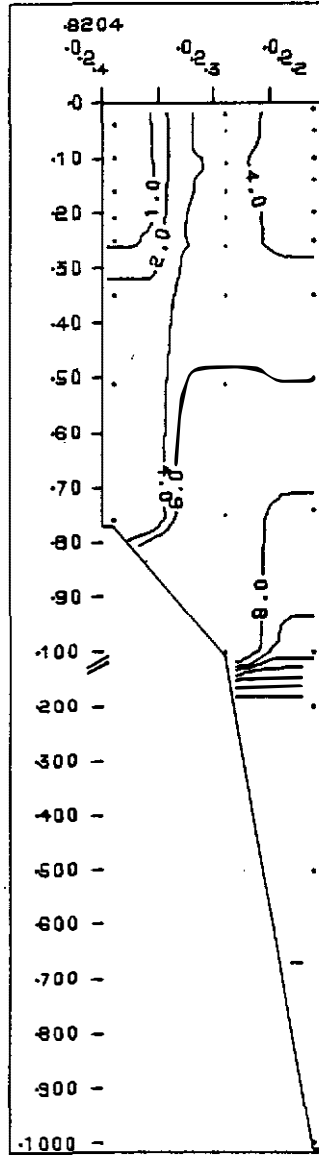
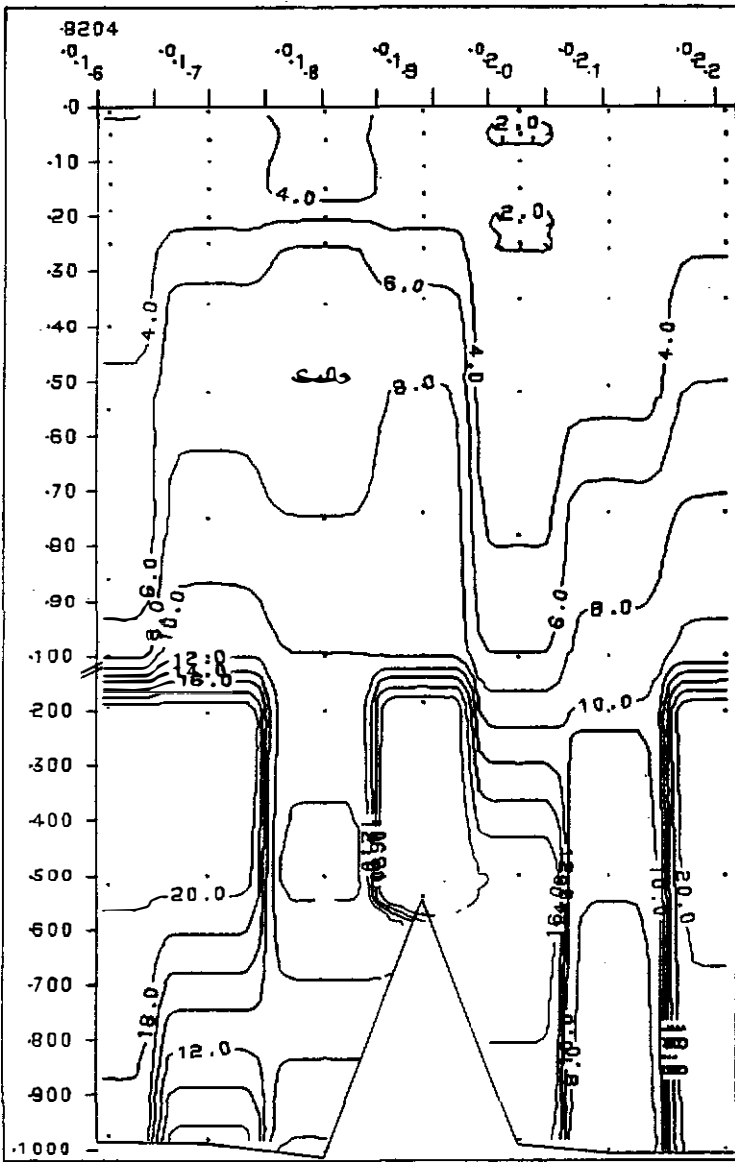
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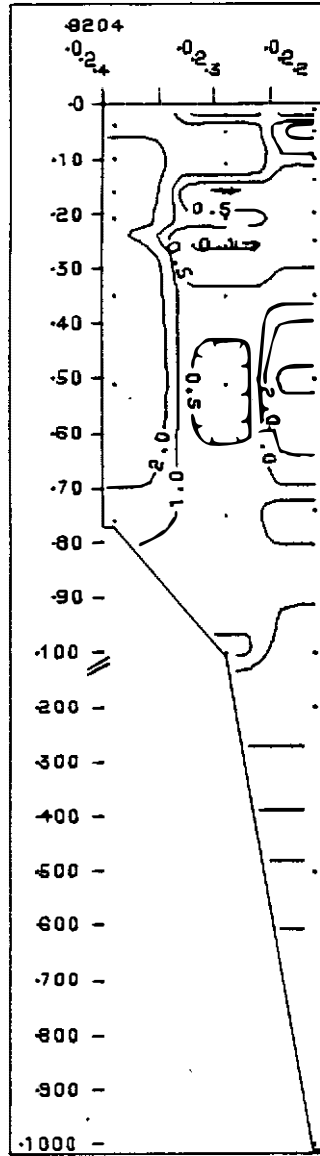
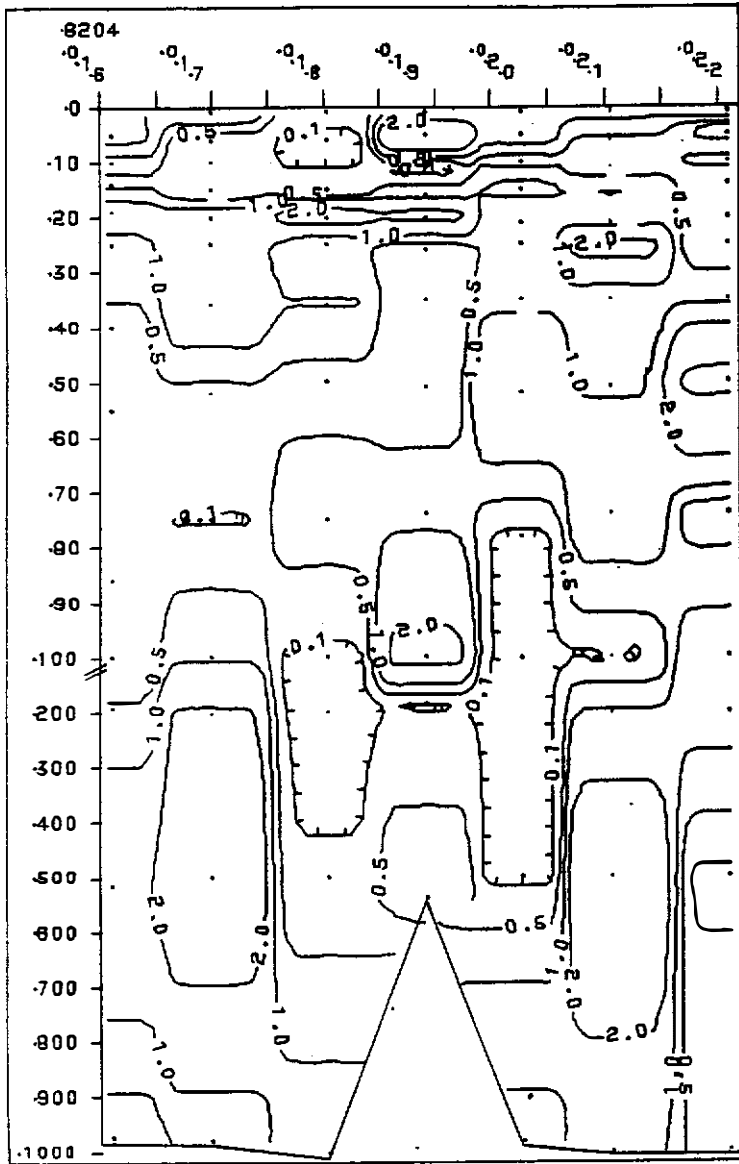
Nitrite (uM)



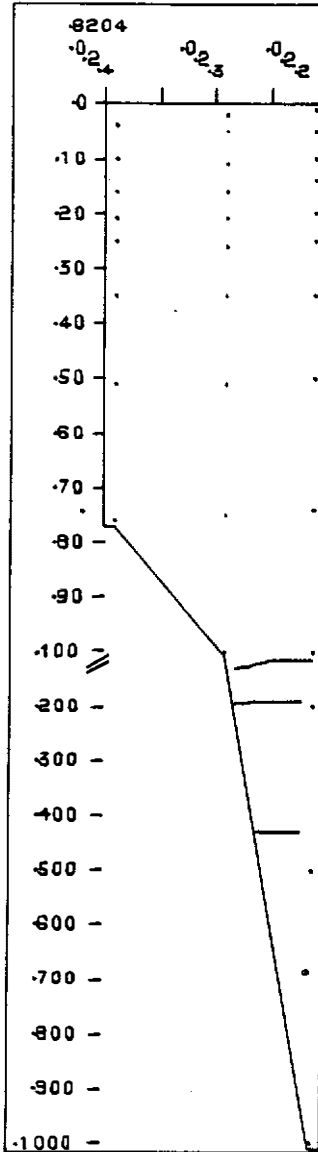
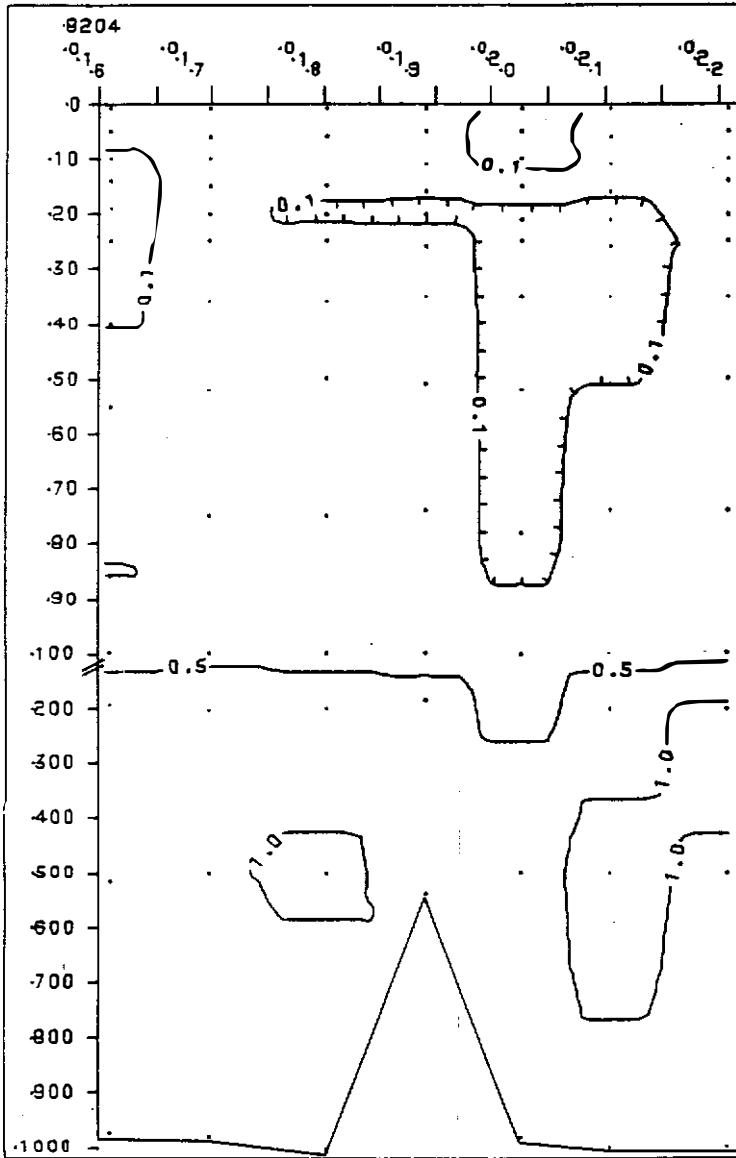
Nitrate (μM)



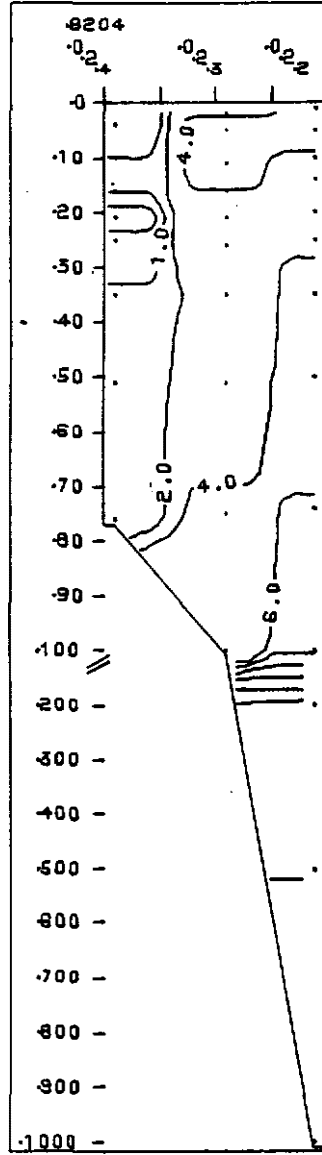
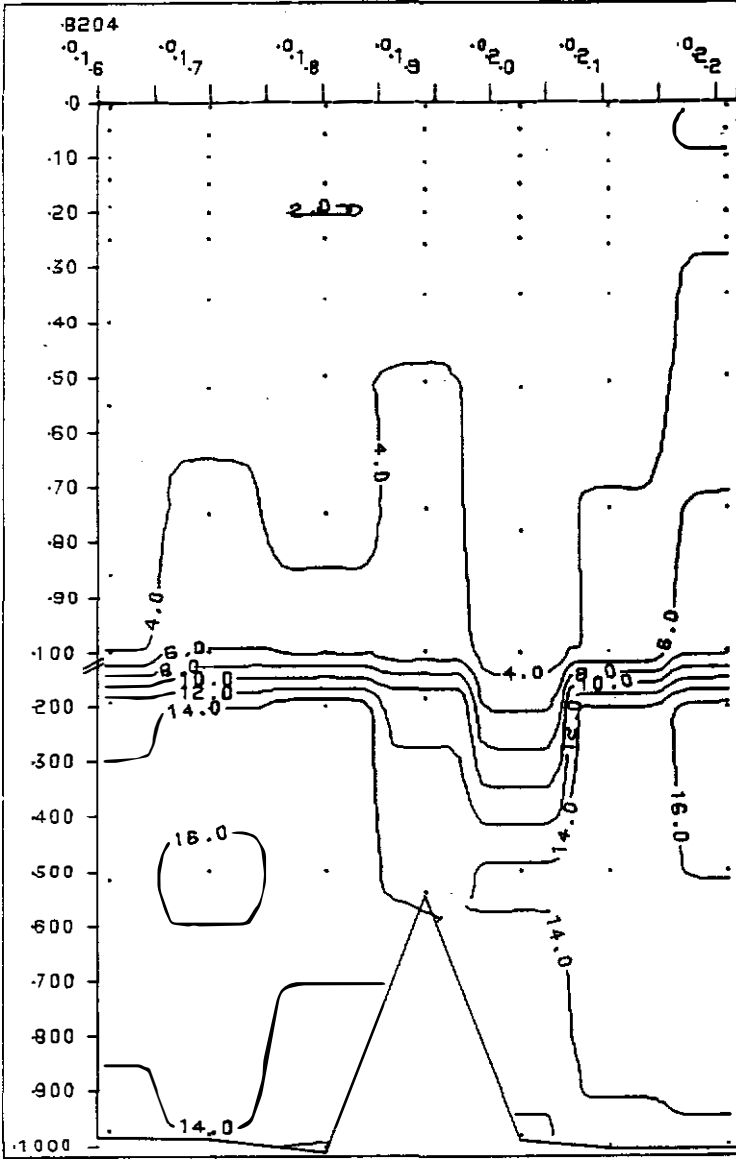
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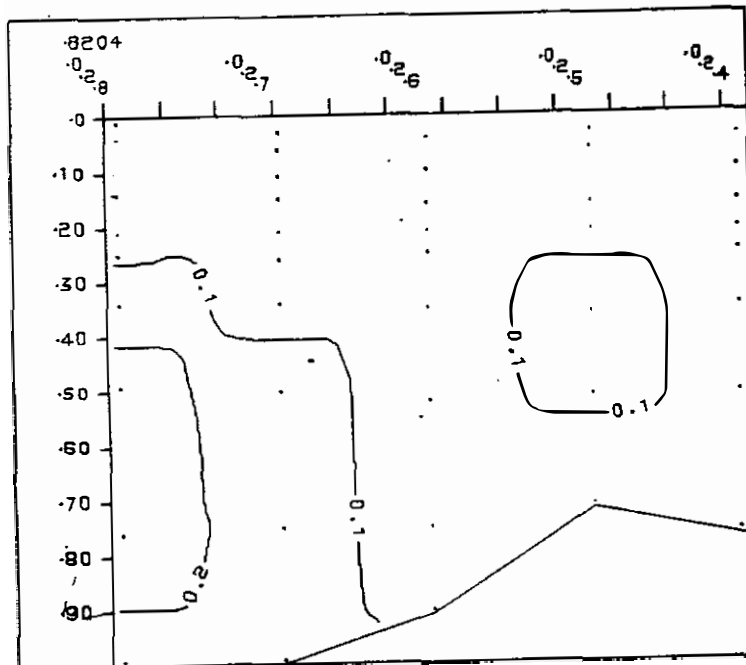
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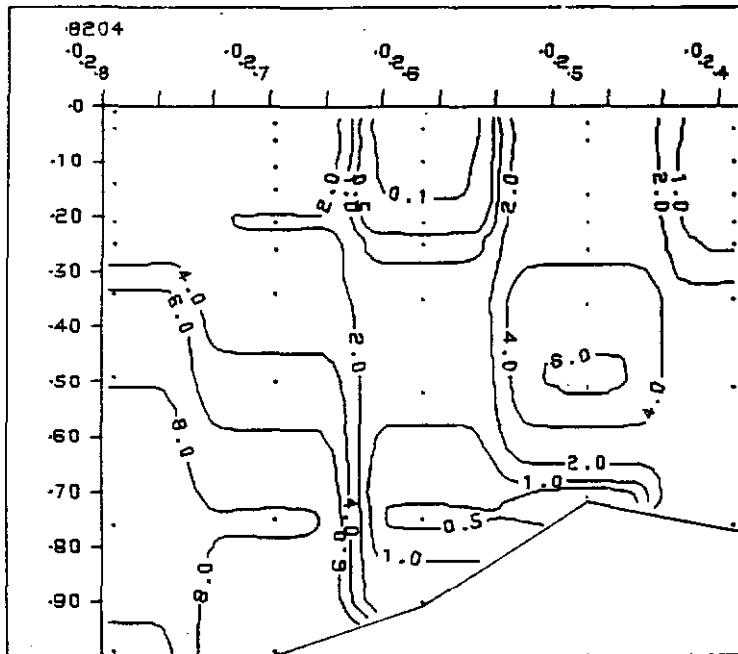
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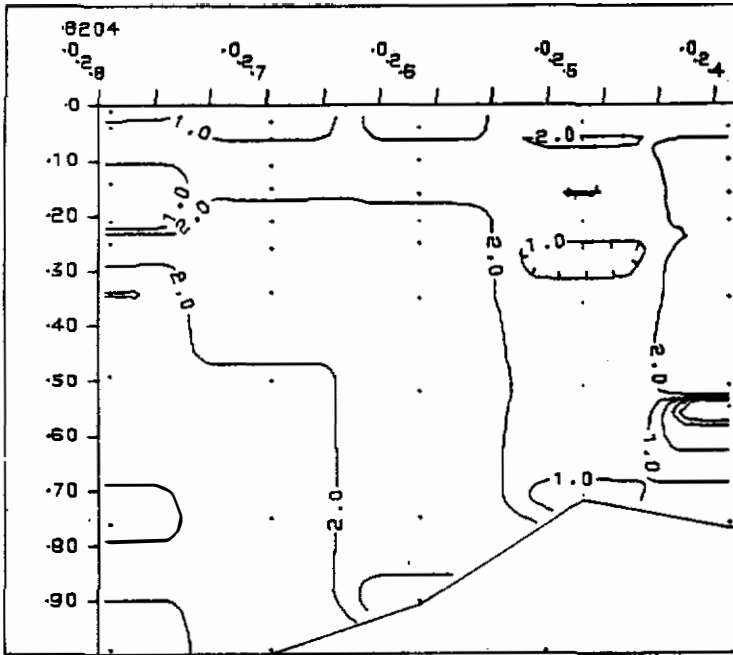
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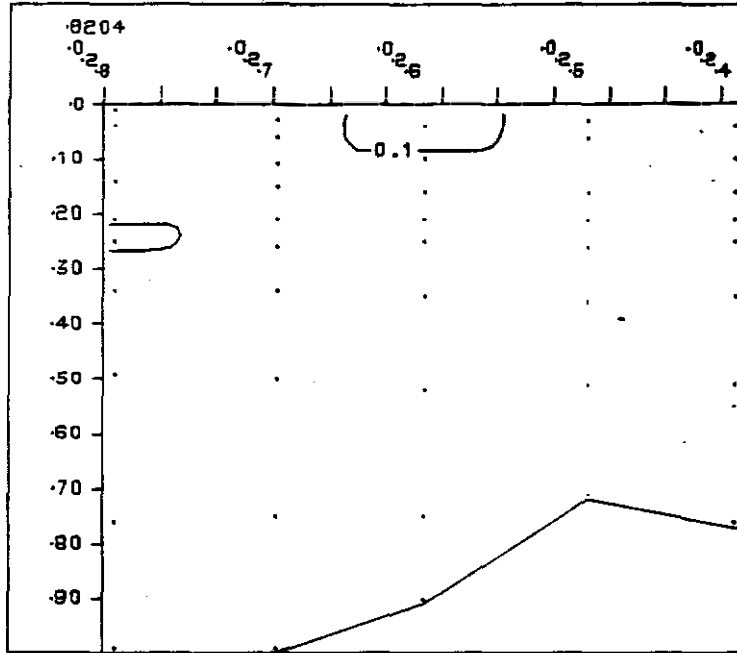
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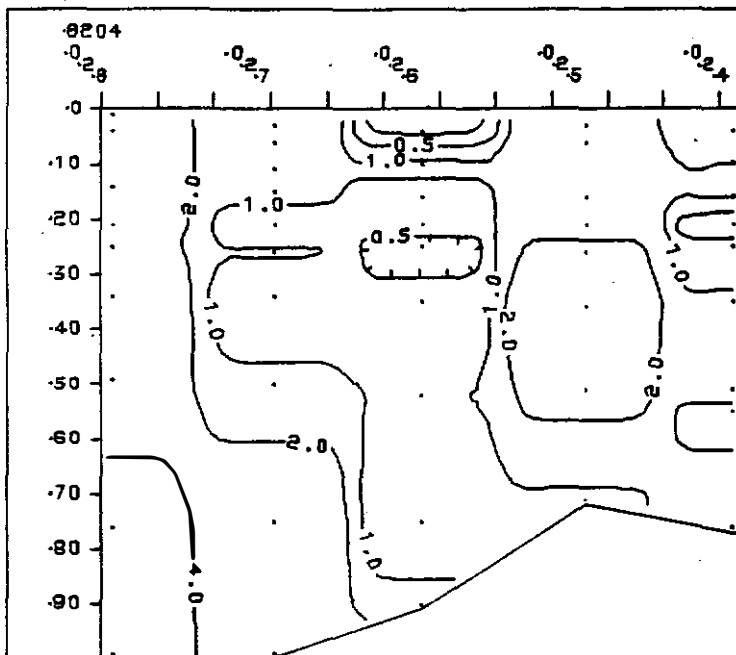
Ammonium (μM)



Phosphate (uM)



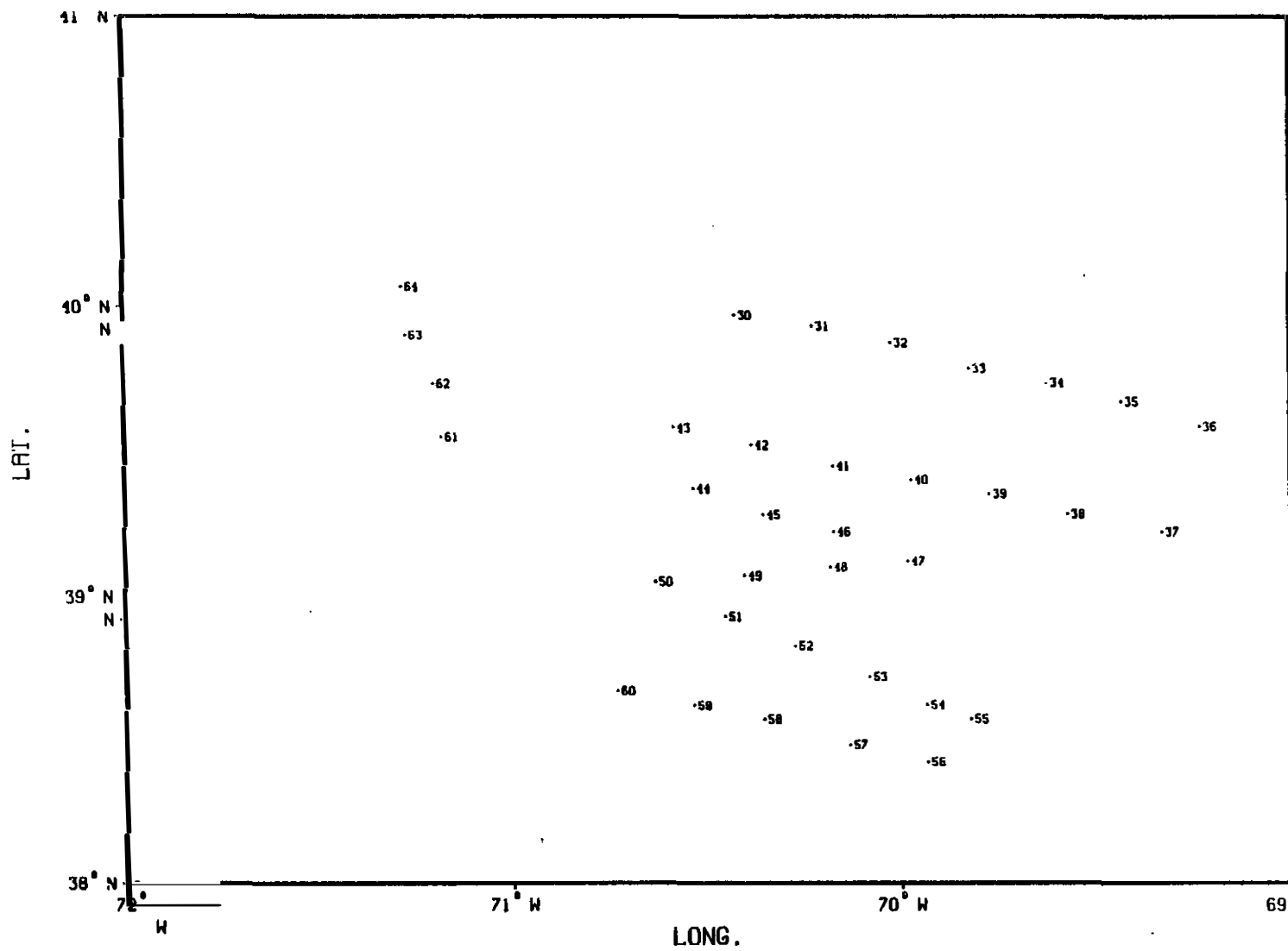
Silicate (μM)



AL8204 PART 2

30 APRIL to 3 MAY 1982

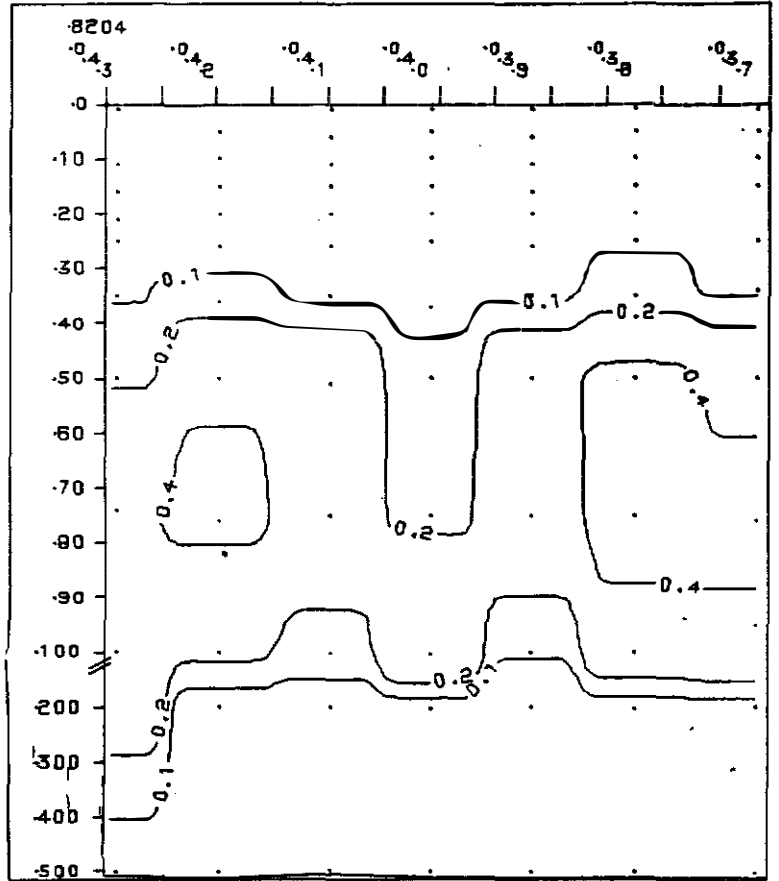
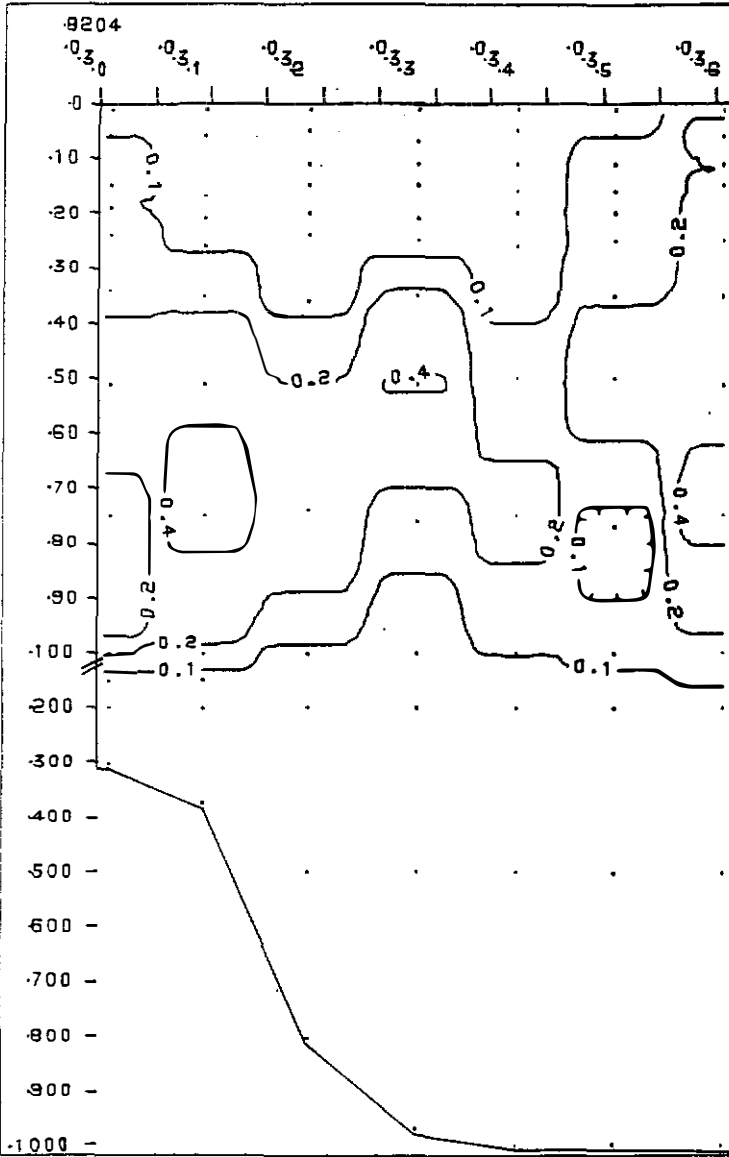




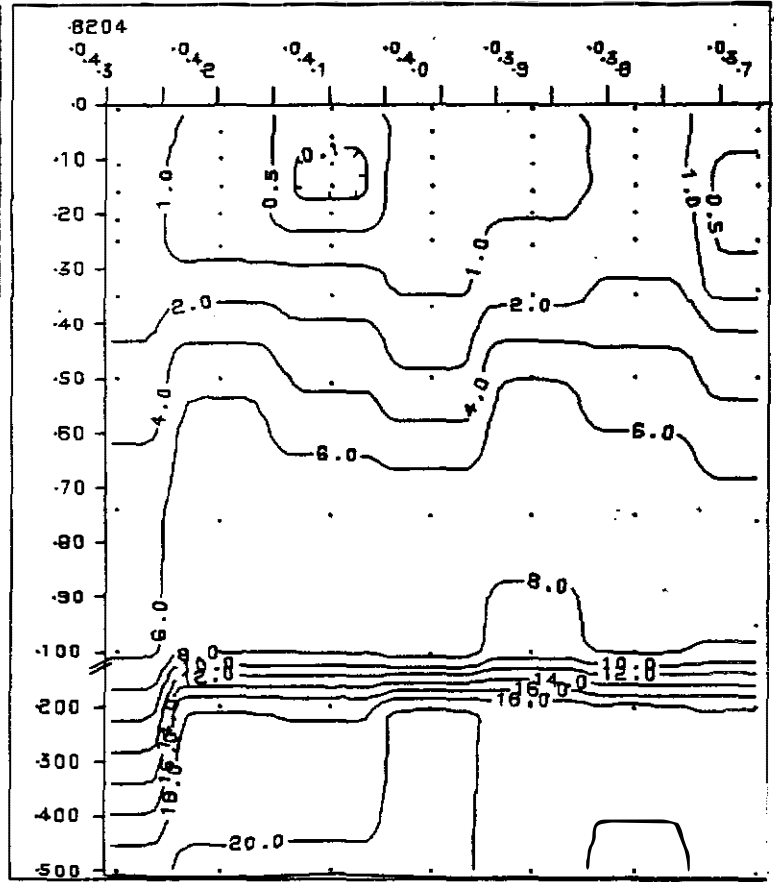
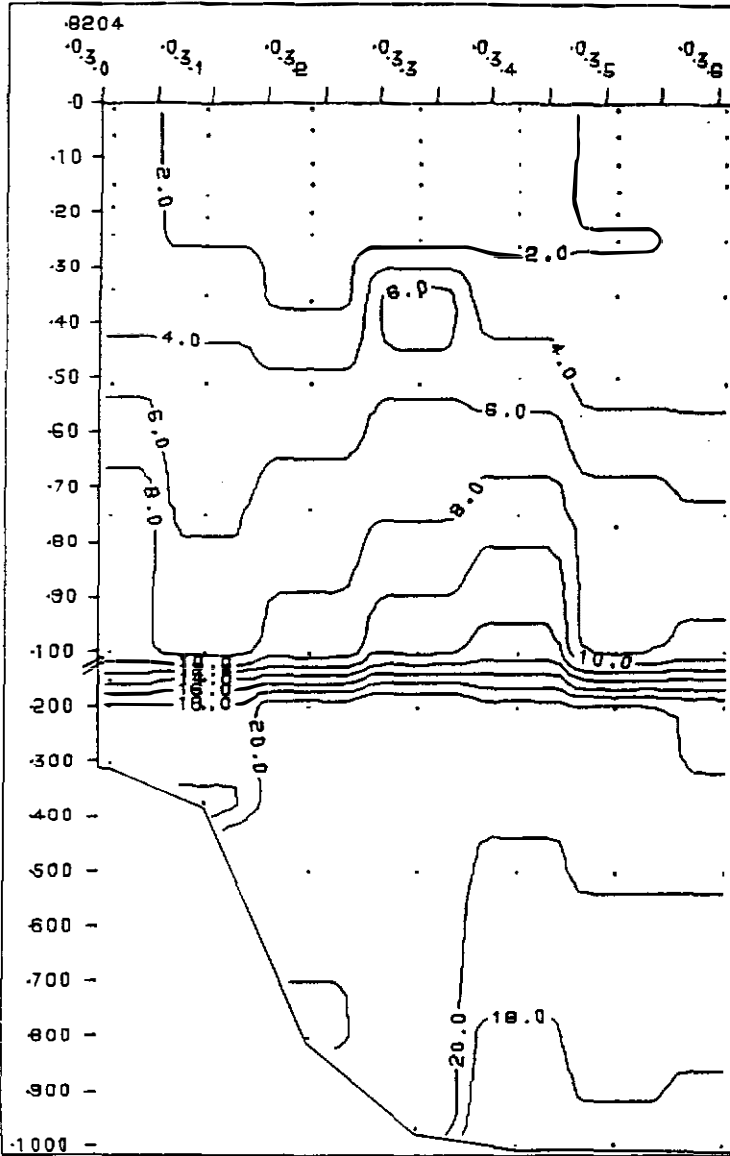
ALB8204 PART 2

Station Positions

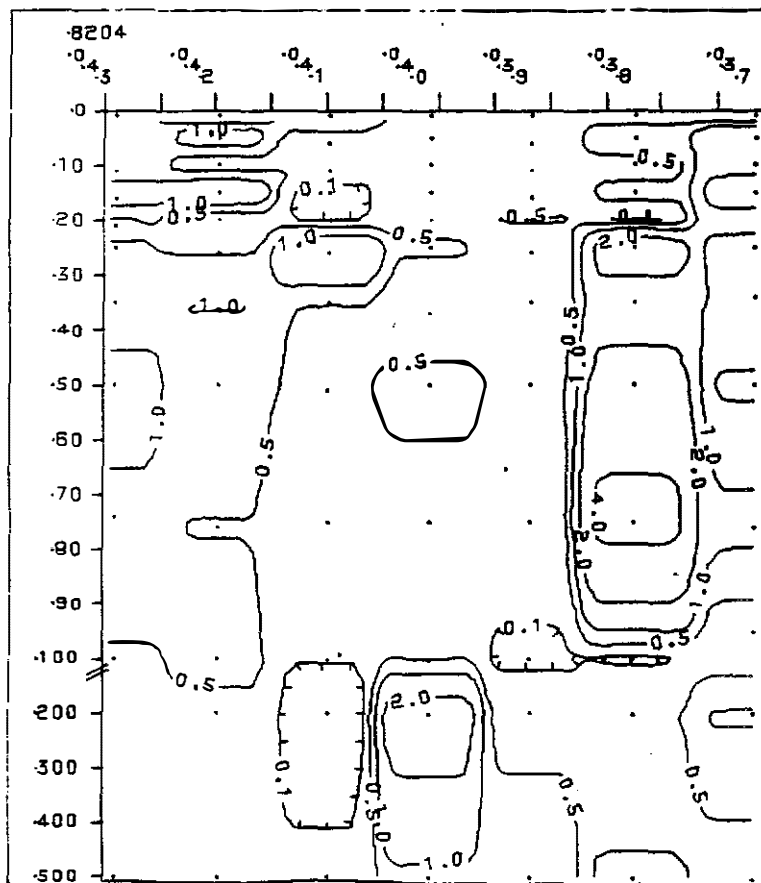
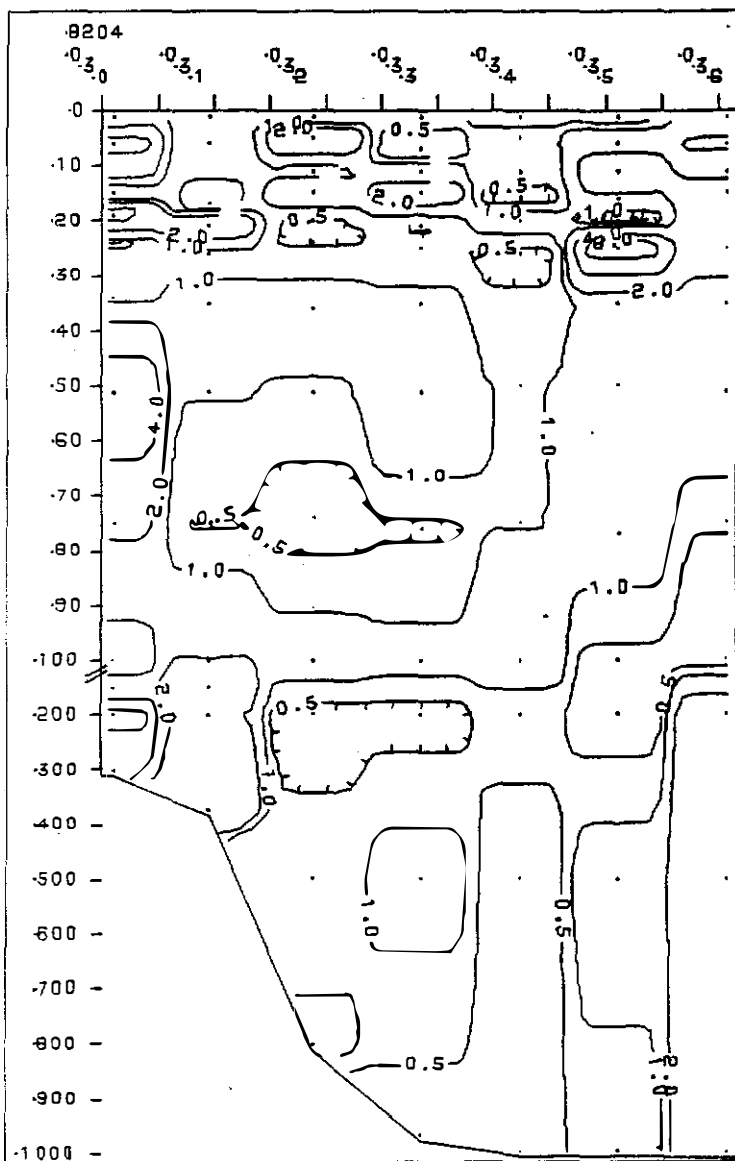
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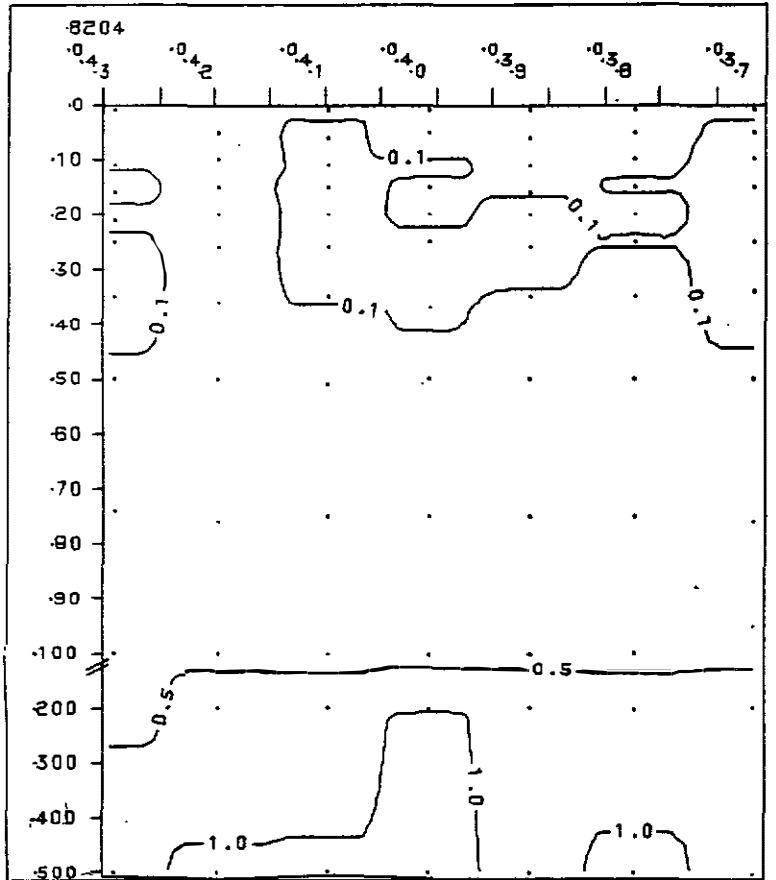
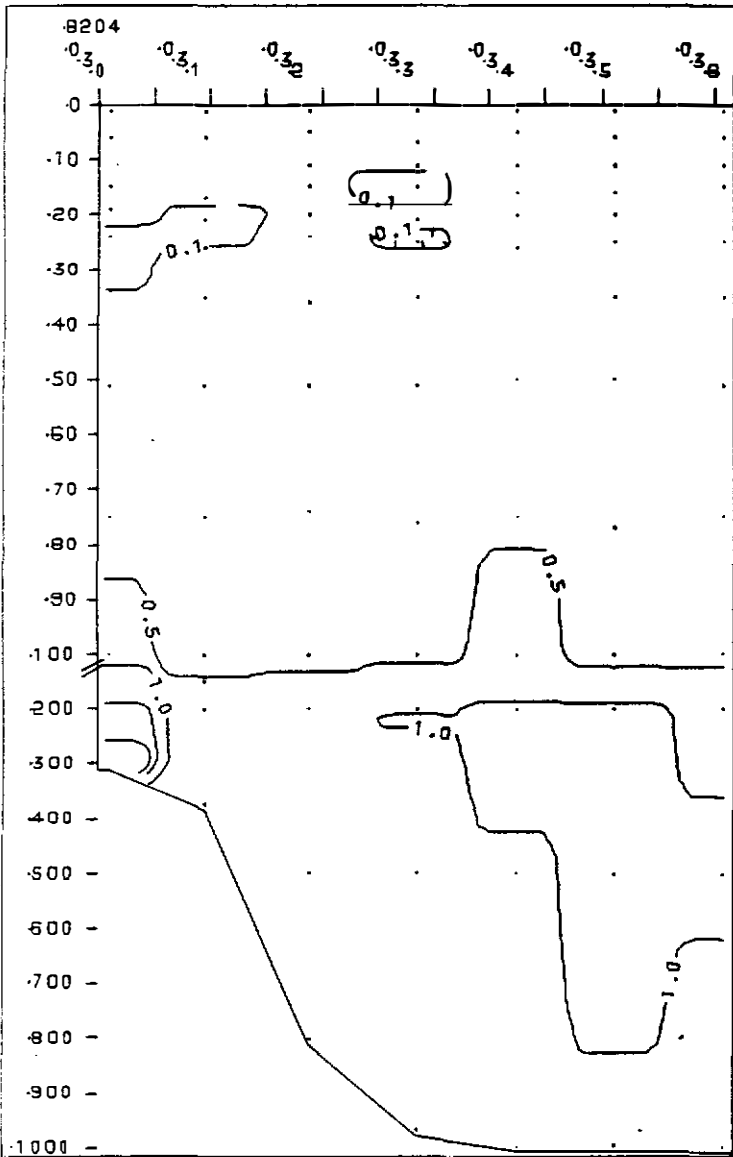
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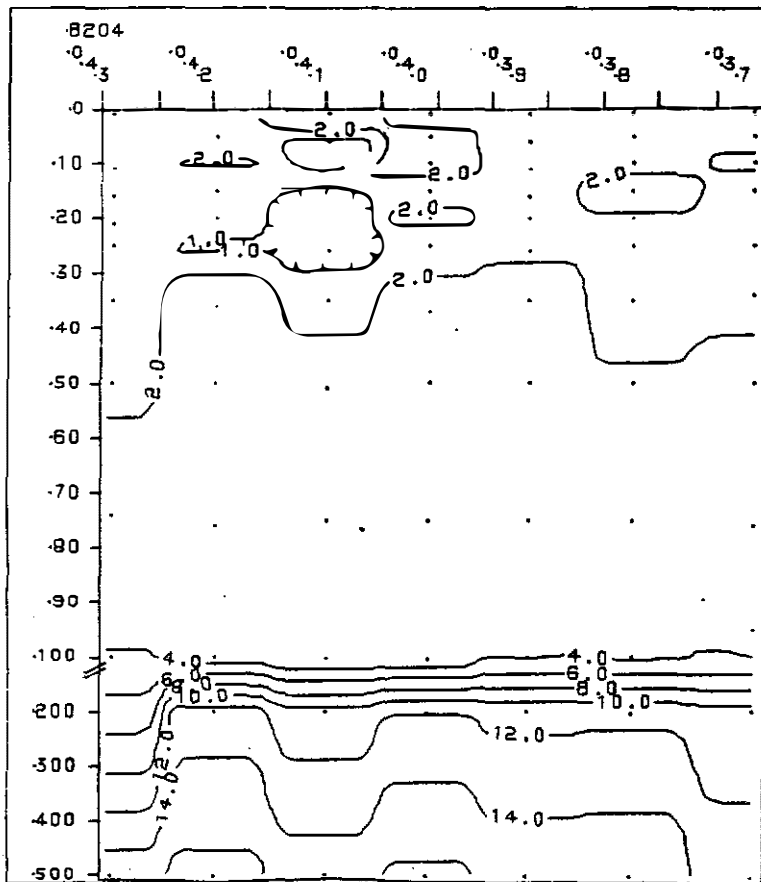
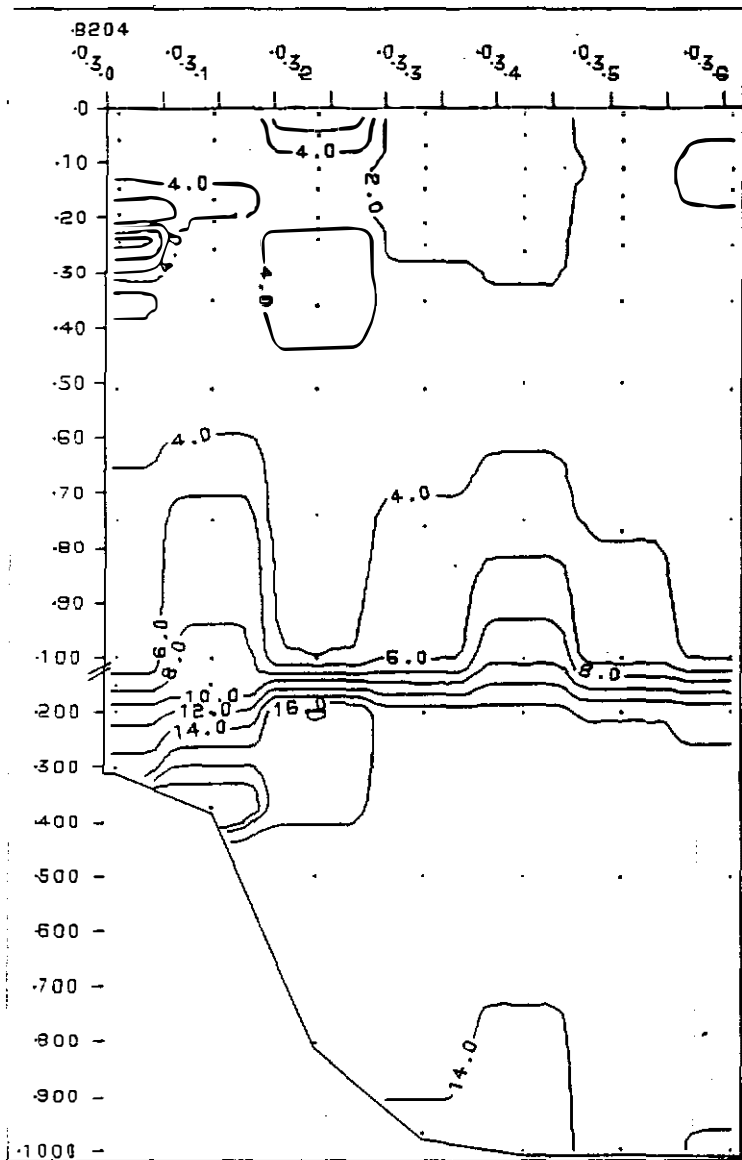
Ammonium (uM)



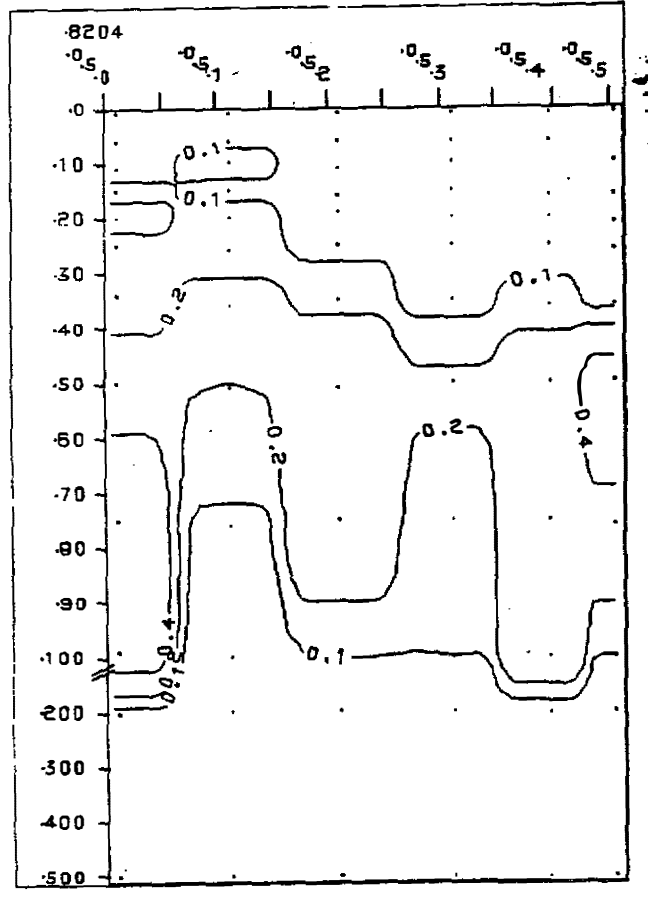
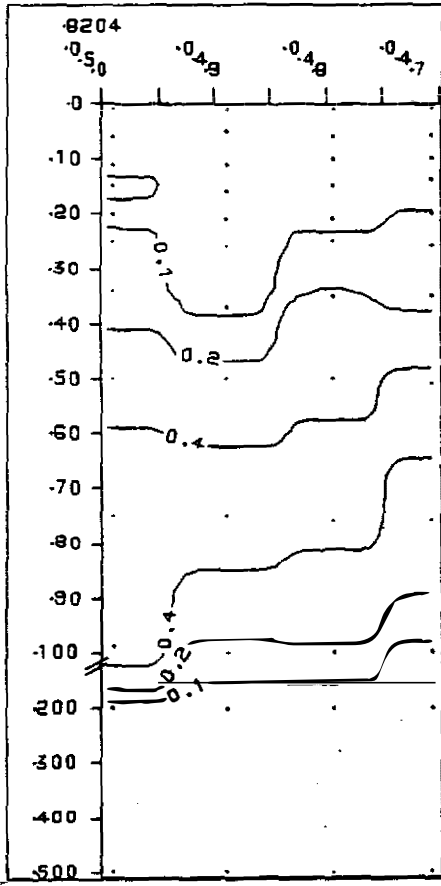
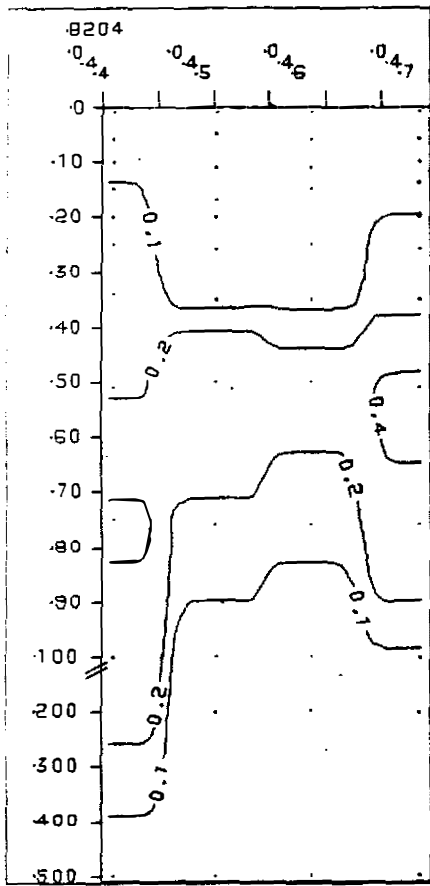
Phosphate (μM)



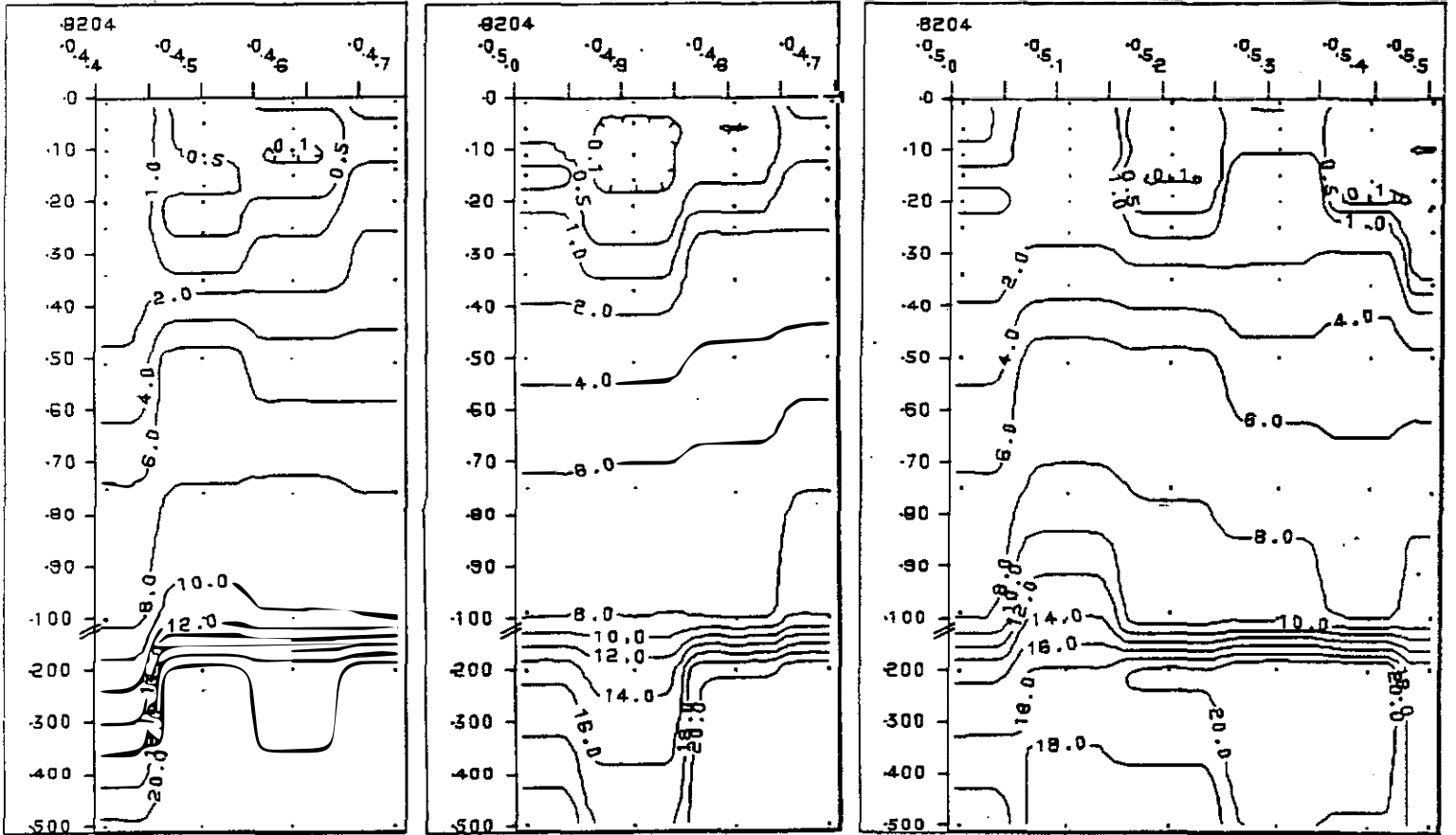
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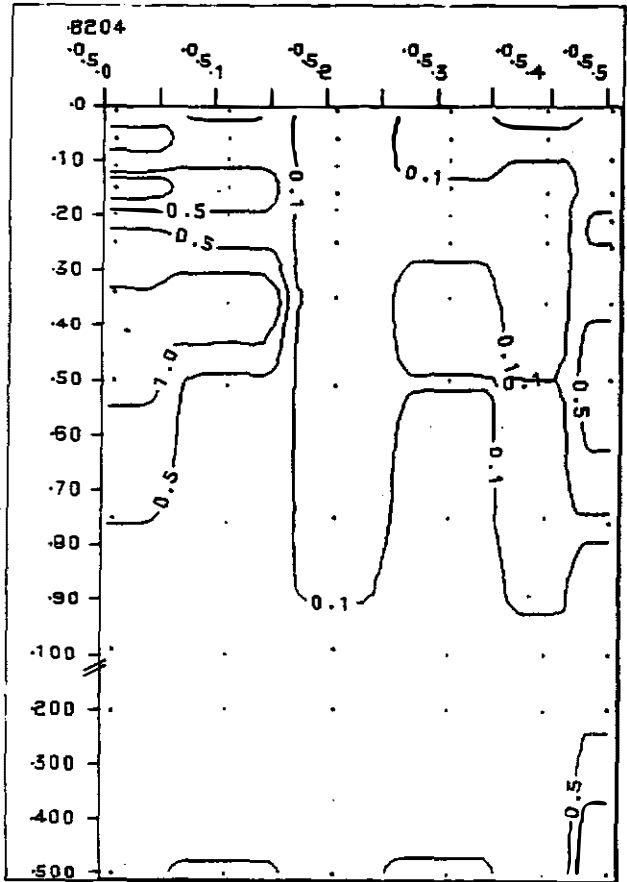
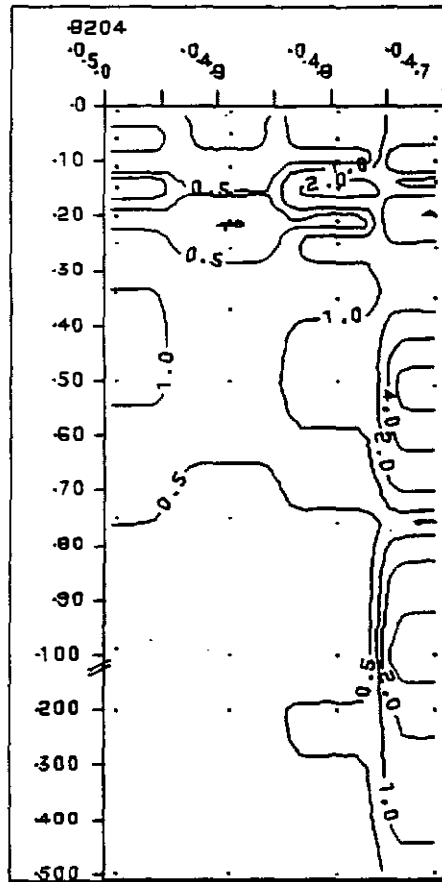
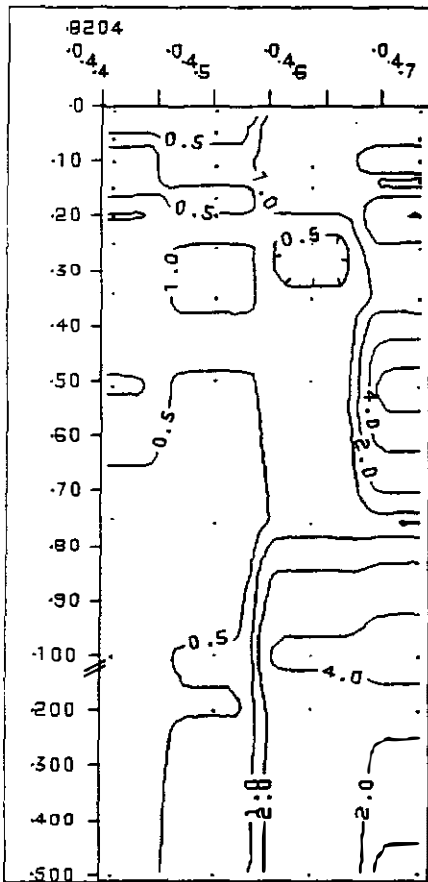
Nitrite (μM)



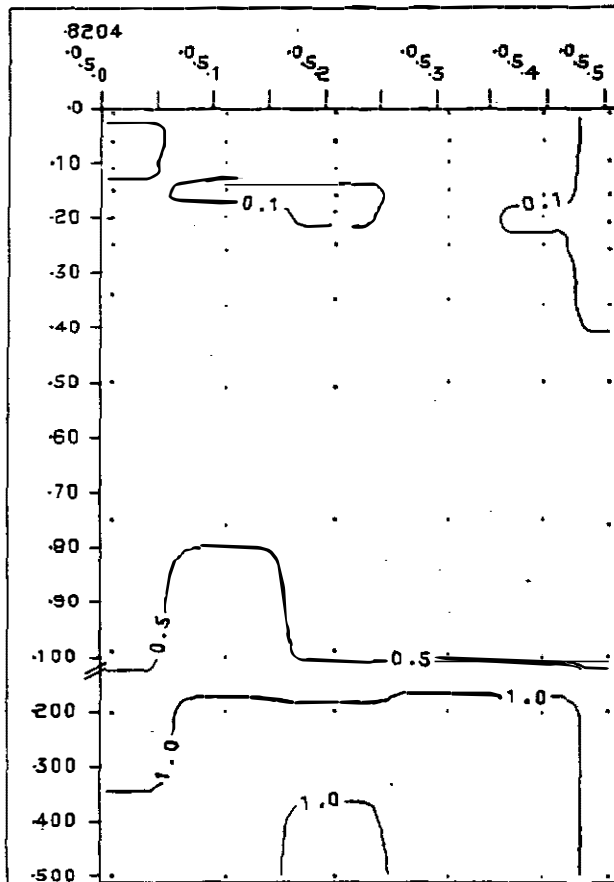
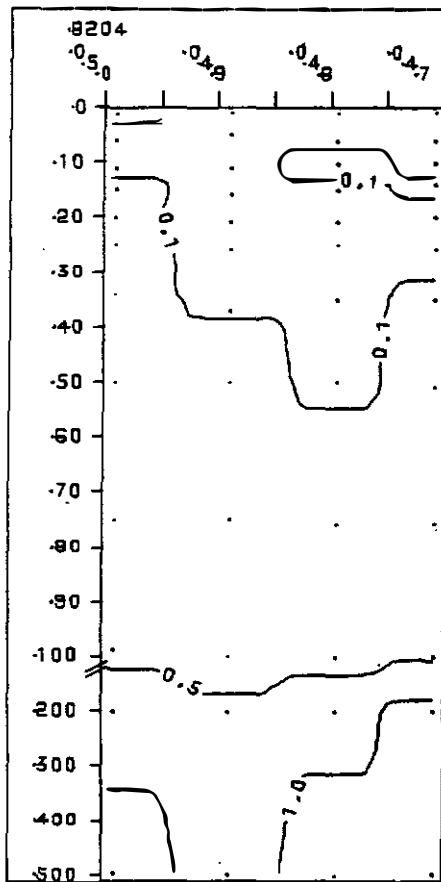
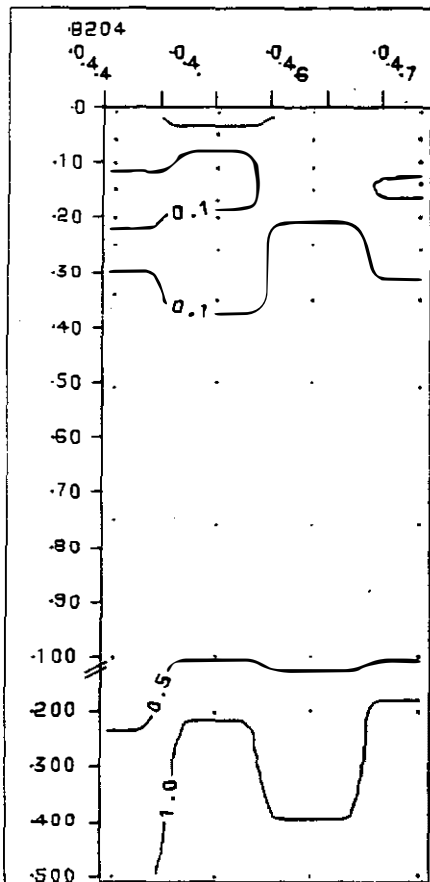
Nitrate (uM)



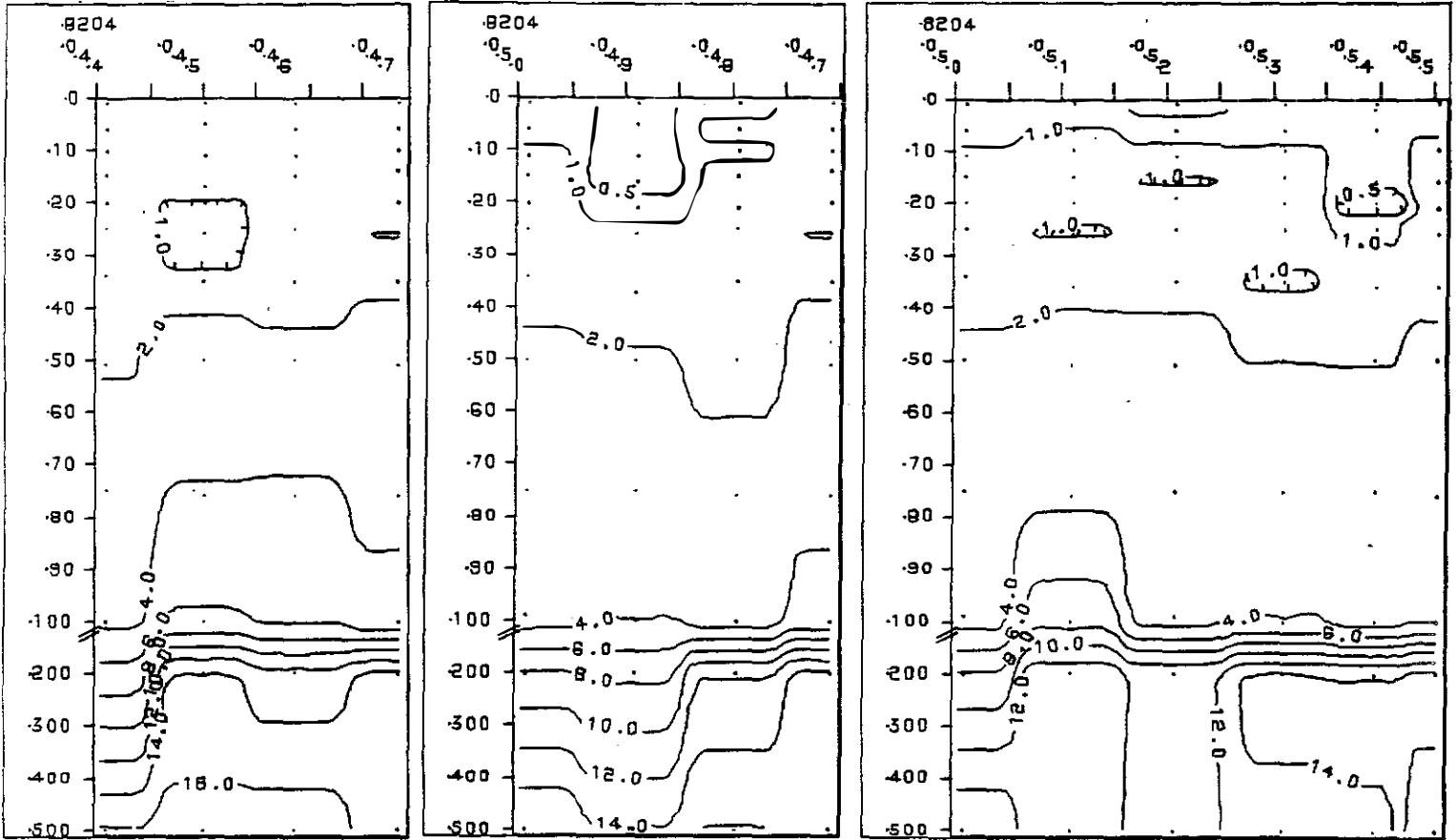
Ammonium (μM)



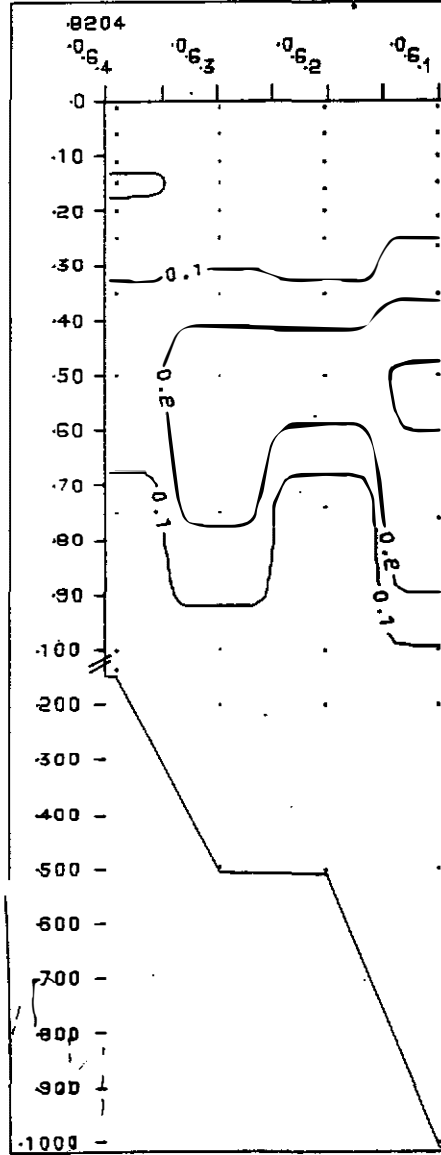
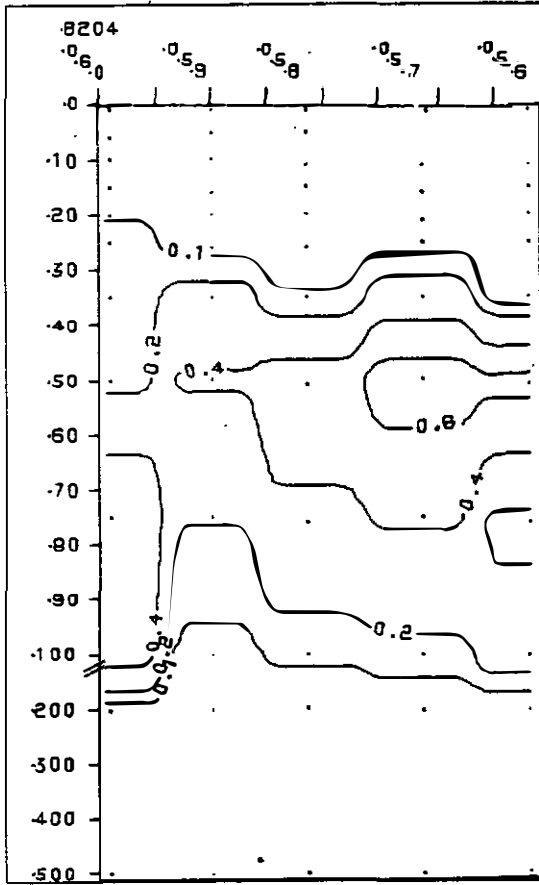
Phosphate (uM)



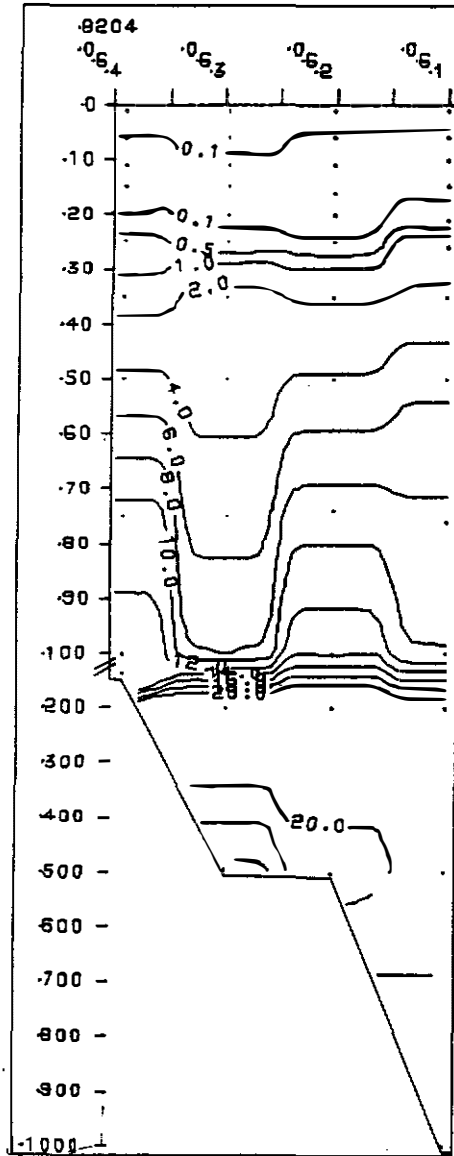
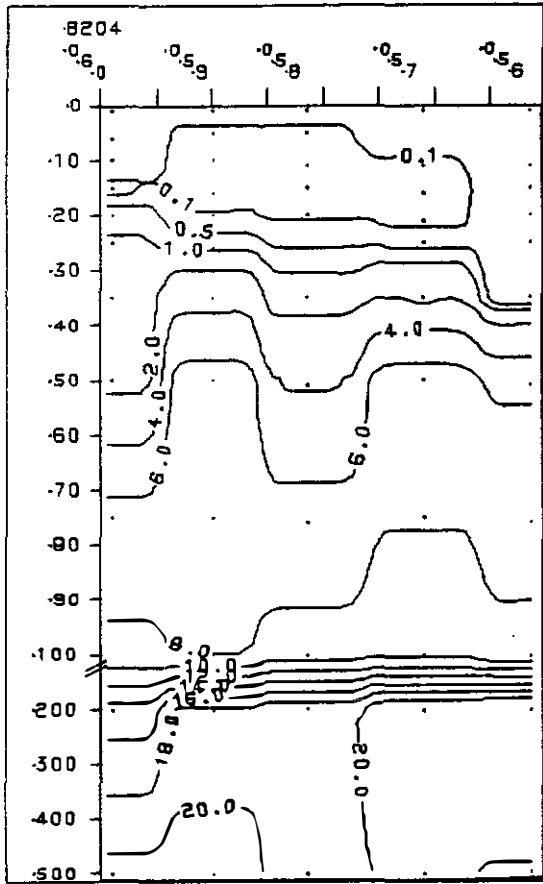
Silicate (μM)



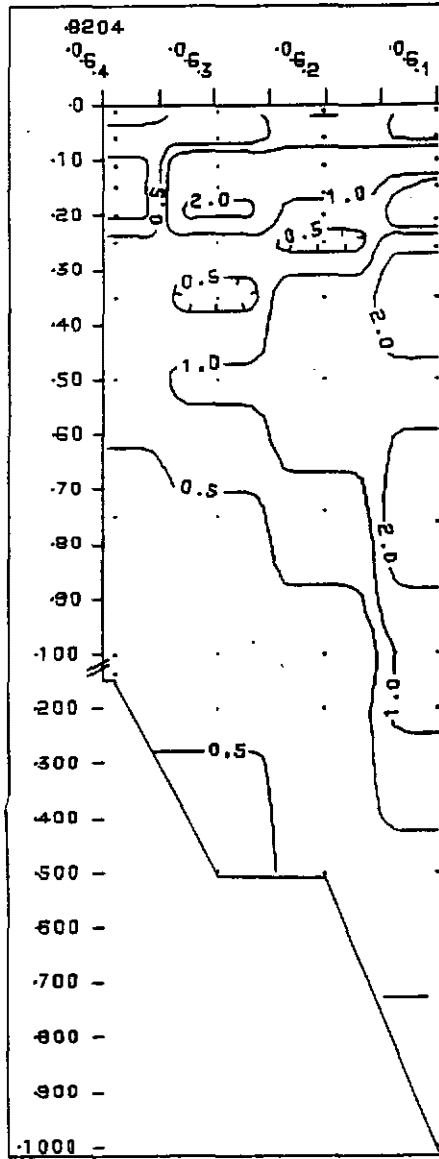
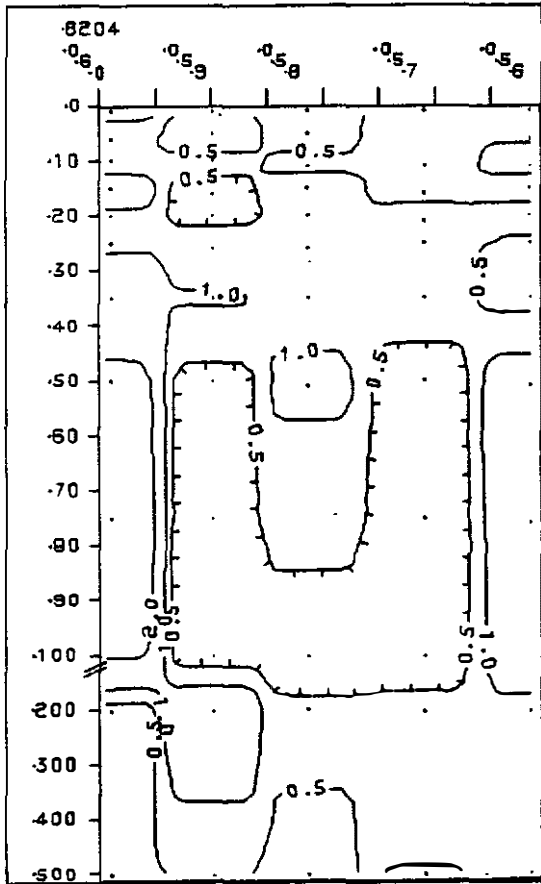
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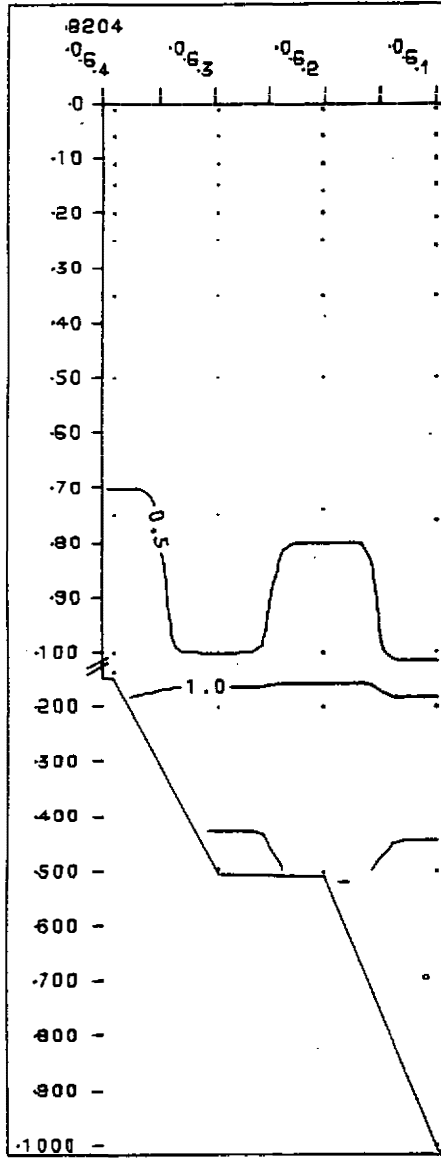
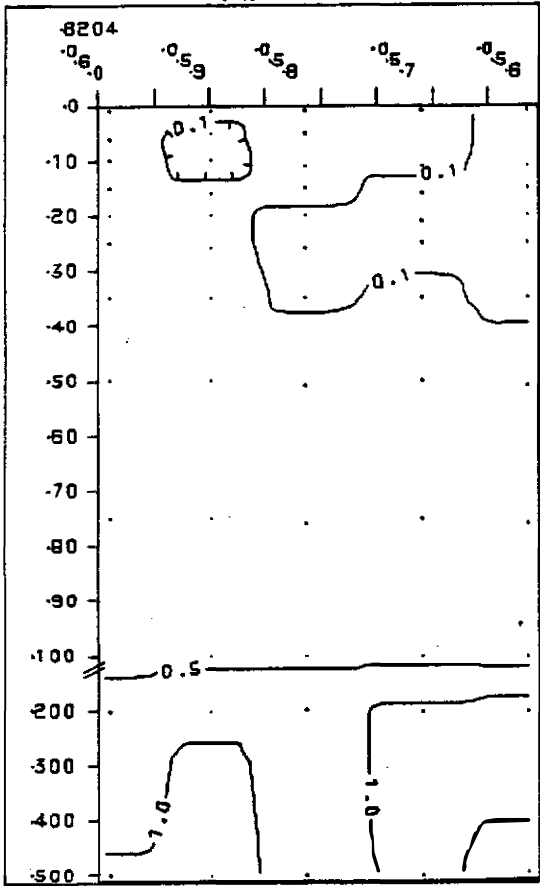
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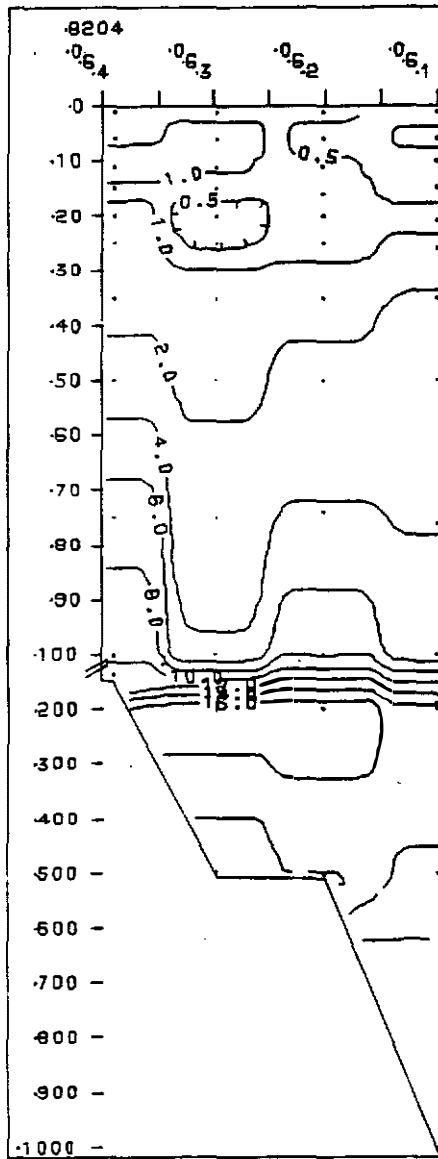
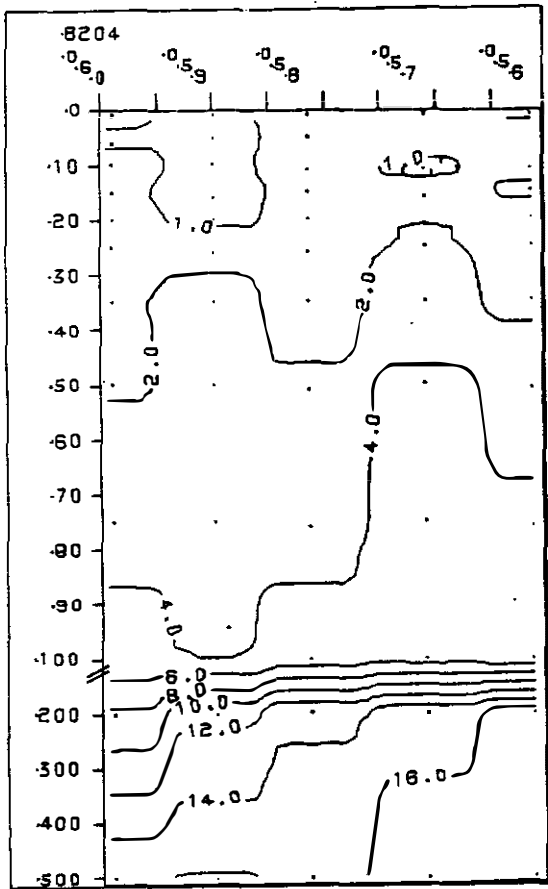
Ammonium (μM)



Phosphate (uM)



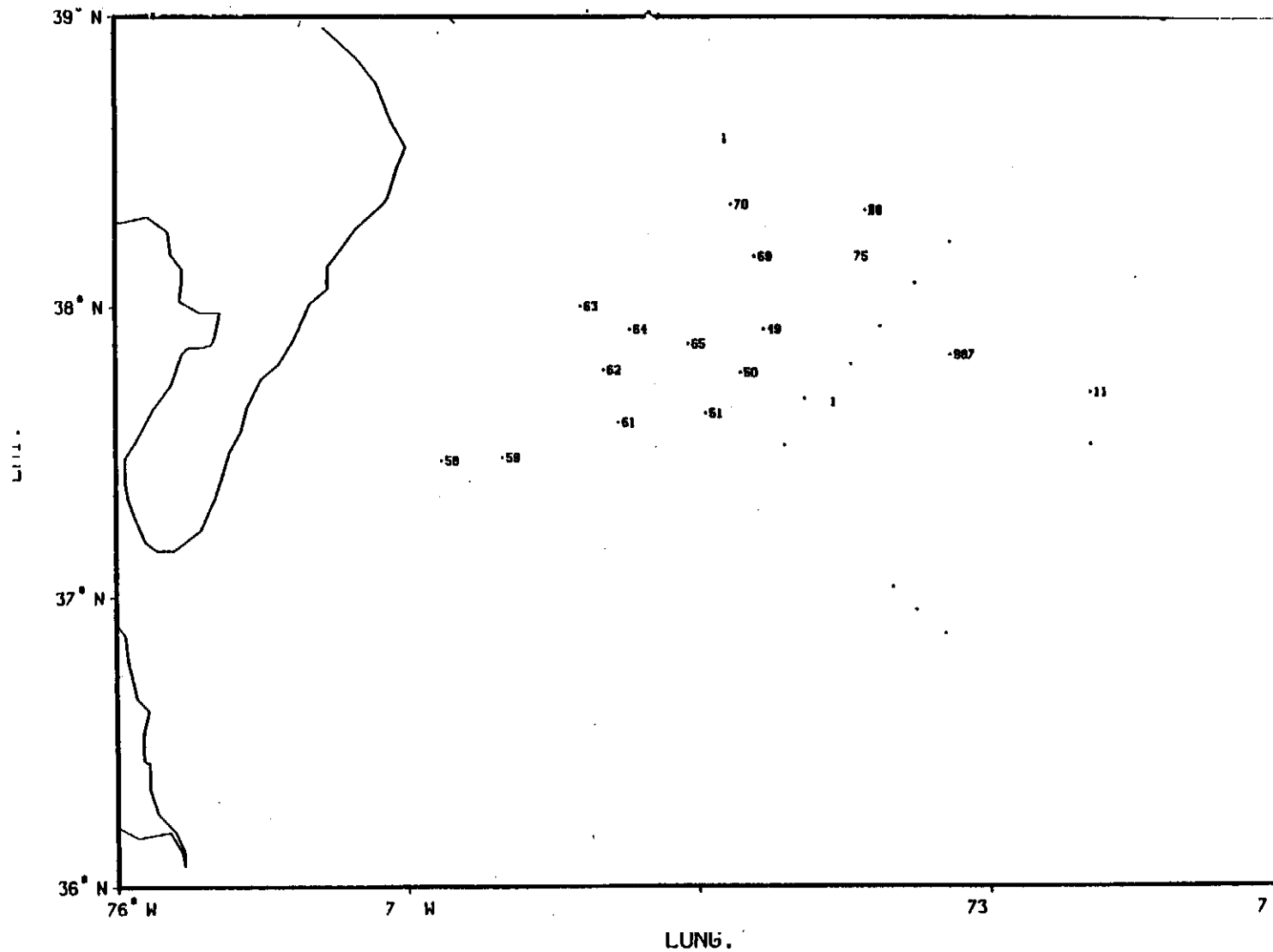
Silicate (uM)



AL8207

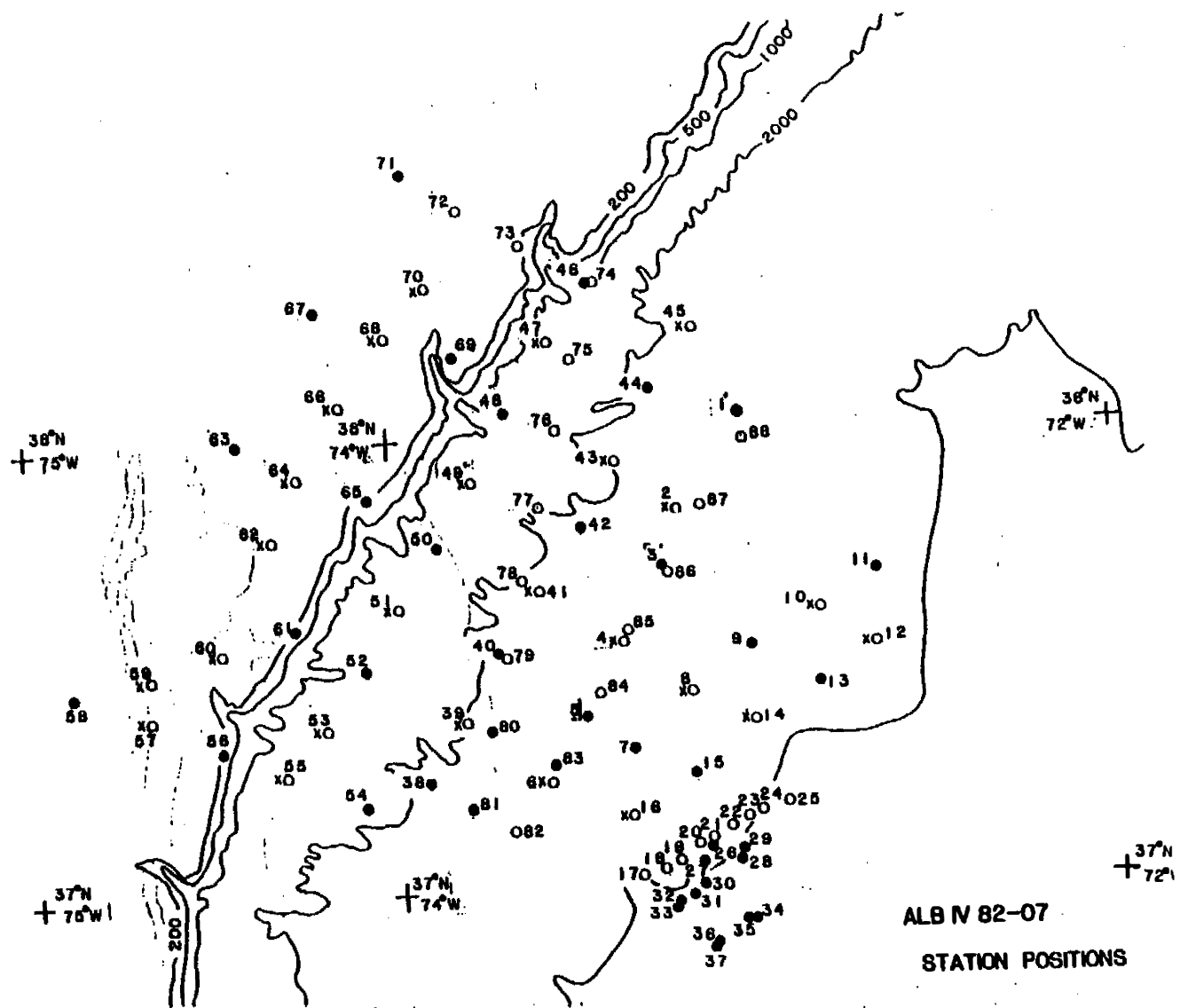
21 June to 1 July 1982



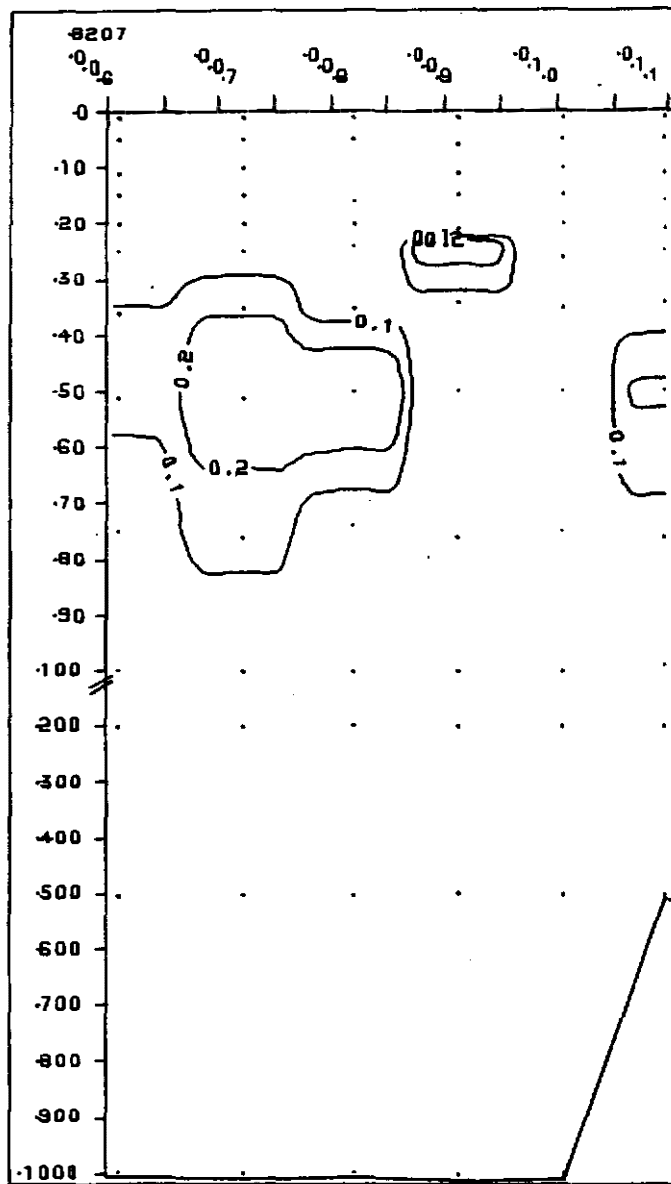
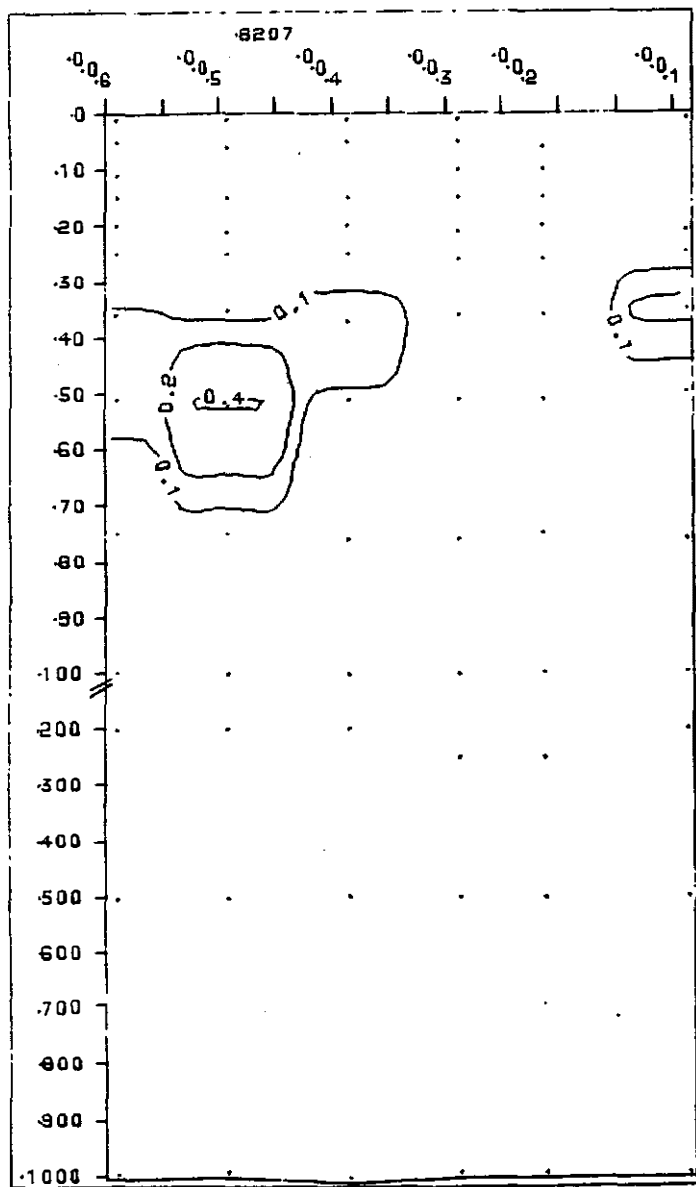


ALB8207

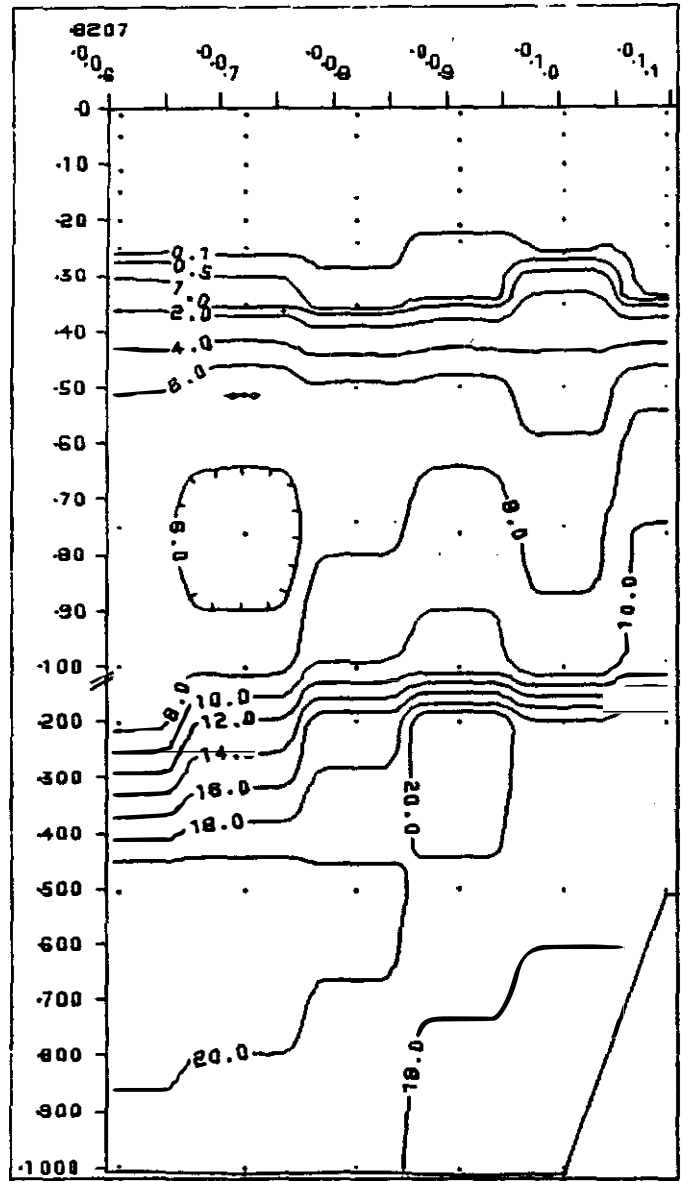
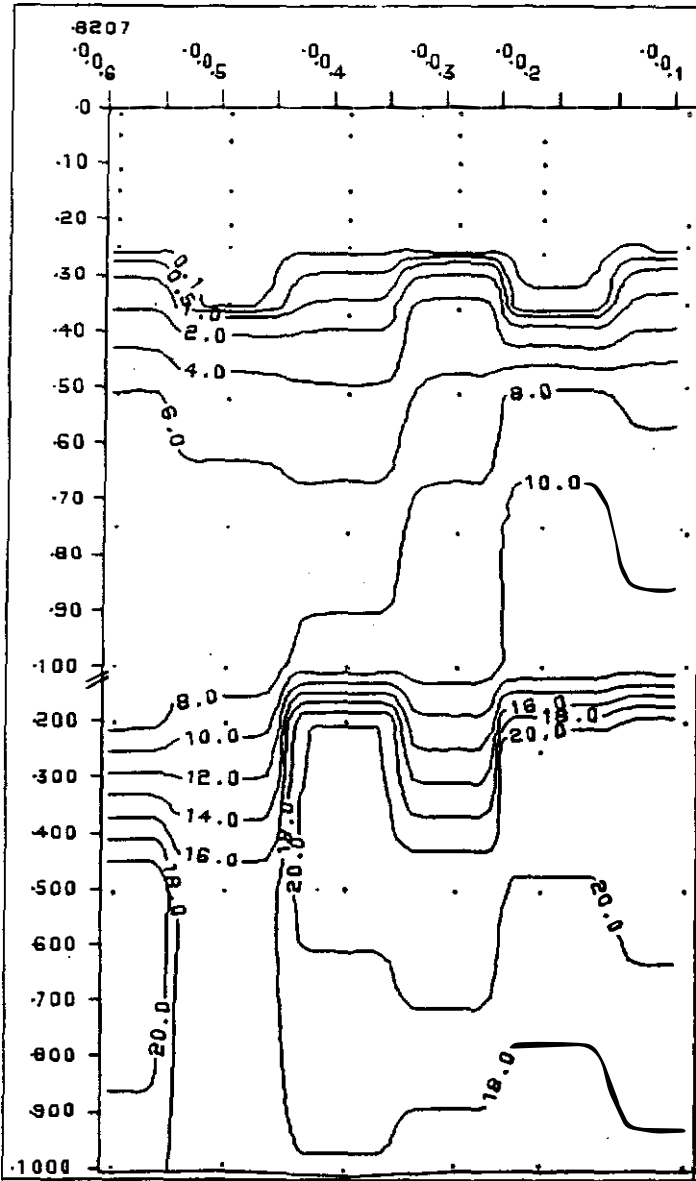
Station Positions



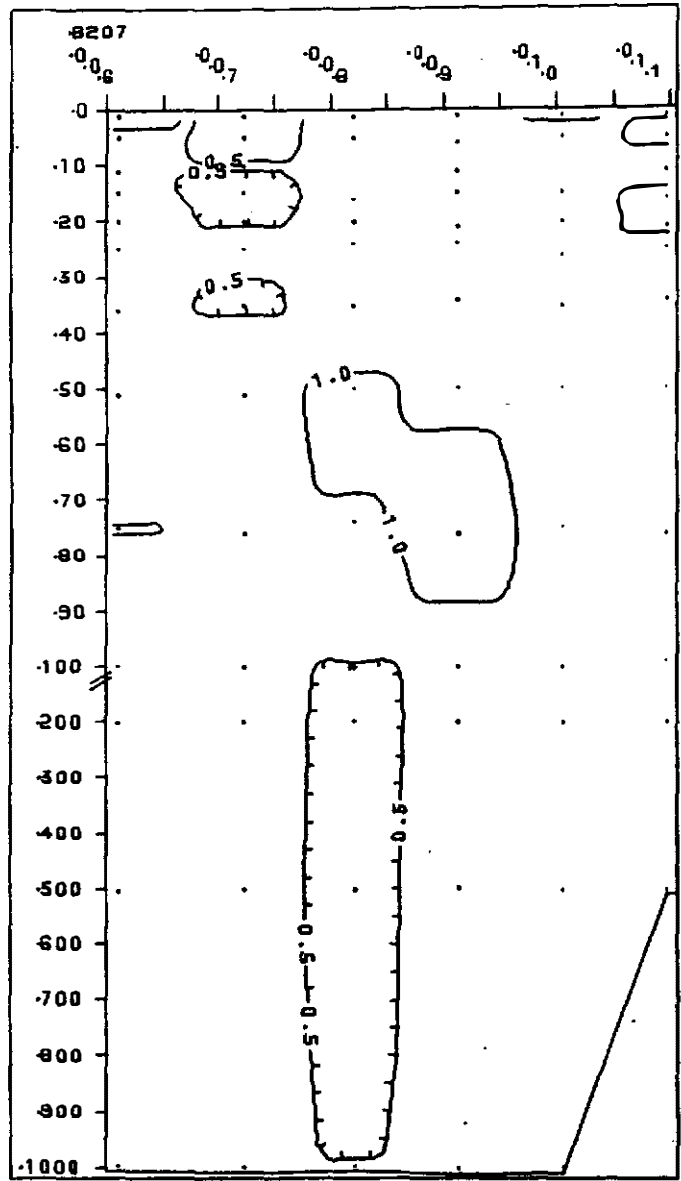
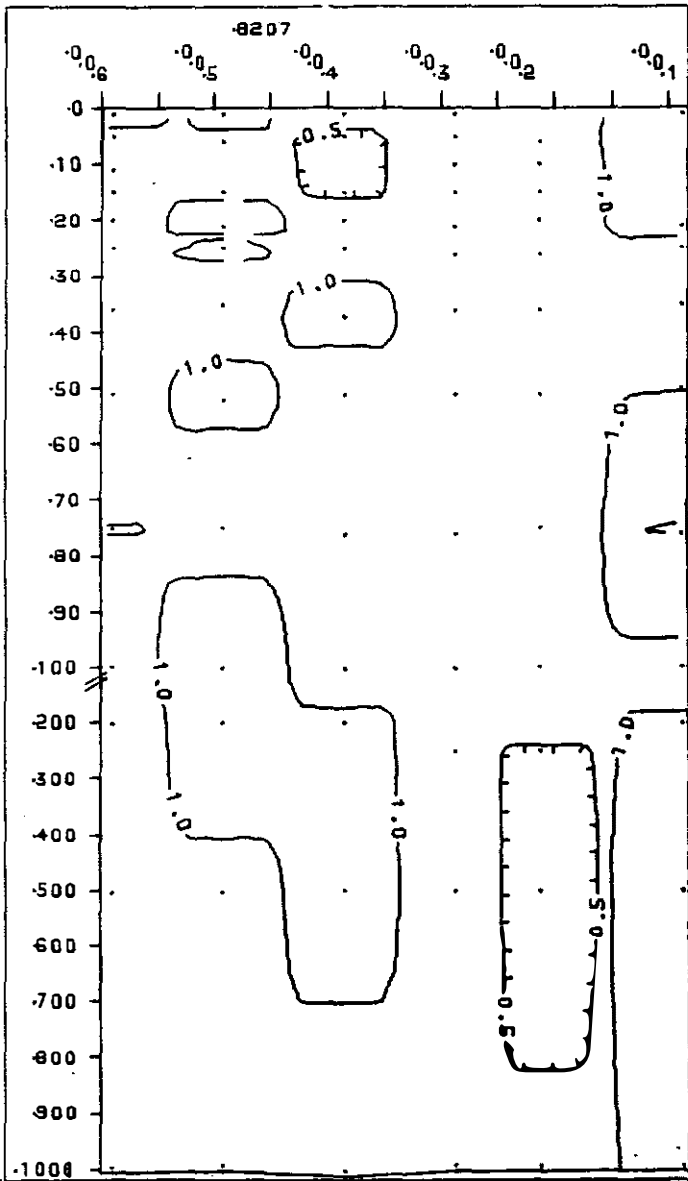
Nitrite (uM)



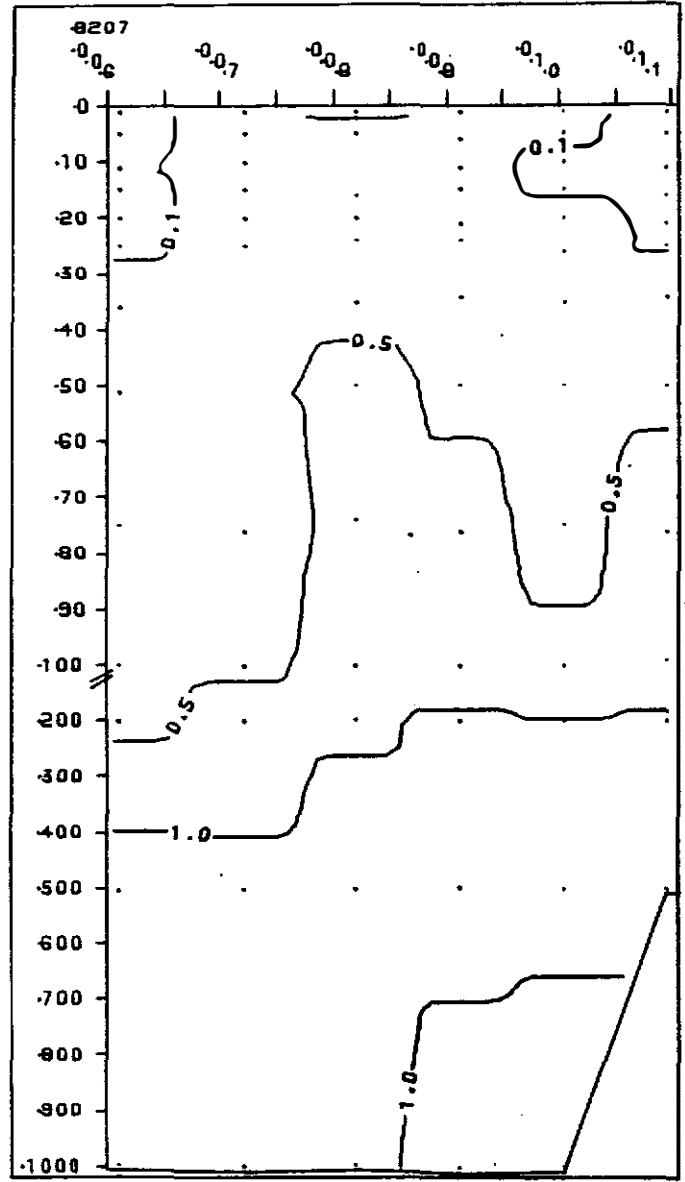
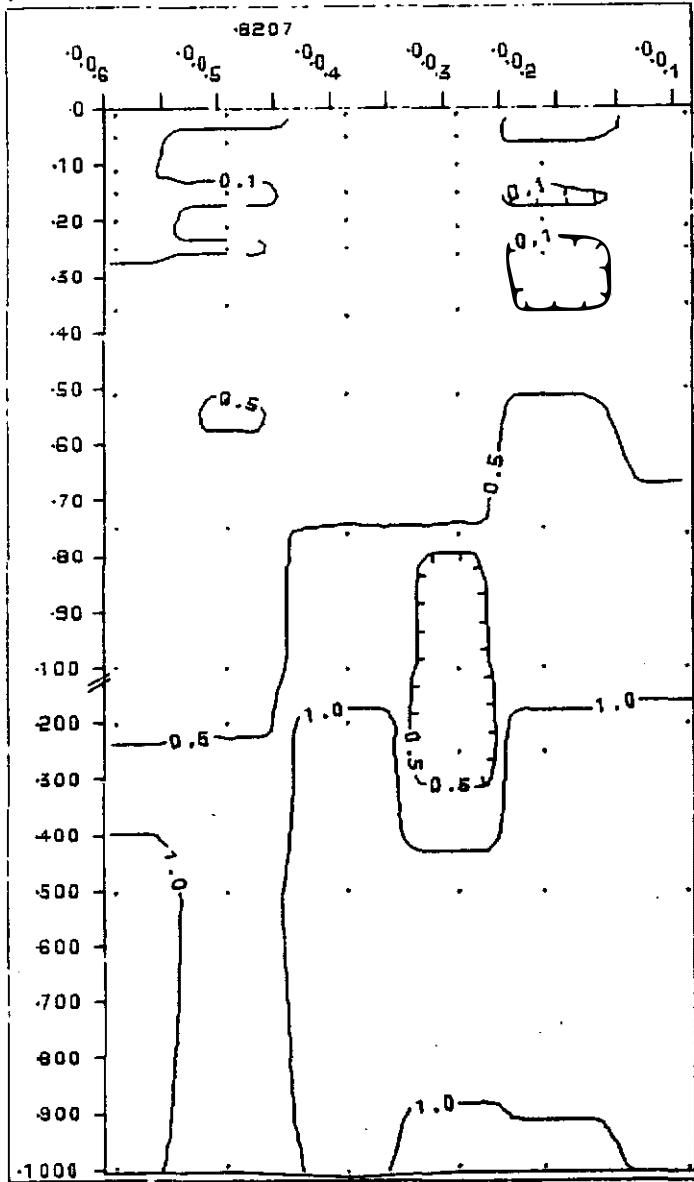
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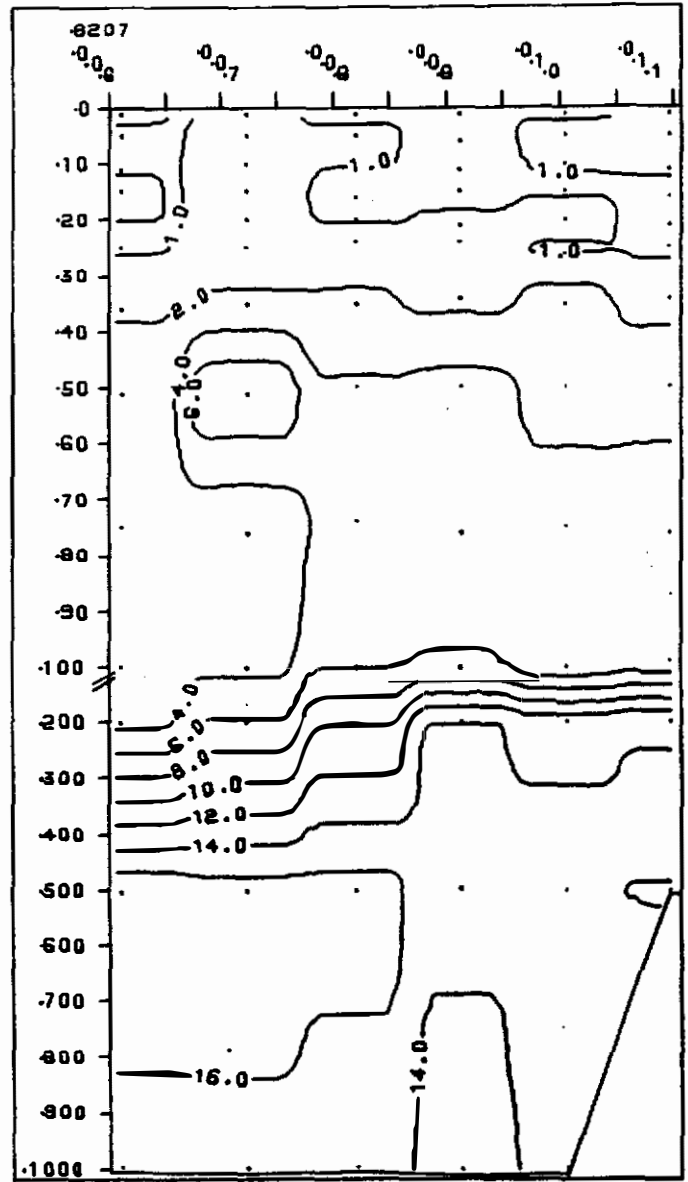
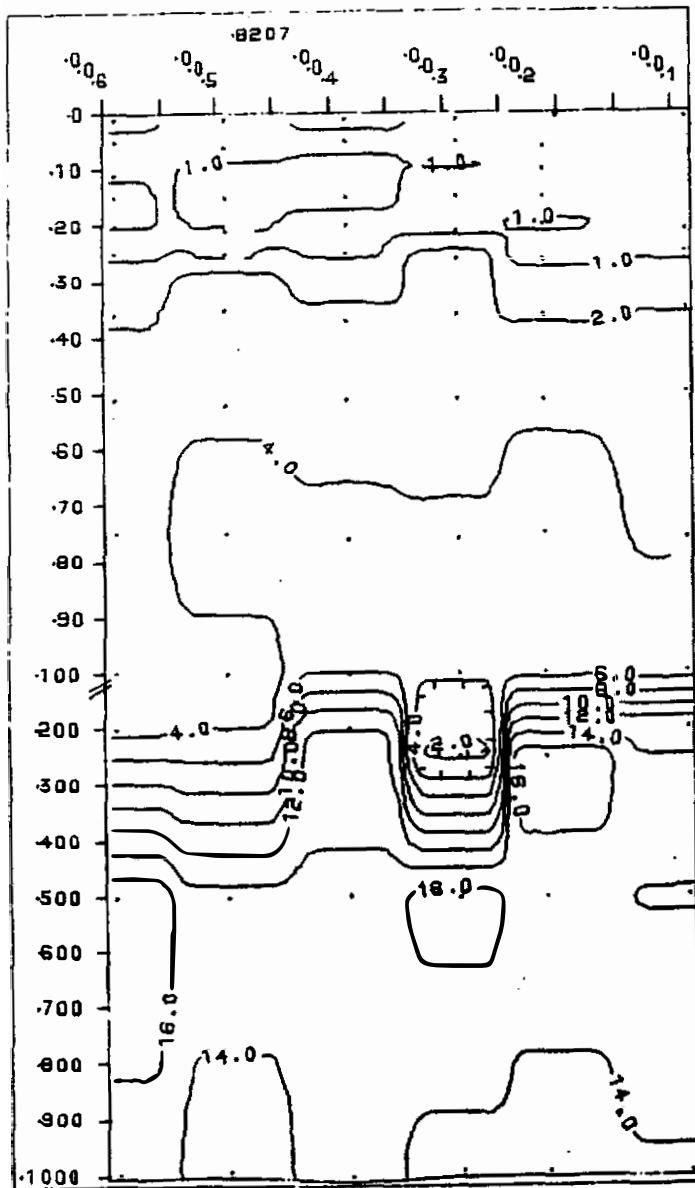
Ammonium (uM)



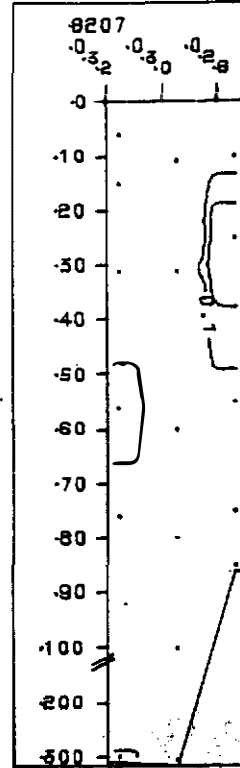
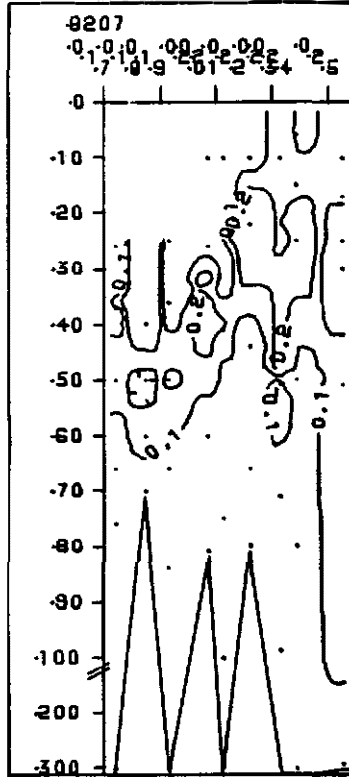
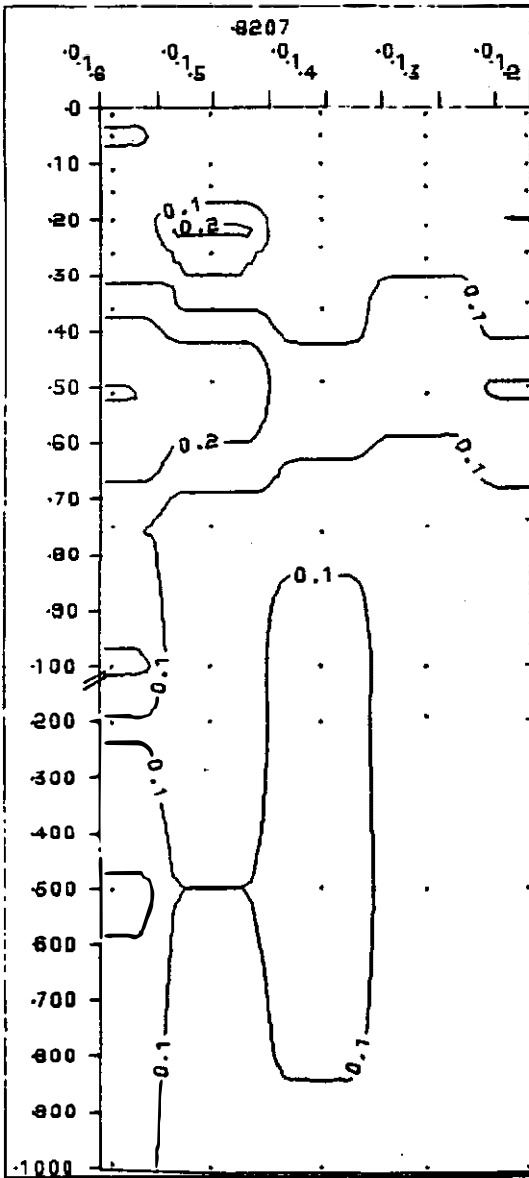
Phosphate (uM)



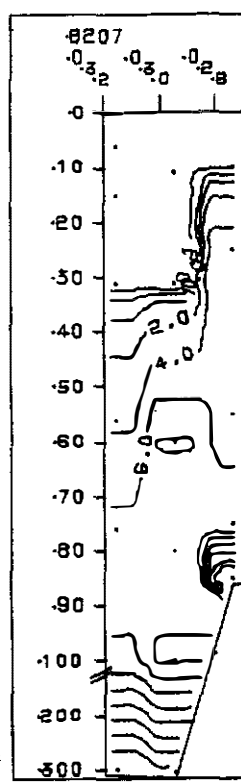
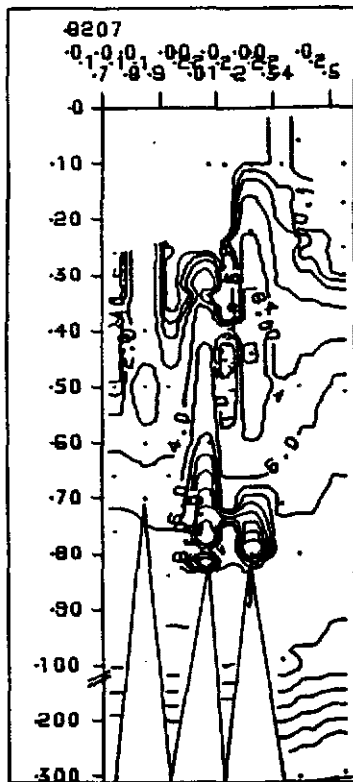
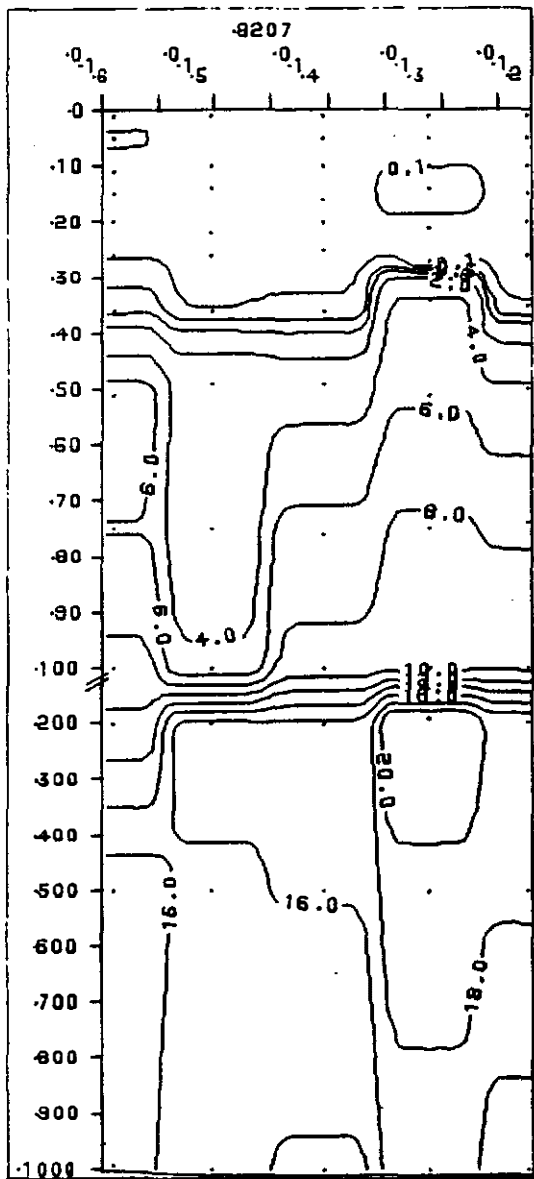
Silicate (μM)



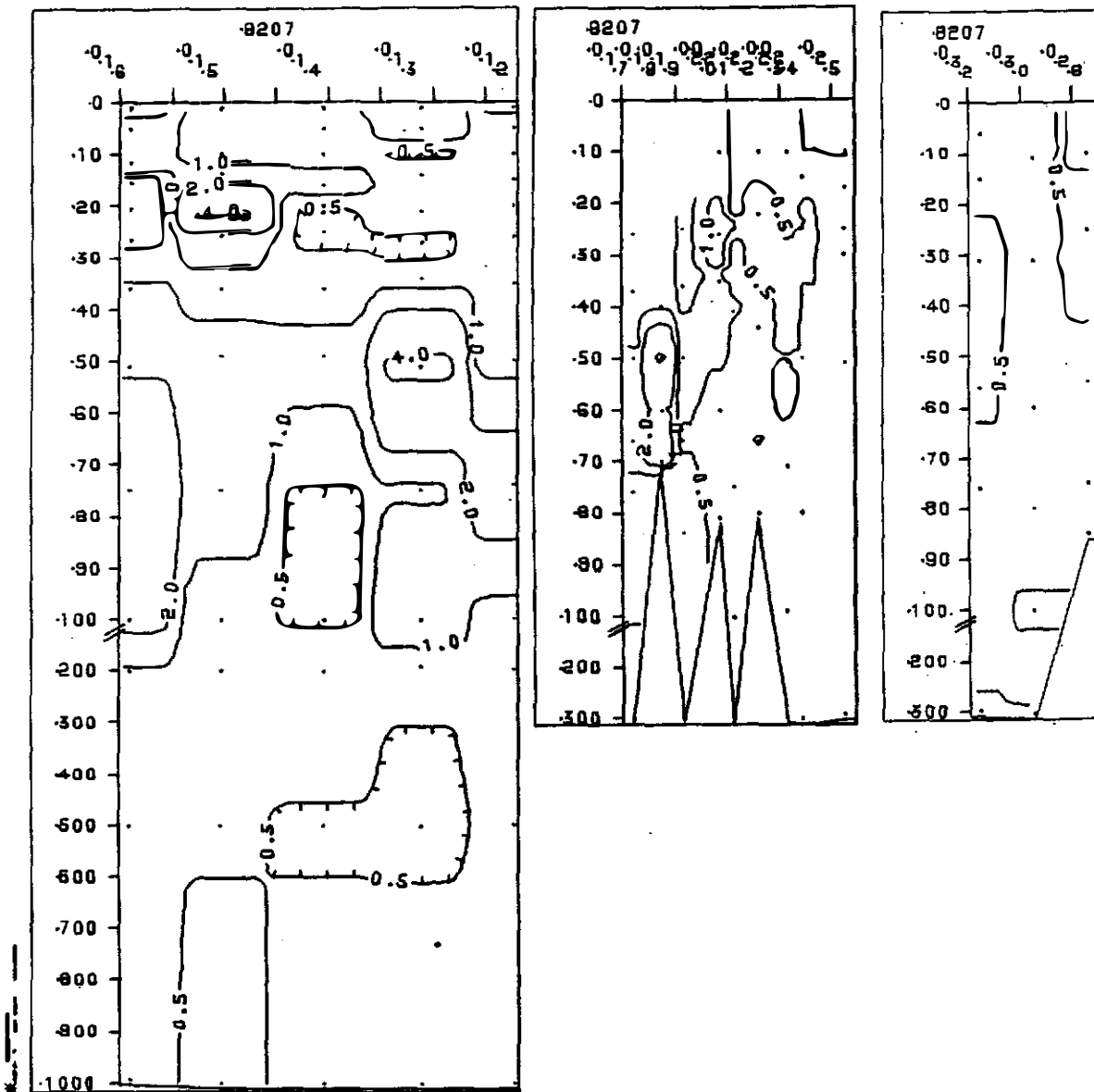
Nitrite (μM)



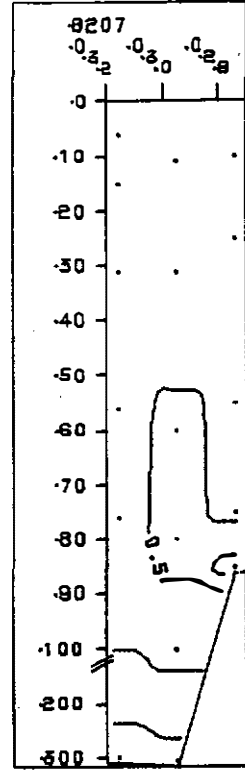
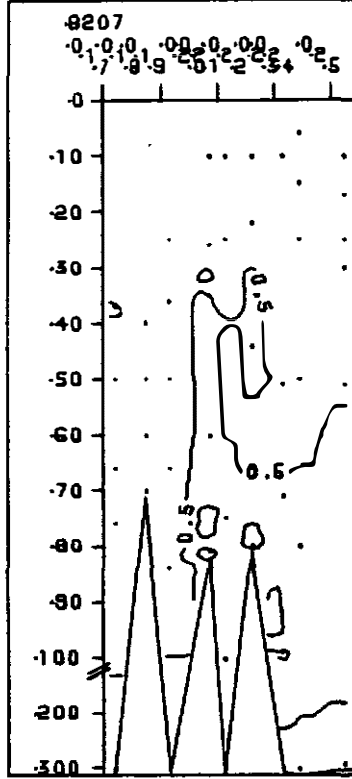
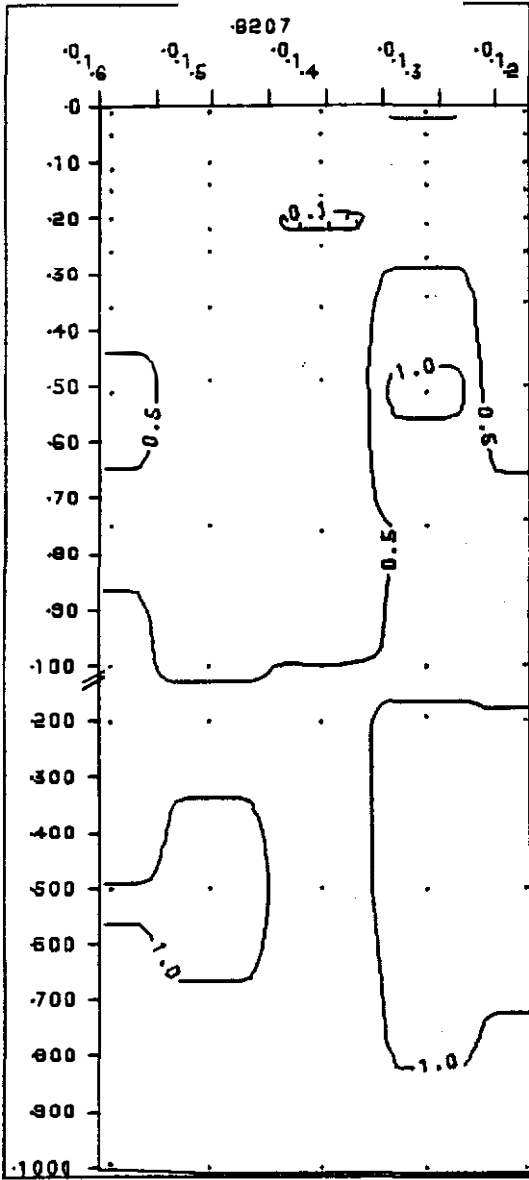
Nitrate (μM)



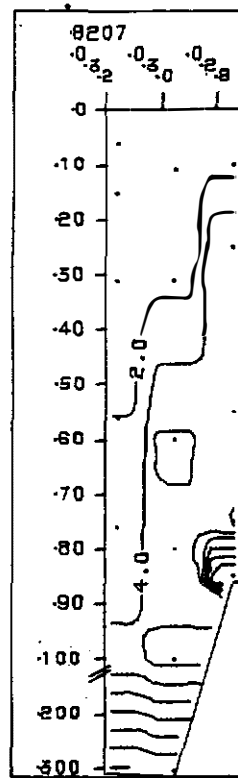
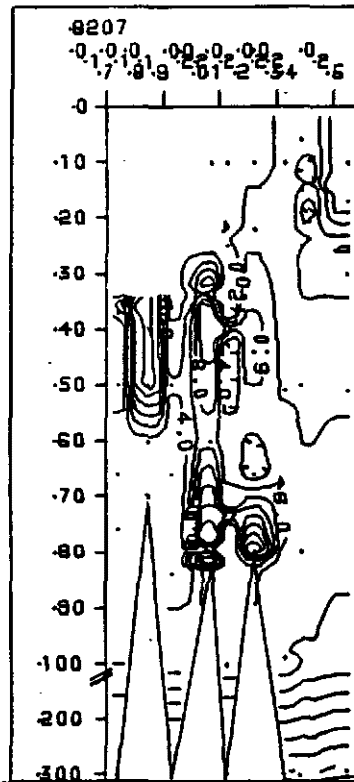
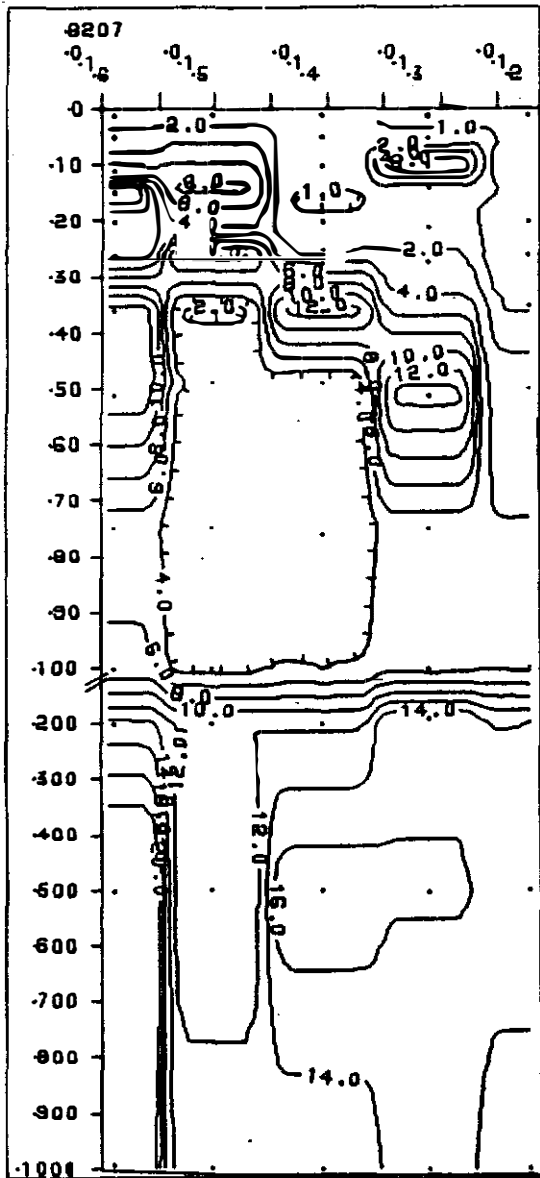
Ammonium (uM)



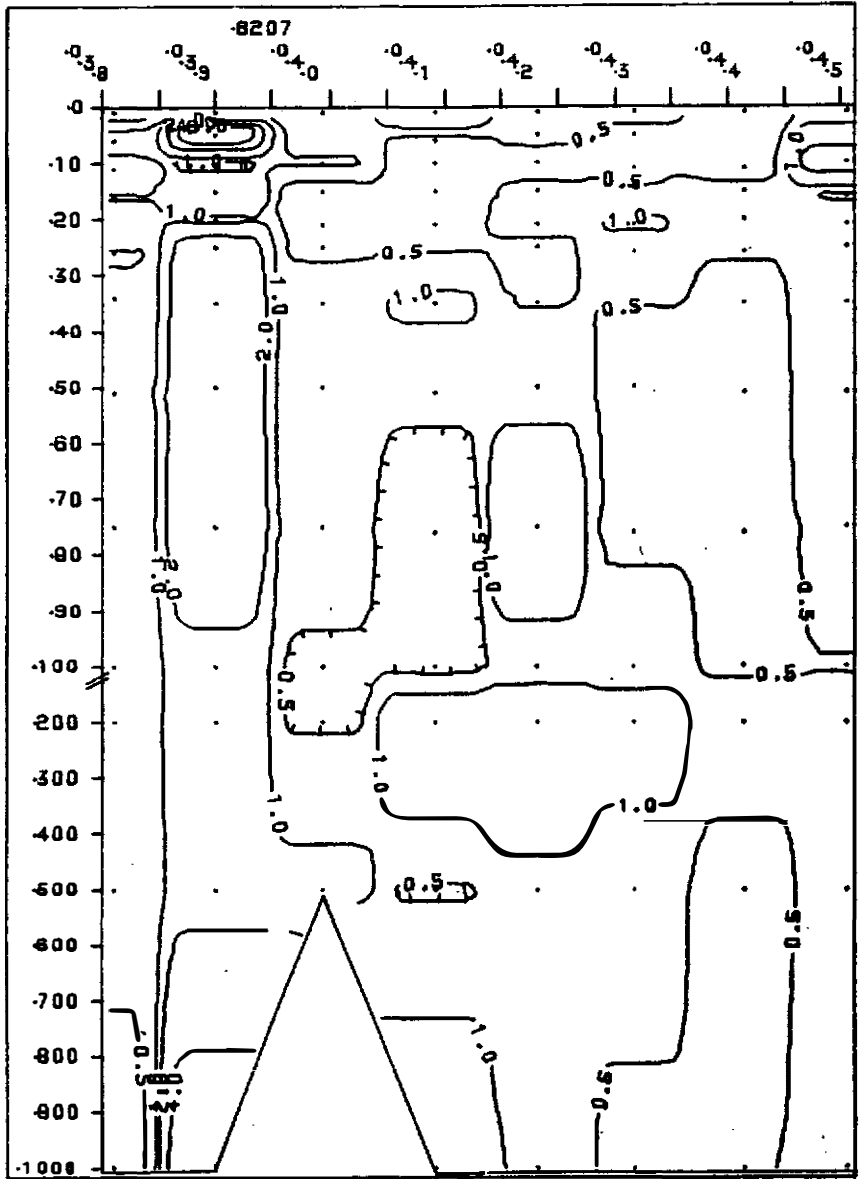
Phosphate (μM)



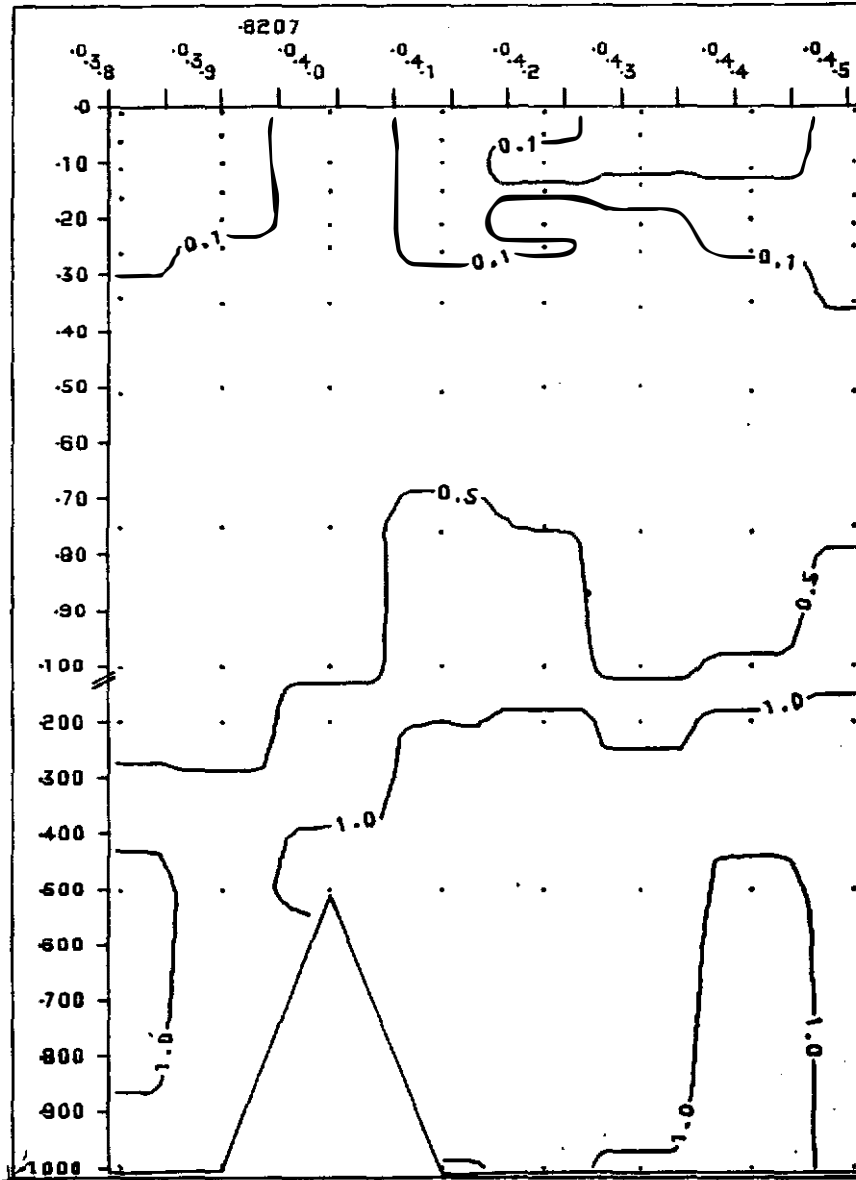
Silicate (μM)



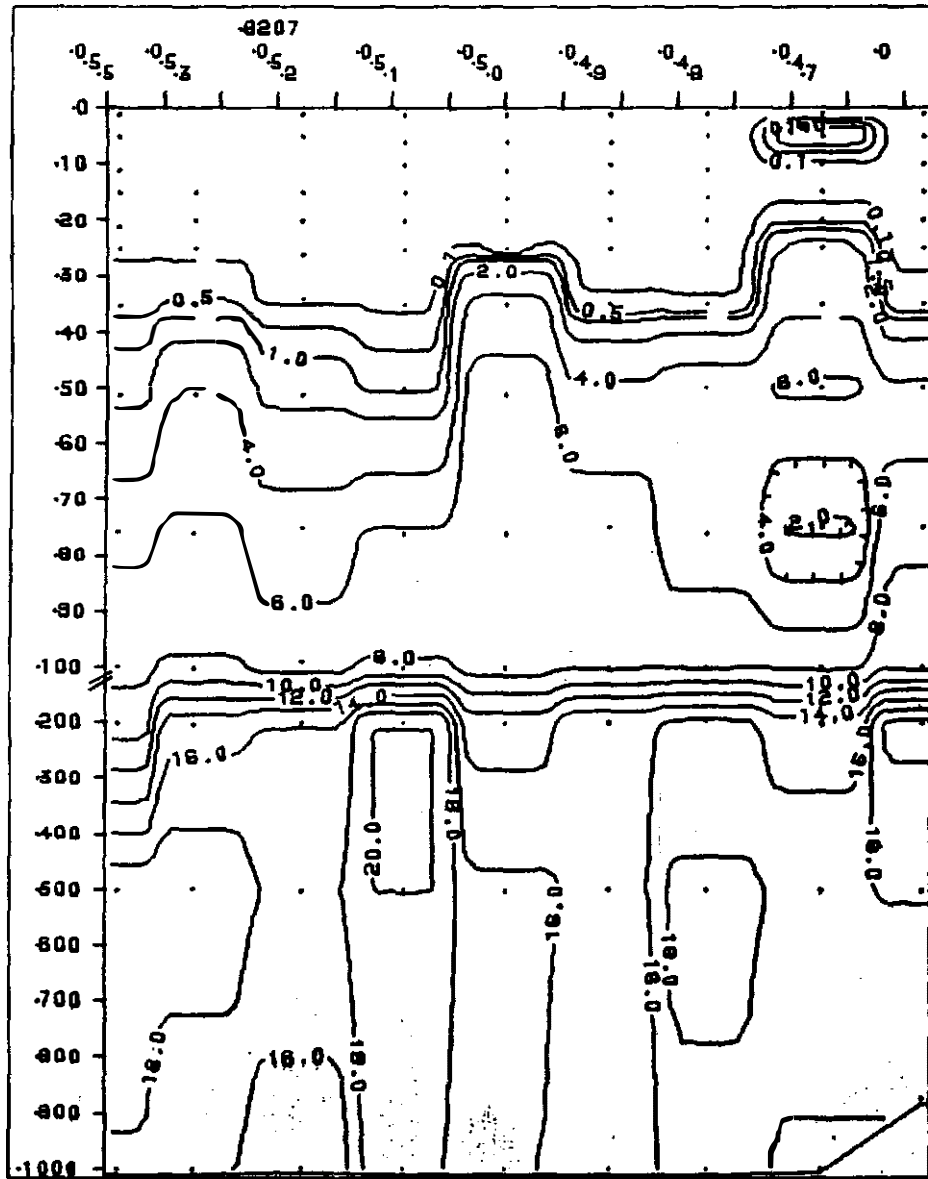
Ammonium (μM)



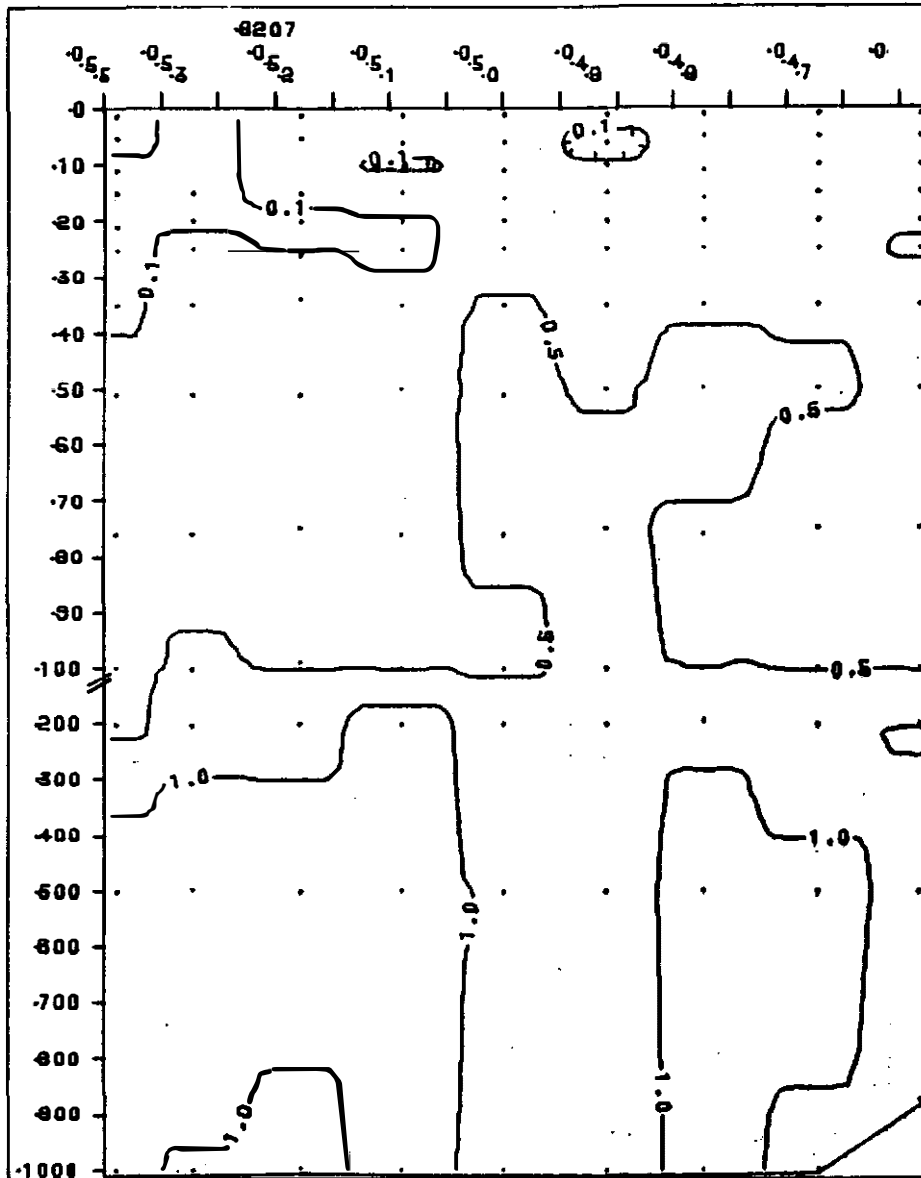
Phosphate (uM)



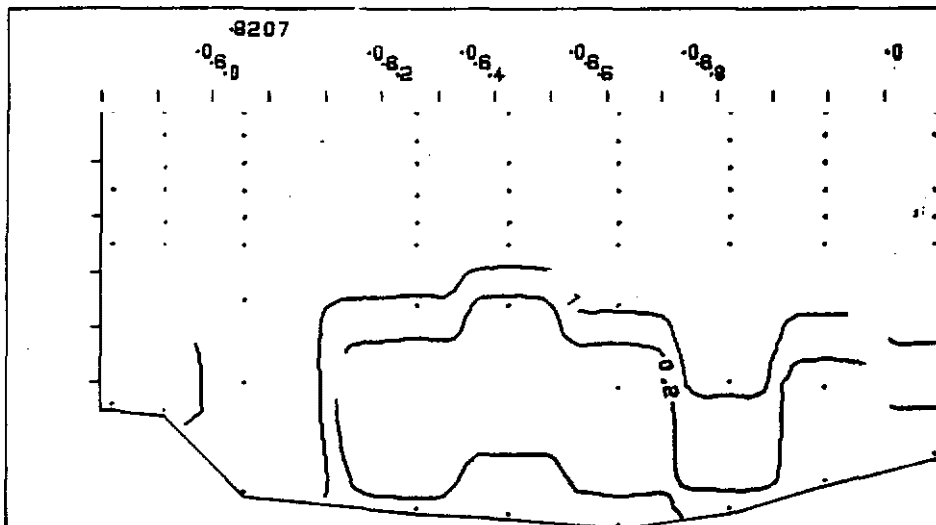
Nitrate (uM)



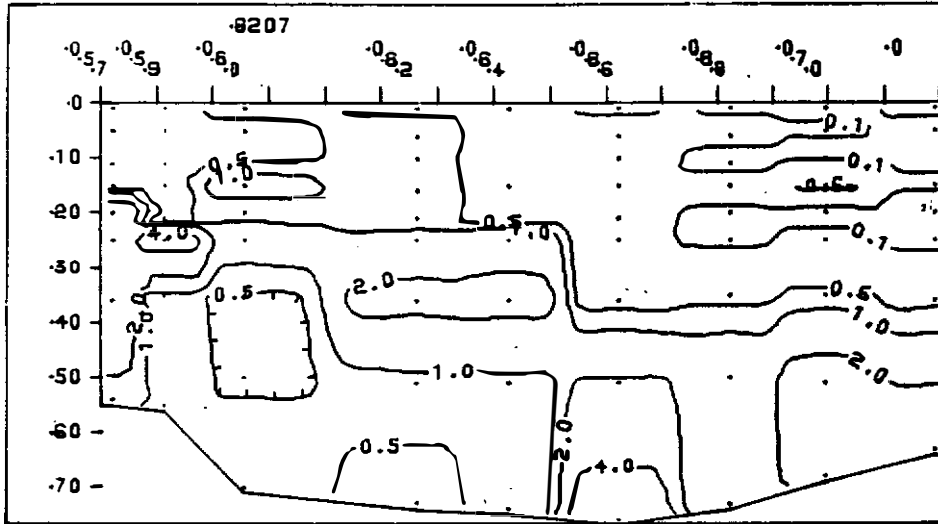
Phosphate (uM)



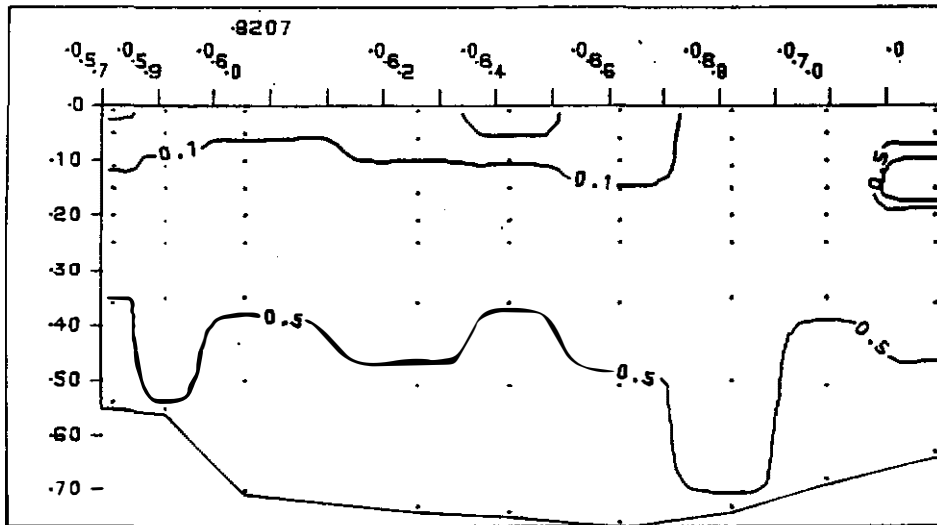
Nitrite (uM)



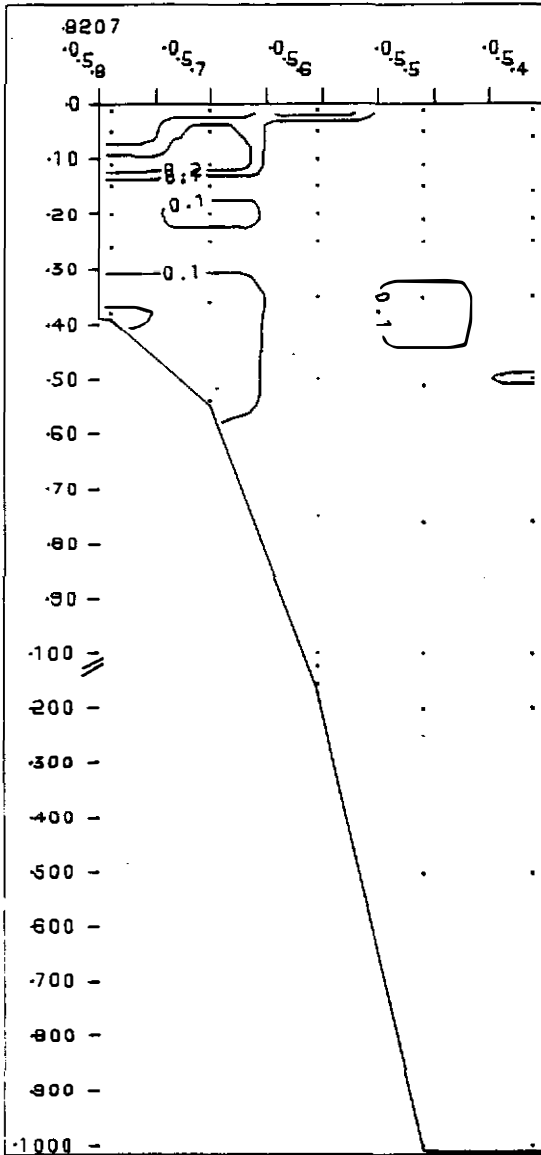
Ammonium (μM)



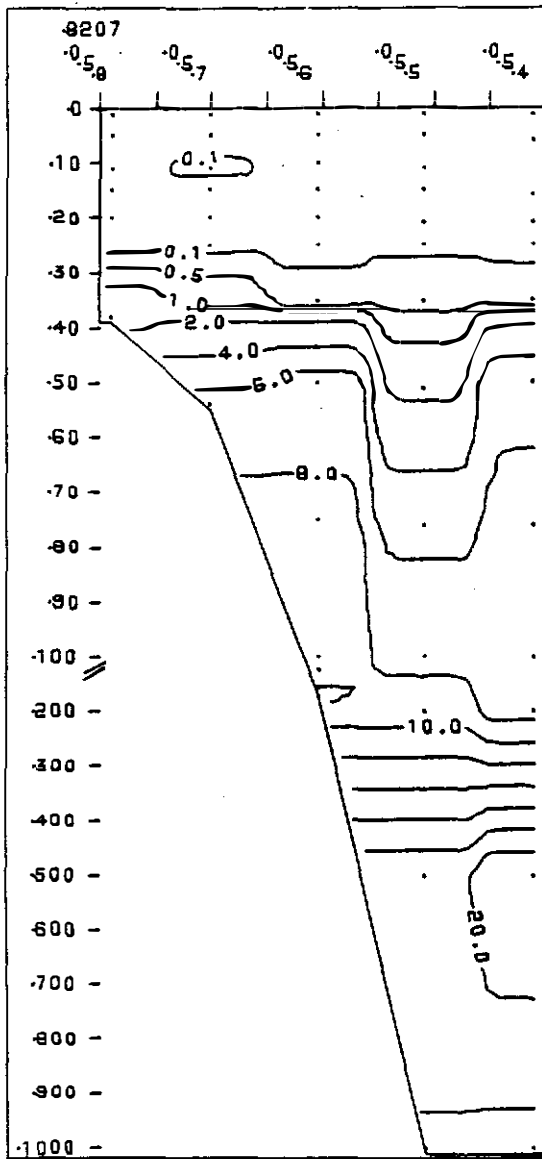
Phosphate (uM)



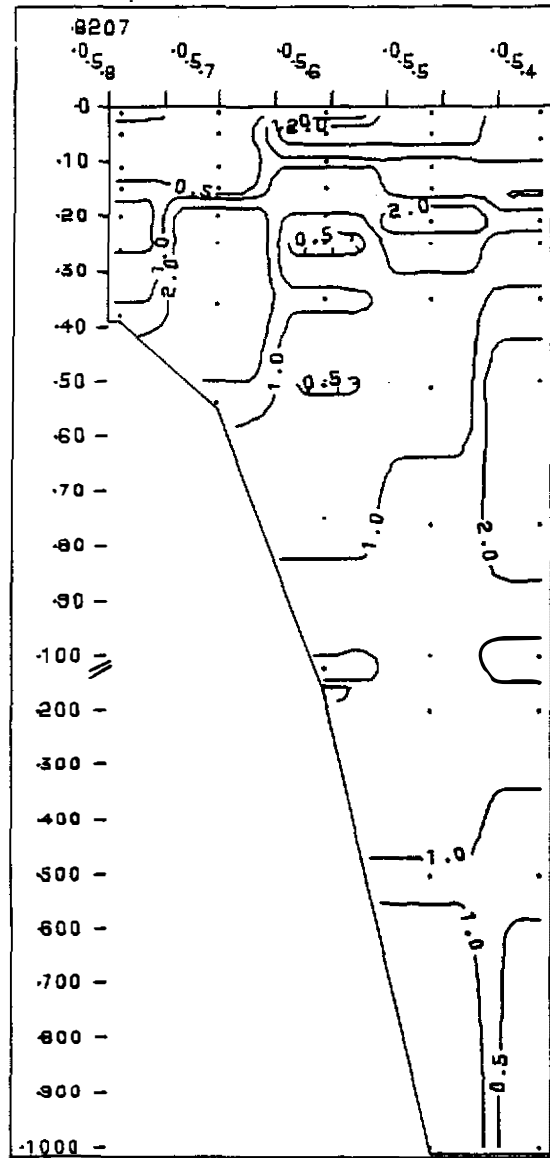
Nitrite (uM)



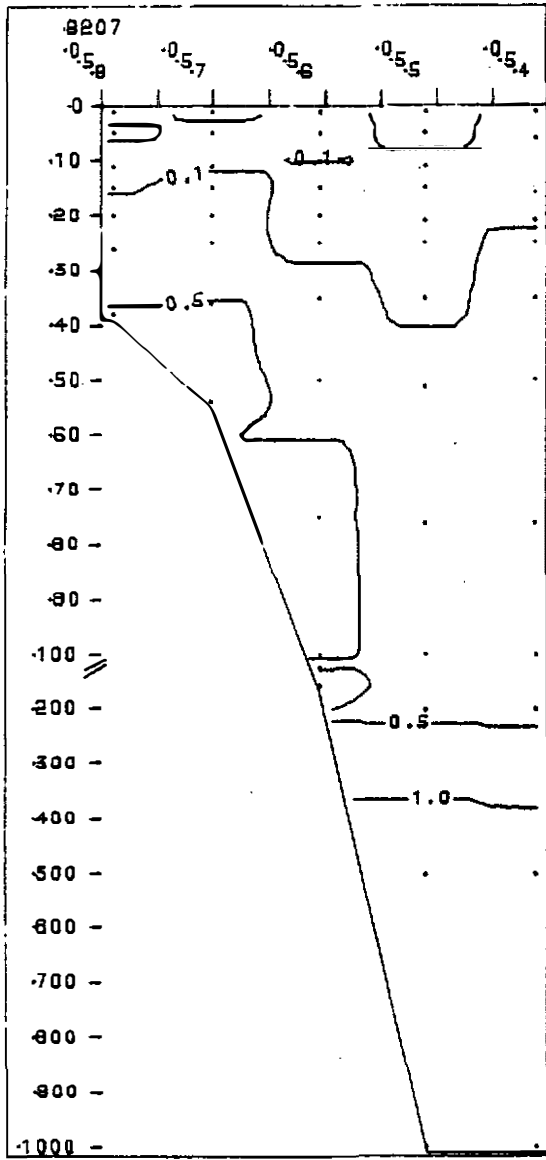
Nitrate (uM)



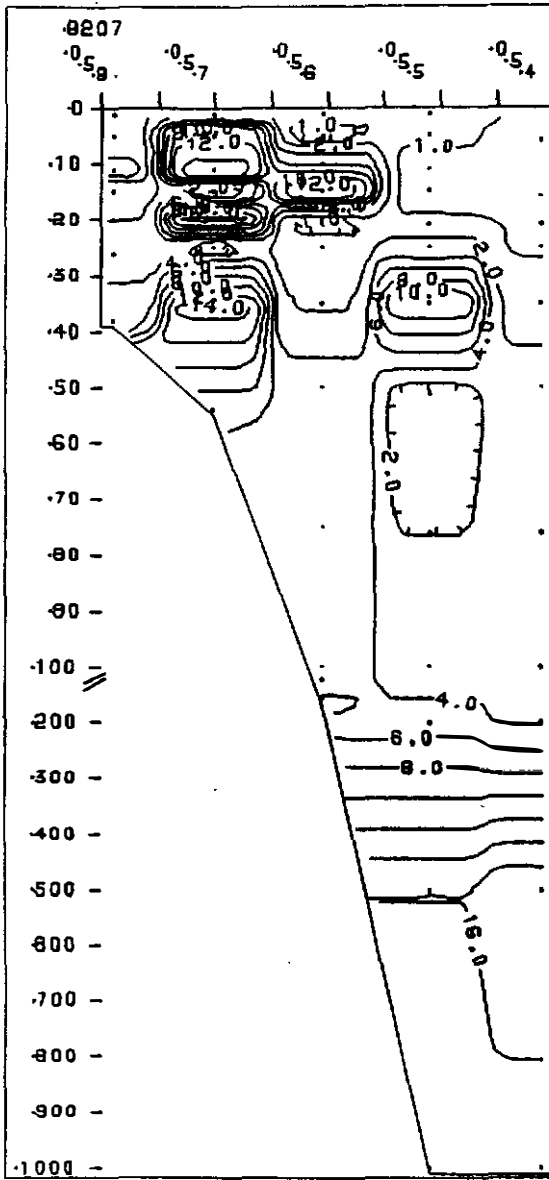
Ammonium (uM)



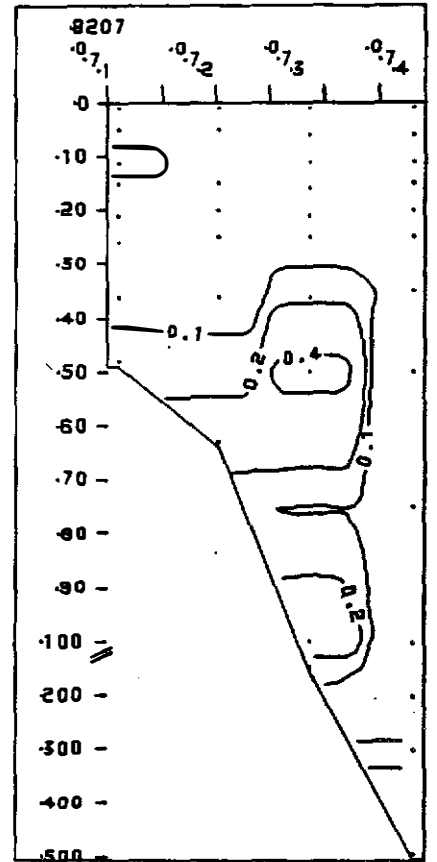
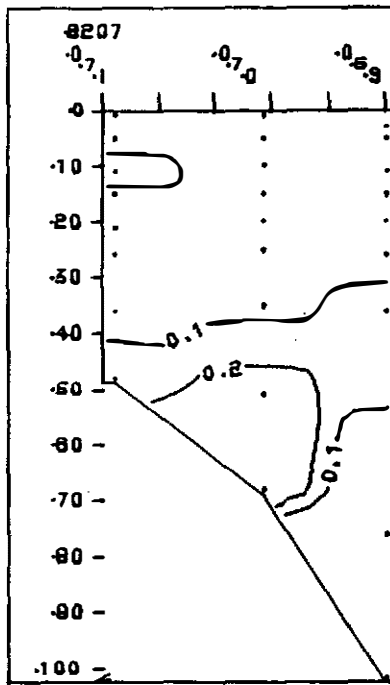
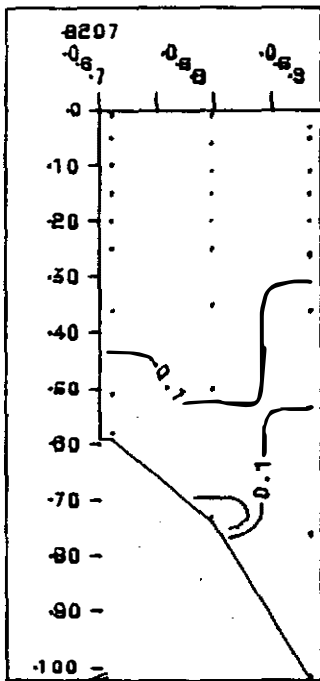
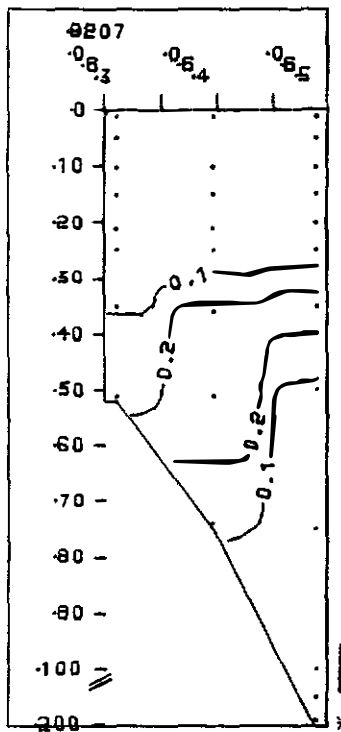
Phosphate (uM)



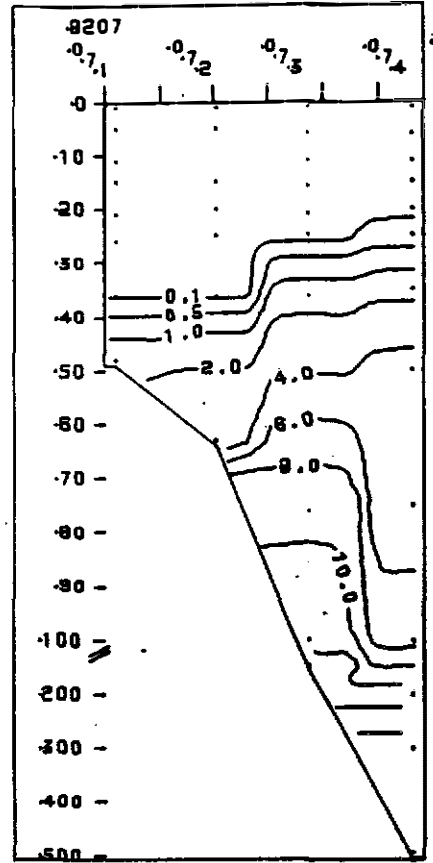
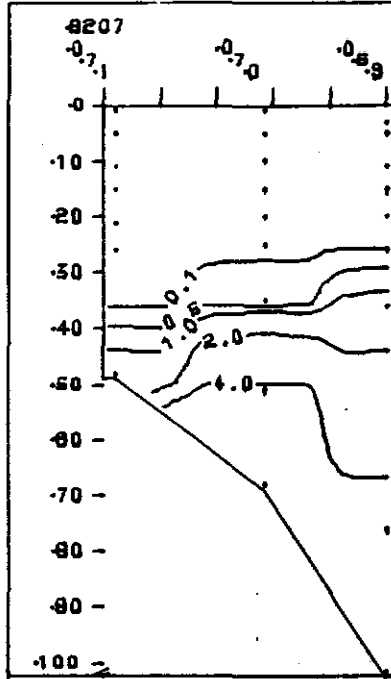
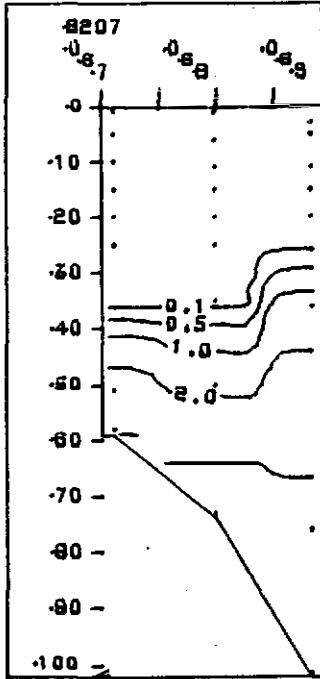
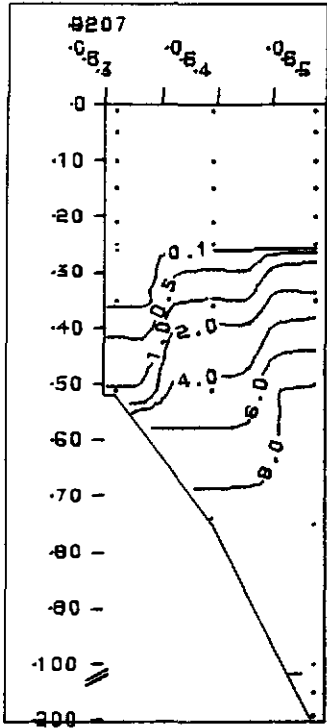
Silicate (uM)



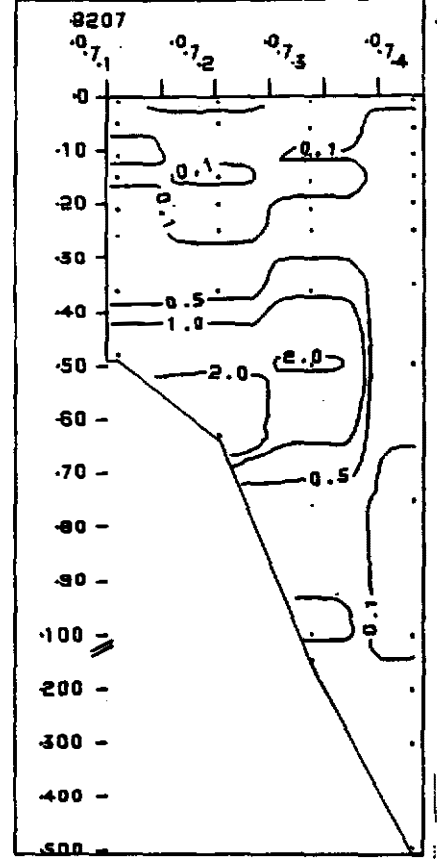
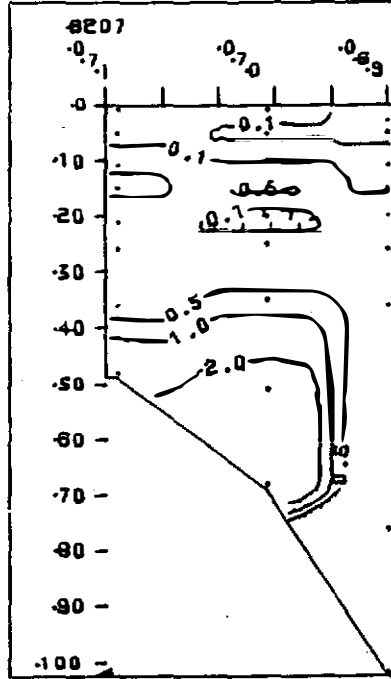
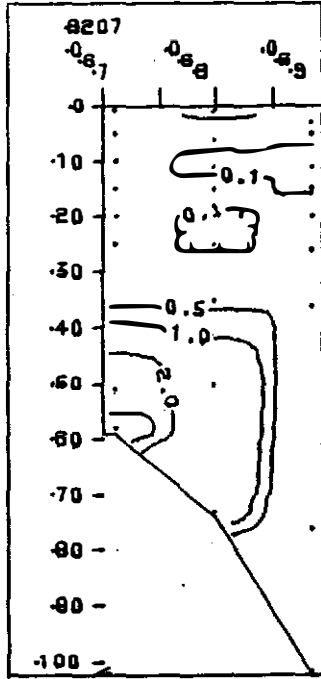
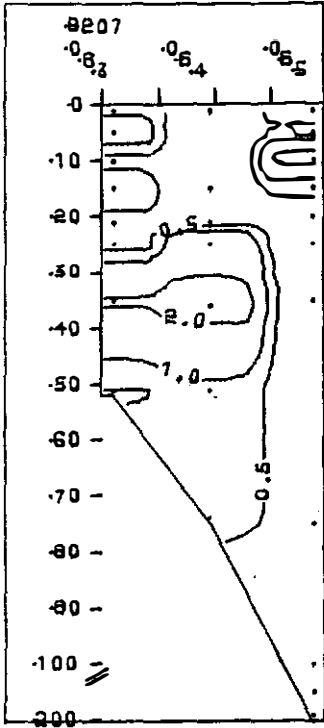
Nitrite (μM)



Nitrate (uM)



Ammonium (μM)



Phosphate (μM)

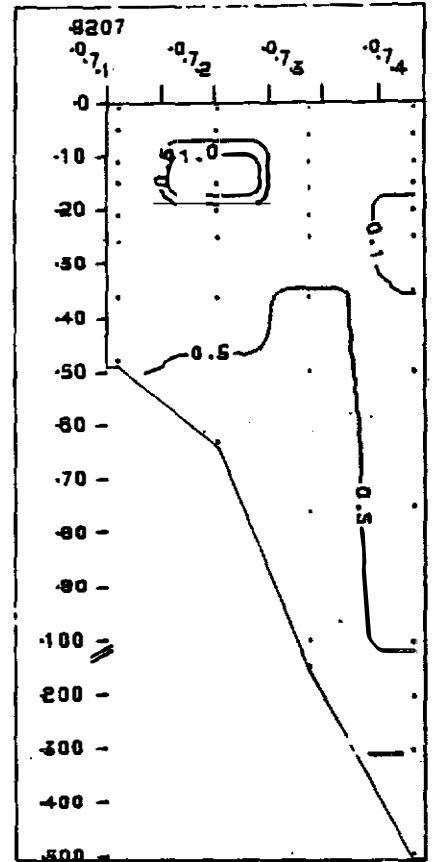
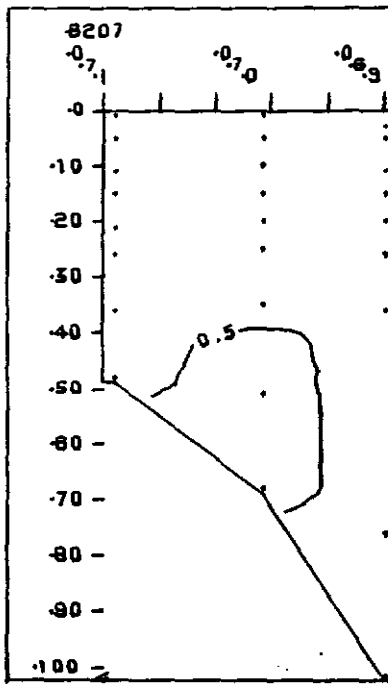
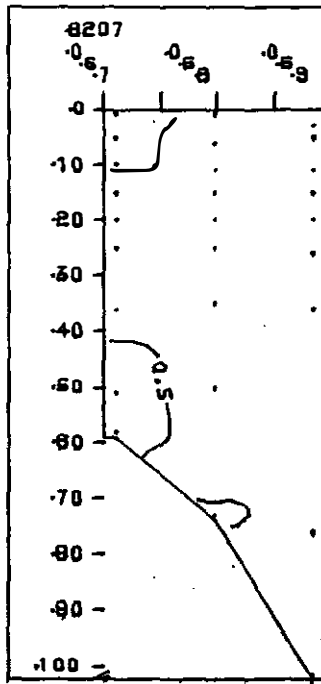
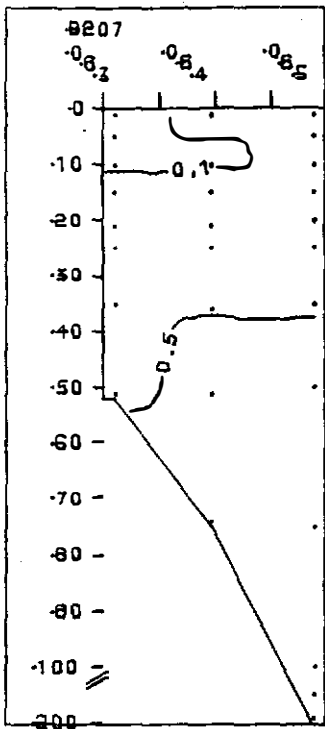
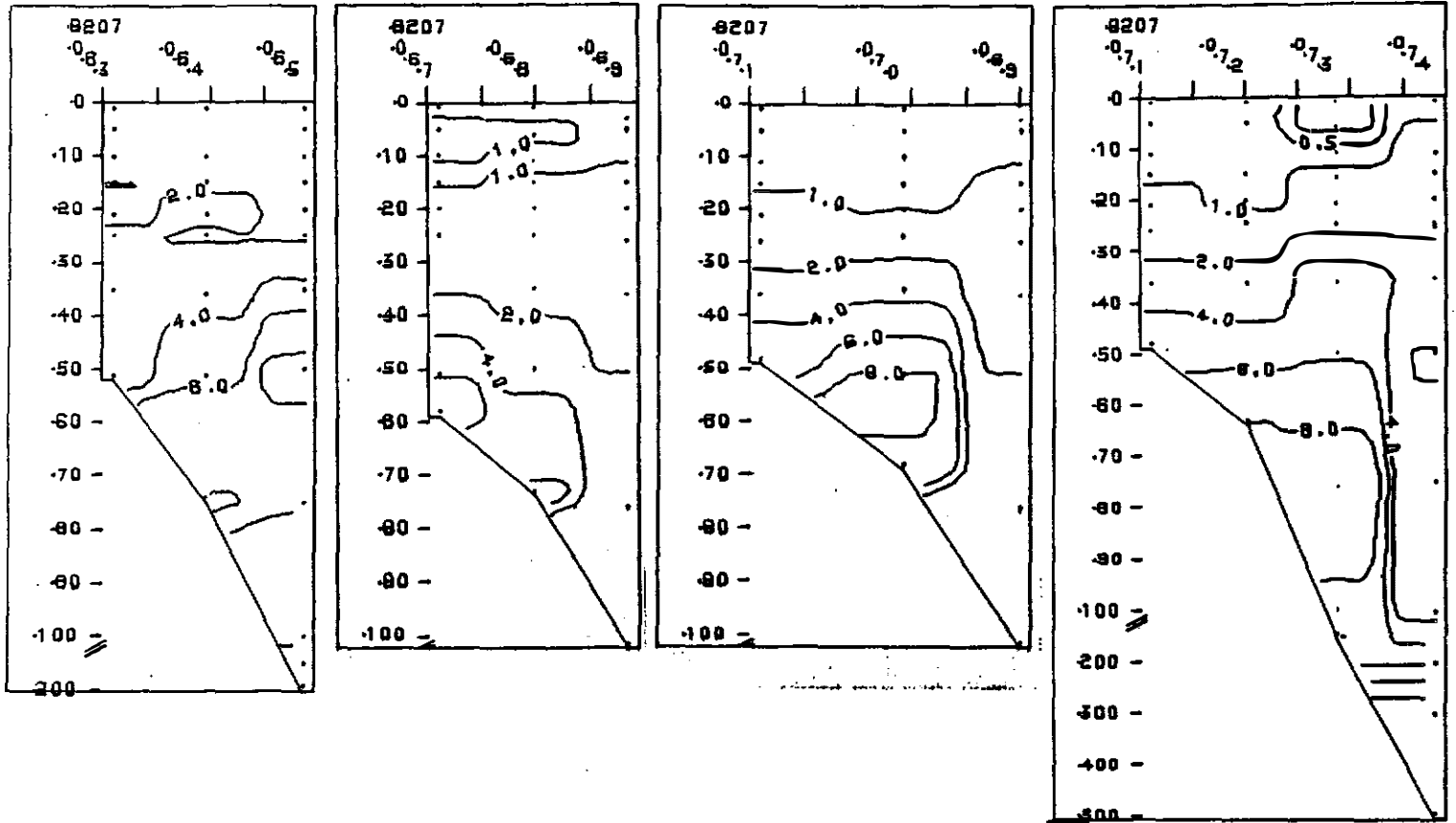
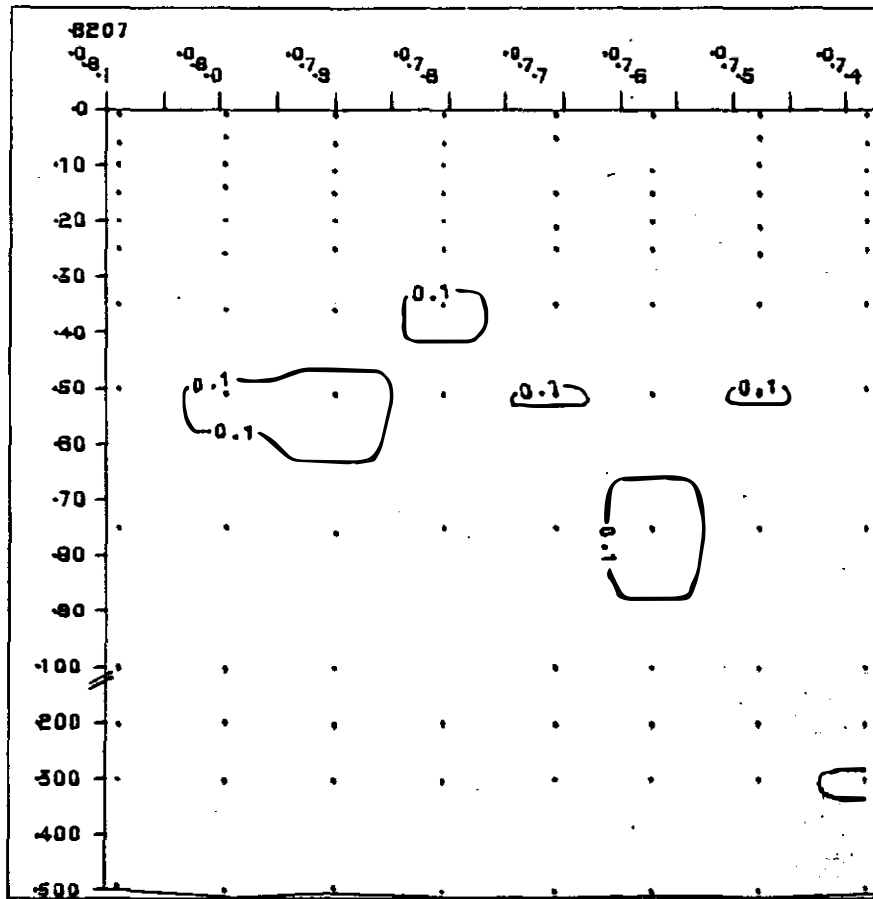


Fig. 11

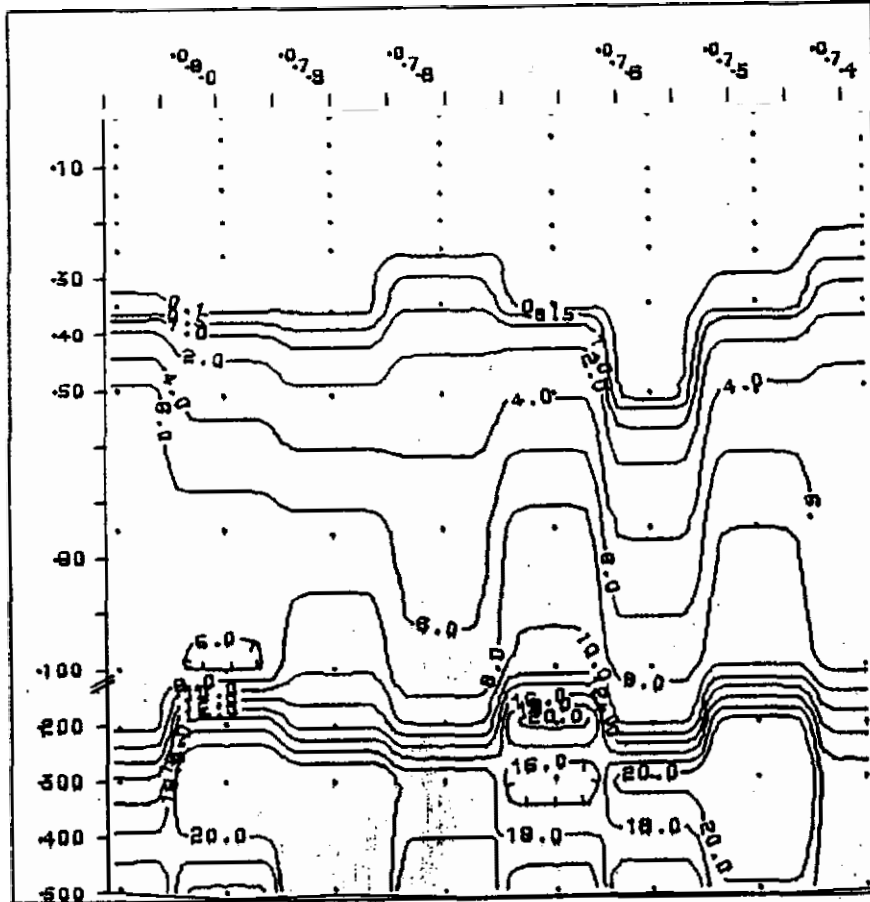
Silicate (μM)



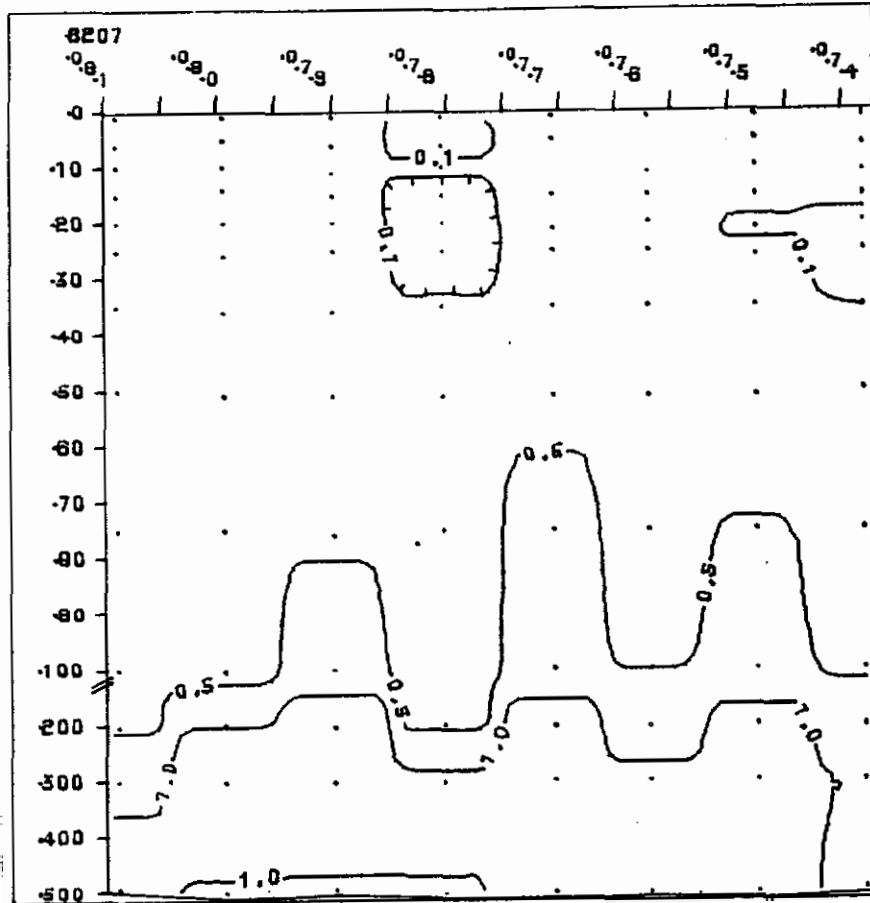
Nitrite (uM)



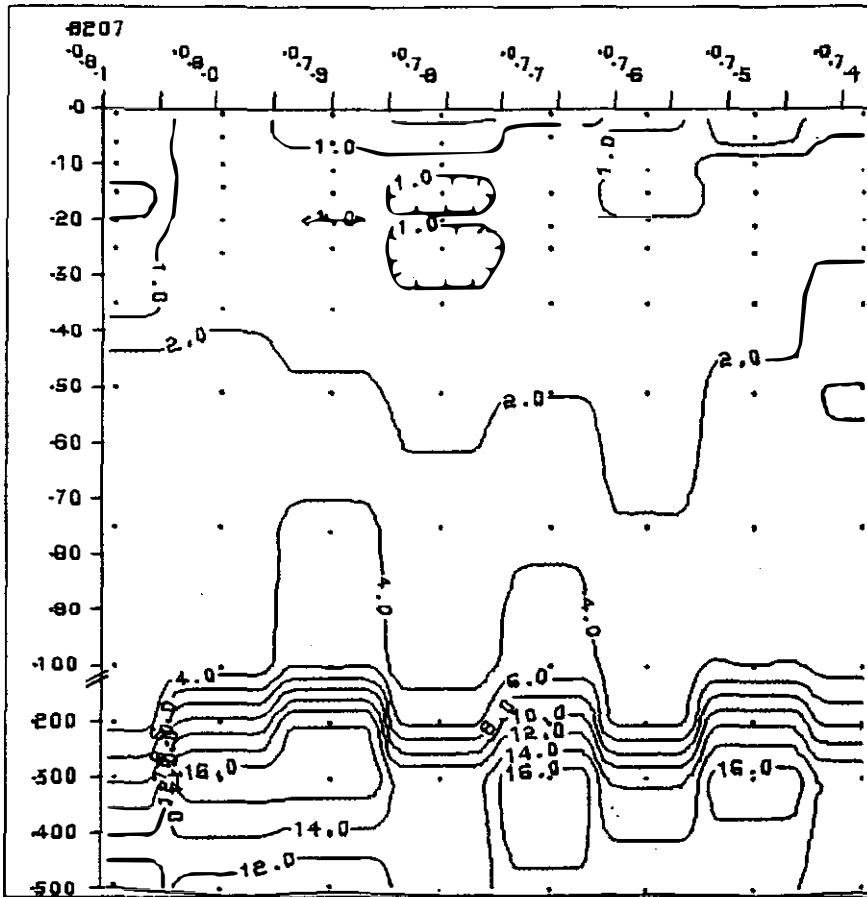
Nitrate (uM)



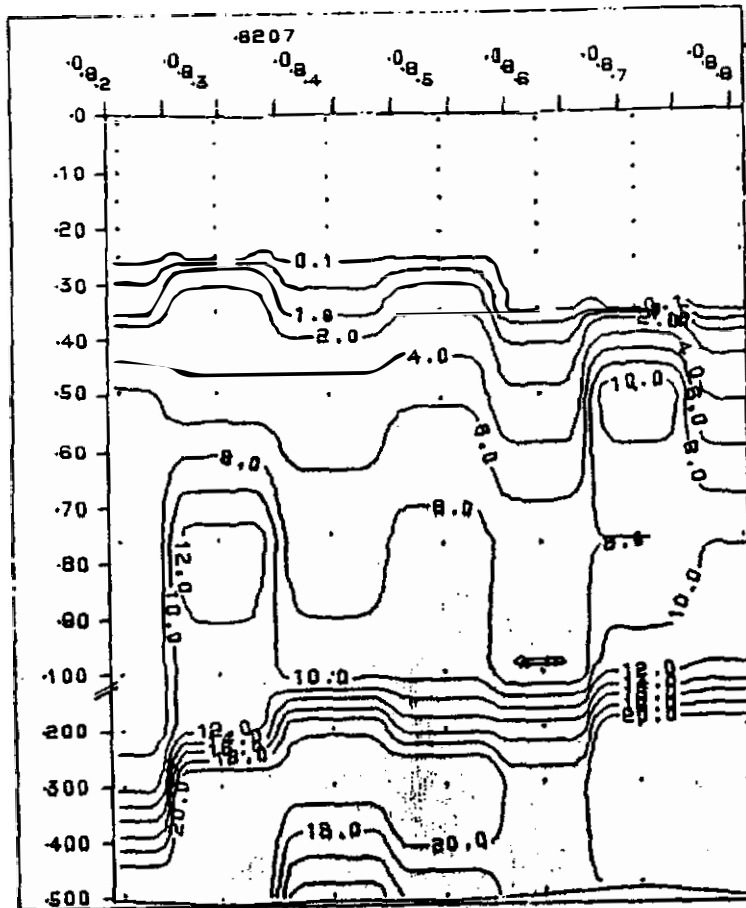
Densities (A)



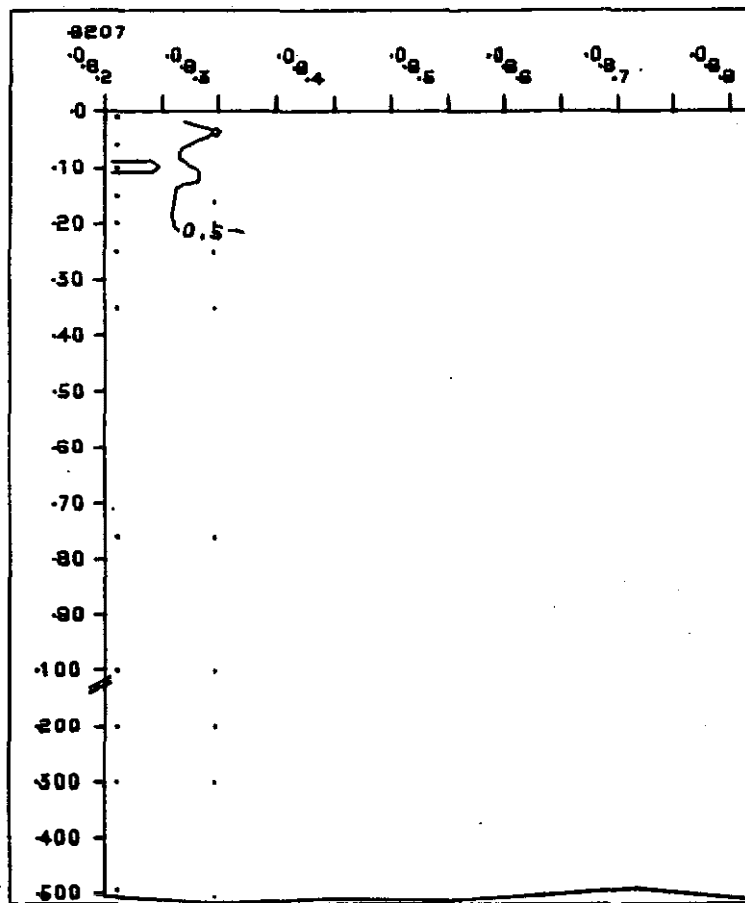
Silicate (uM)



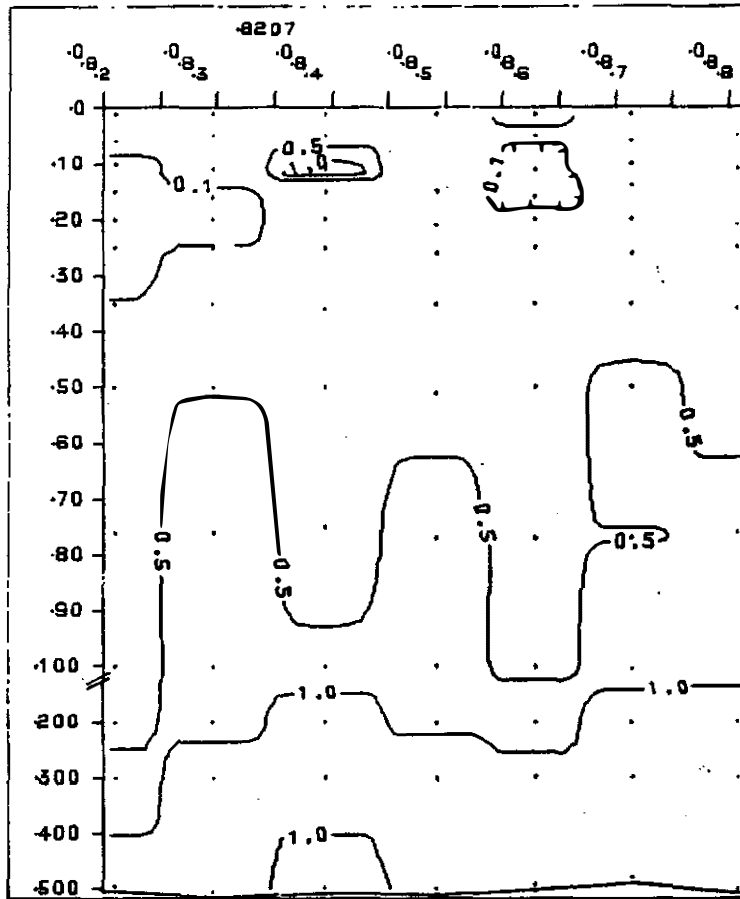
Nitrate (uM)



Ammonium (uM)



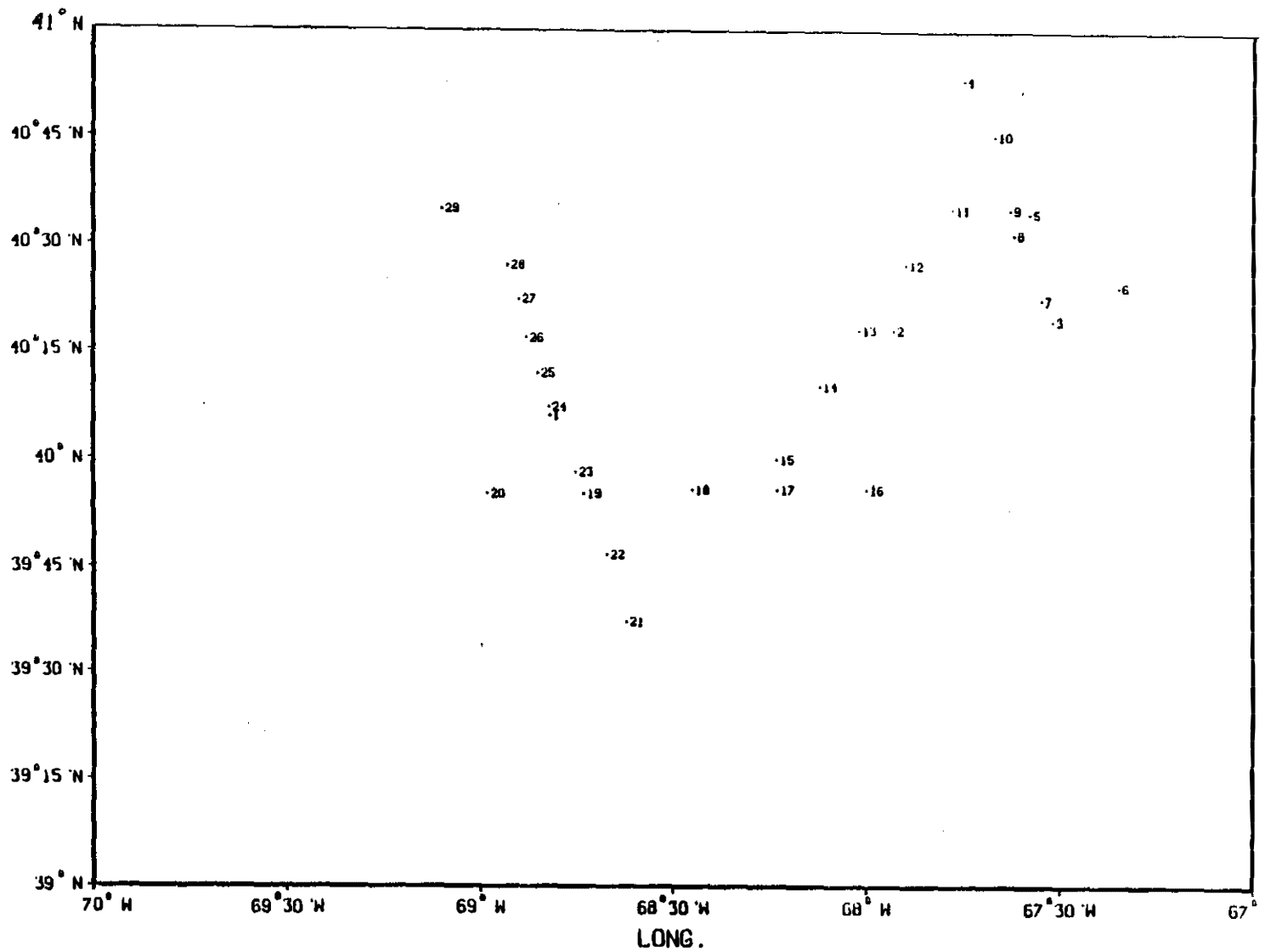
Phosphate (uM)



DL8206

12 August to 16 August 1982

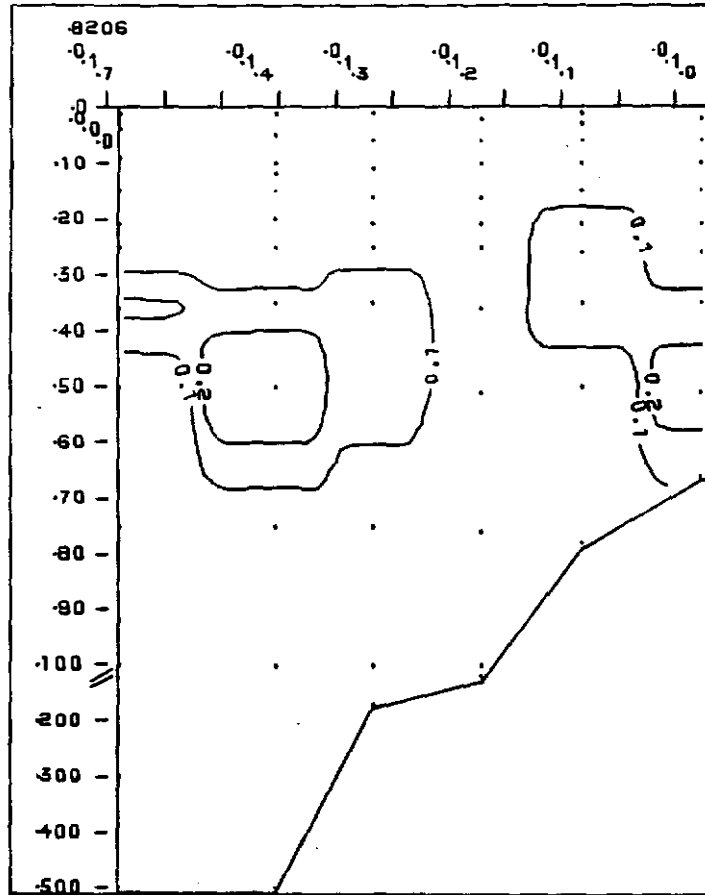
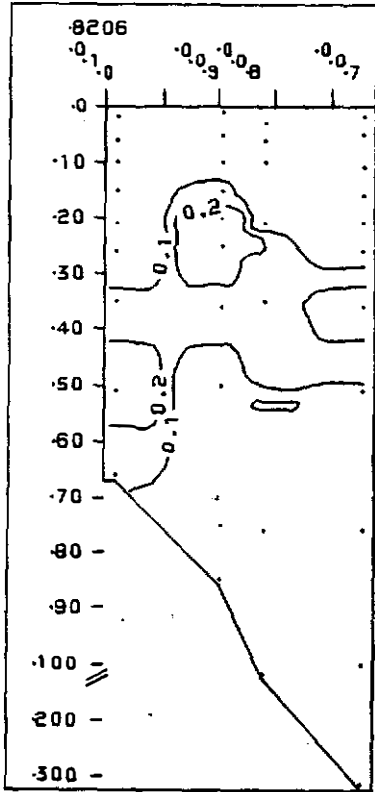




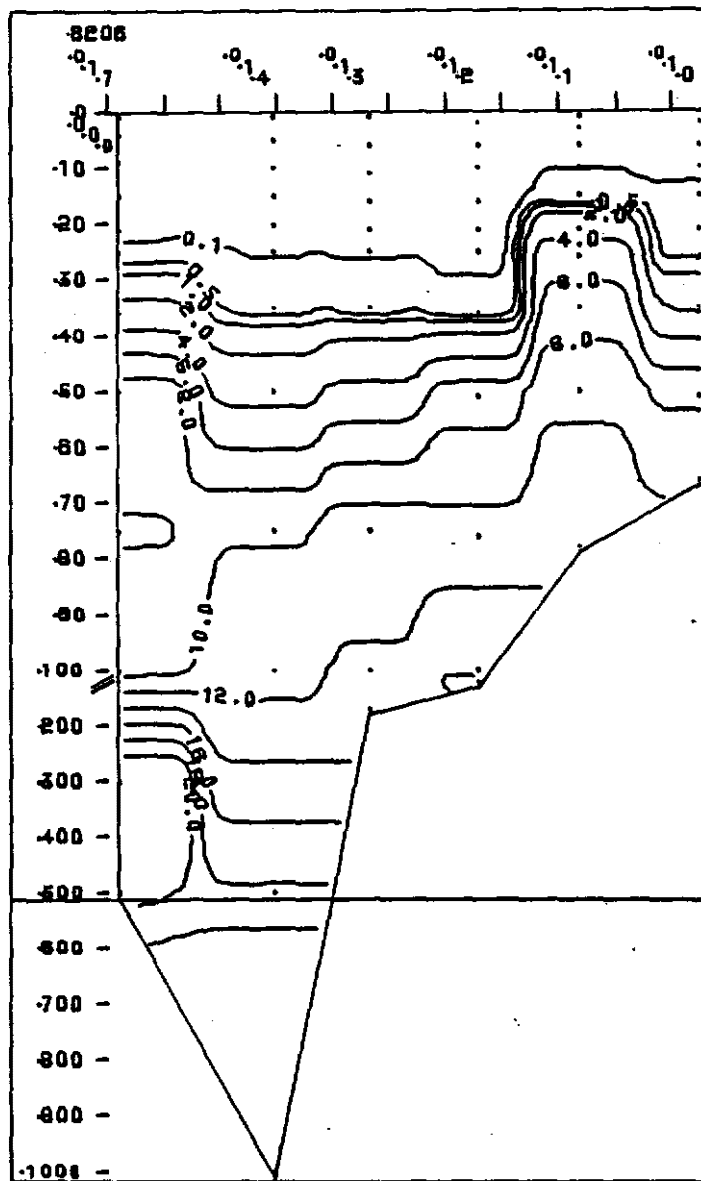
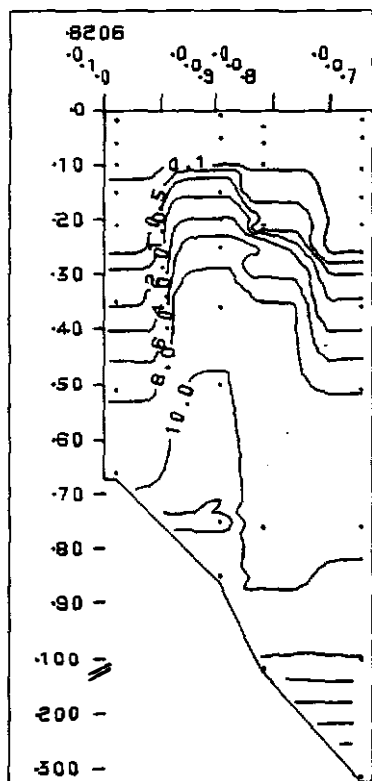
DEL8206

Station Positions

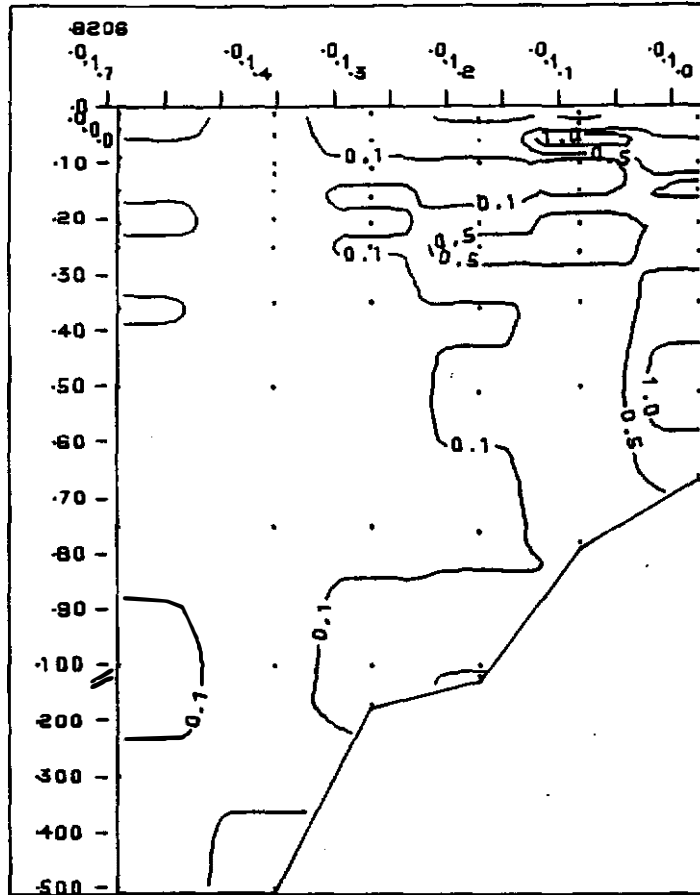
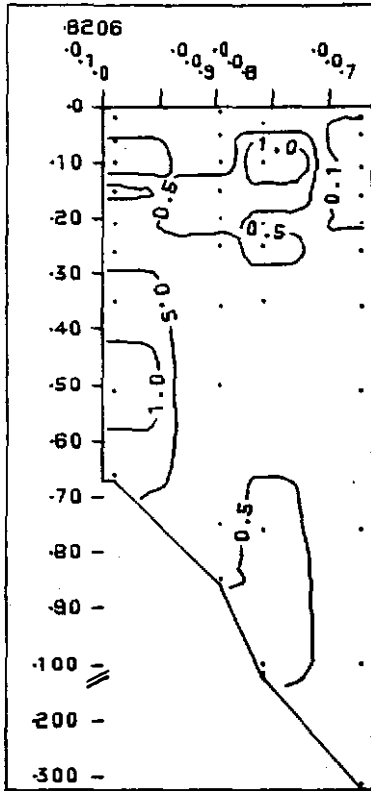
Nitrite (μM)



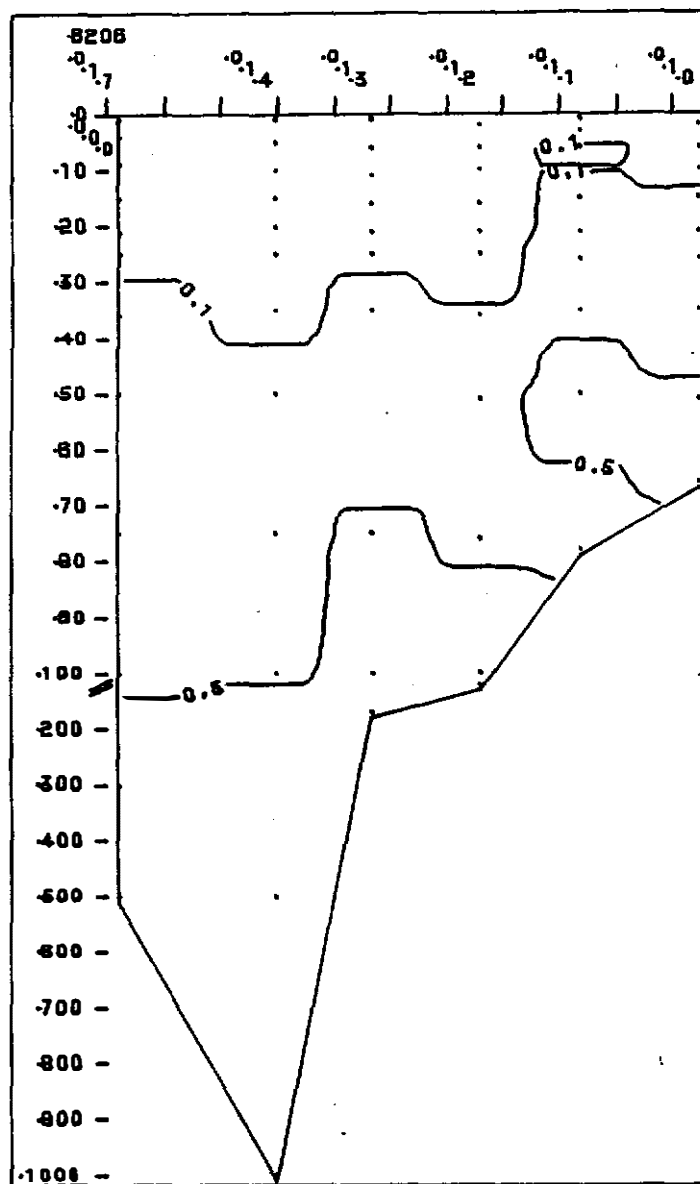
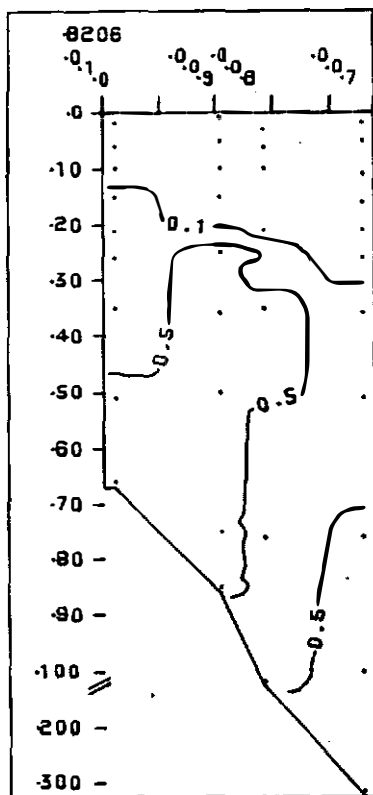
Nitrate (uM)



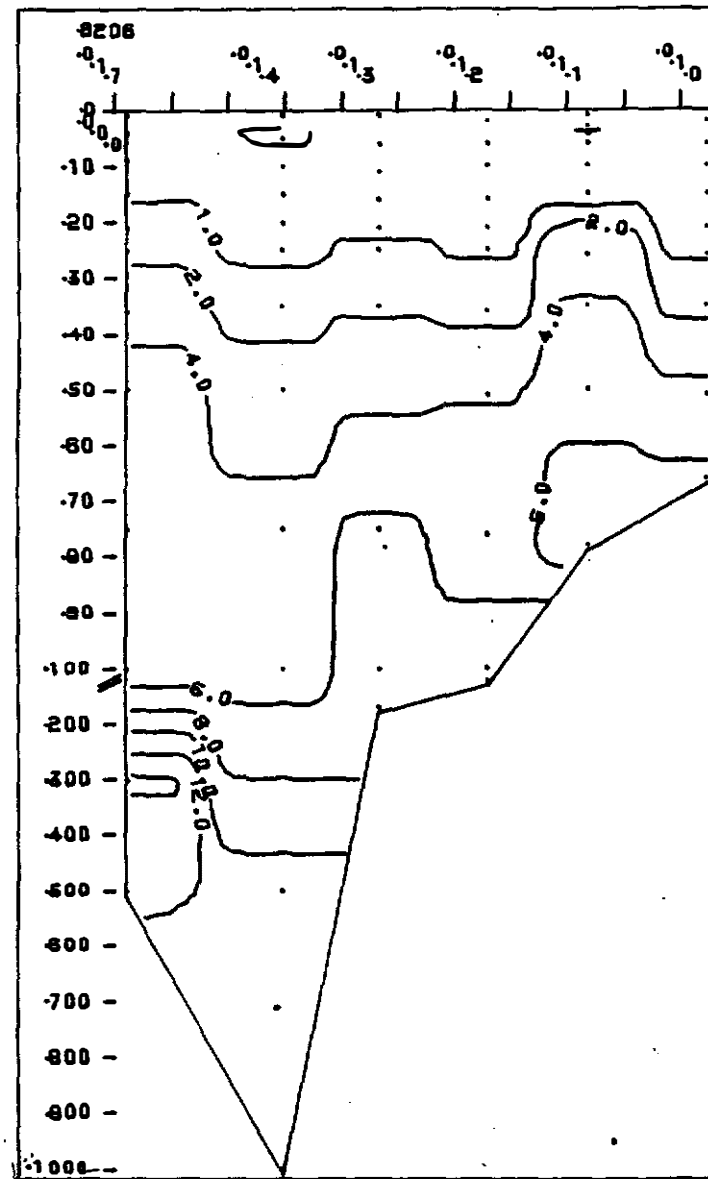
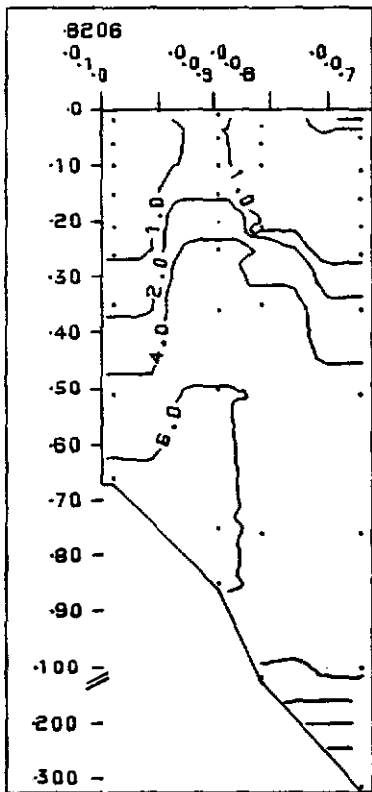
Ammonium (μM)



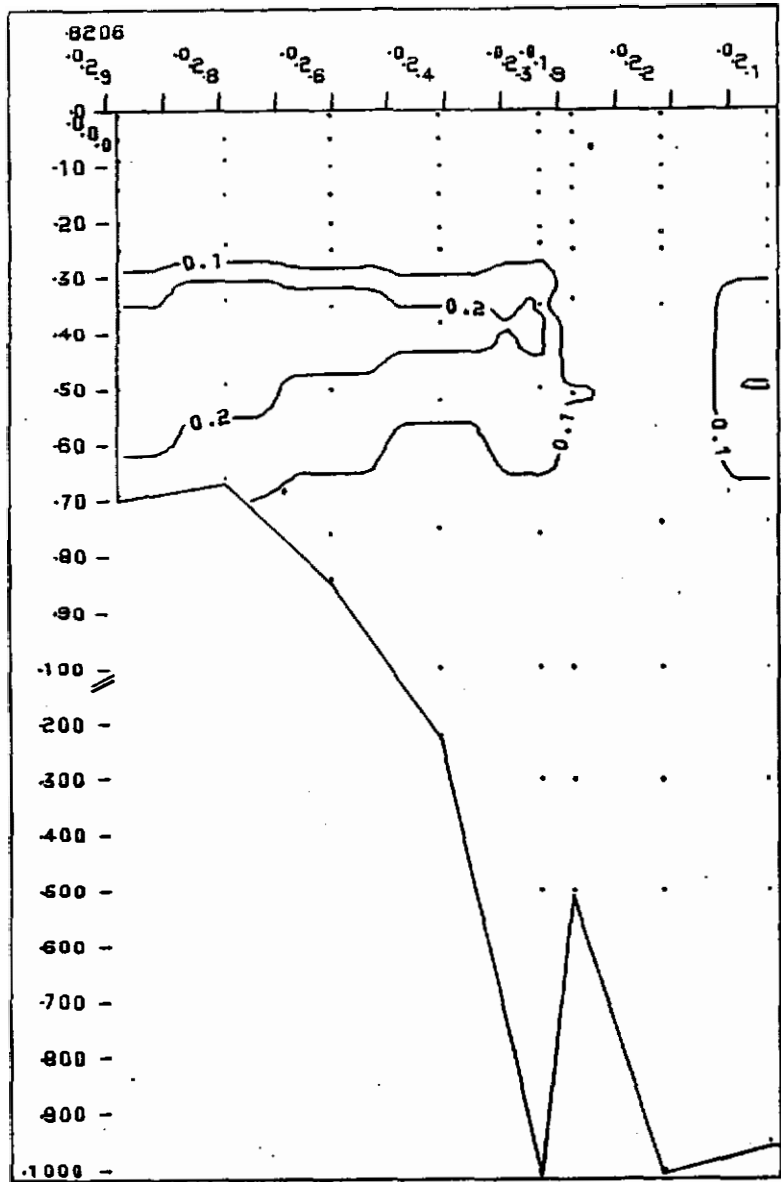
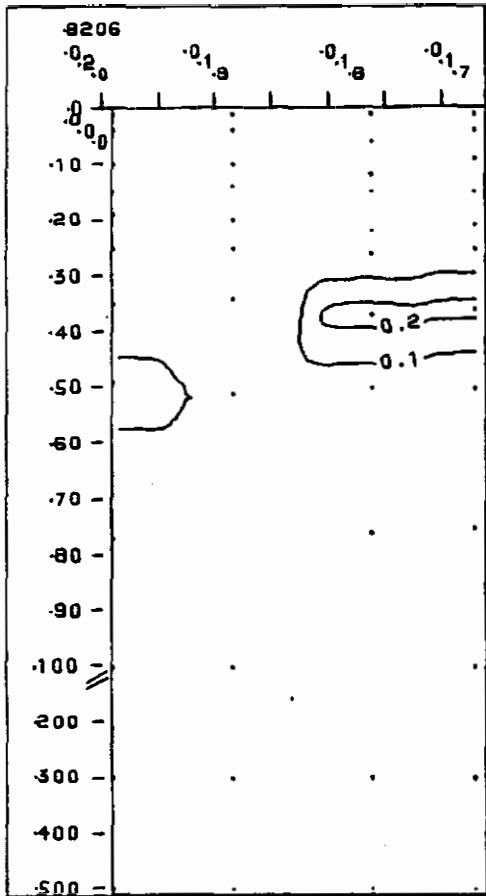
Phosphate (μM)



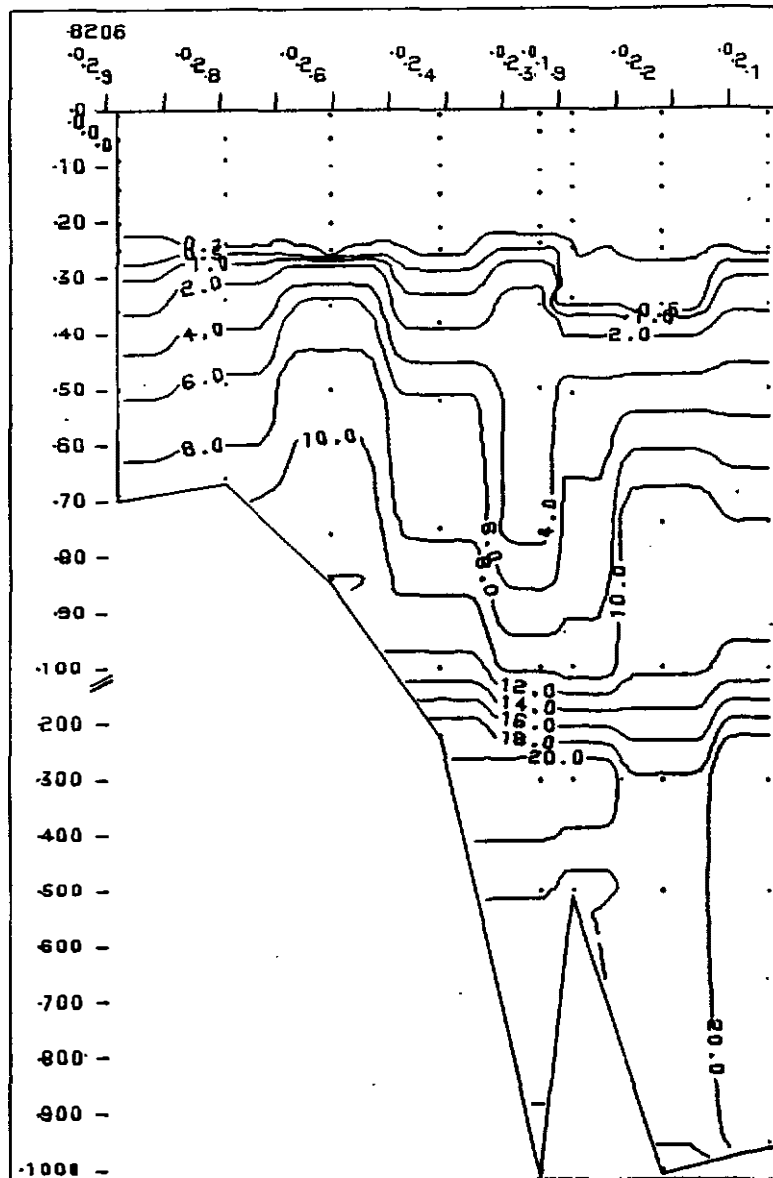
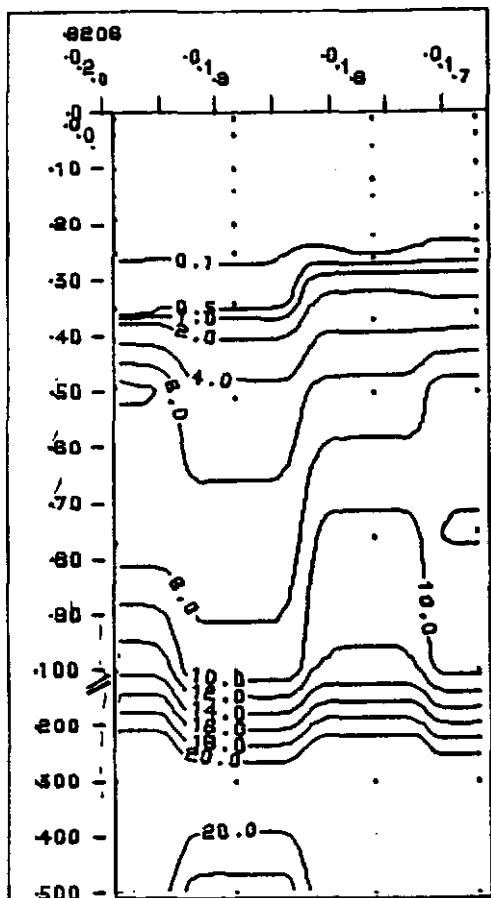
Silicate (μM)



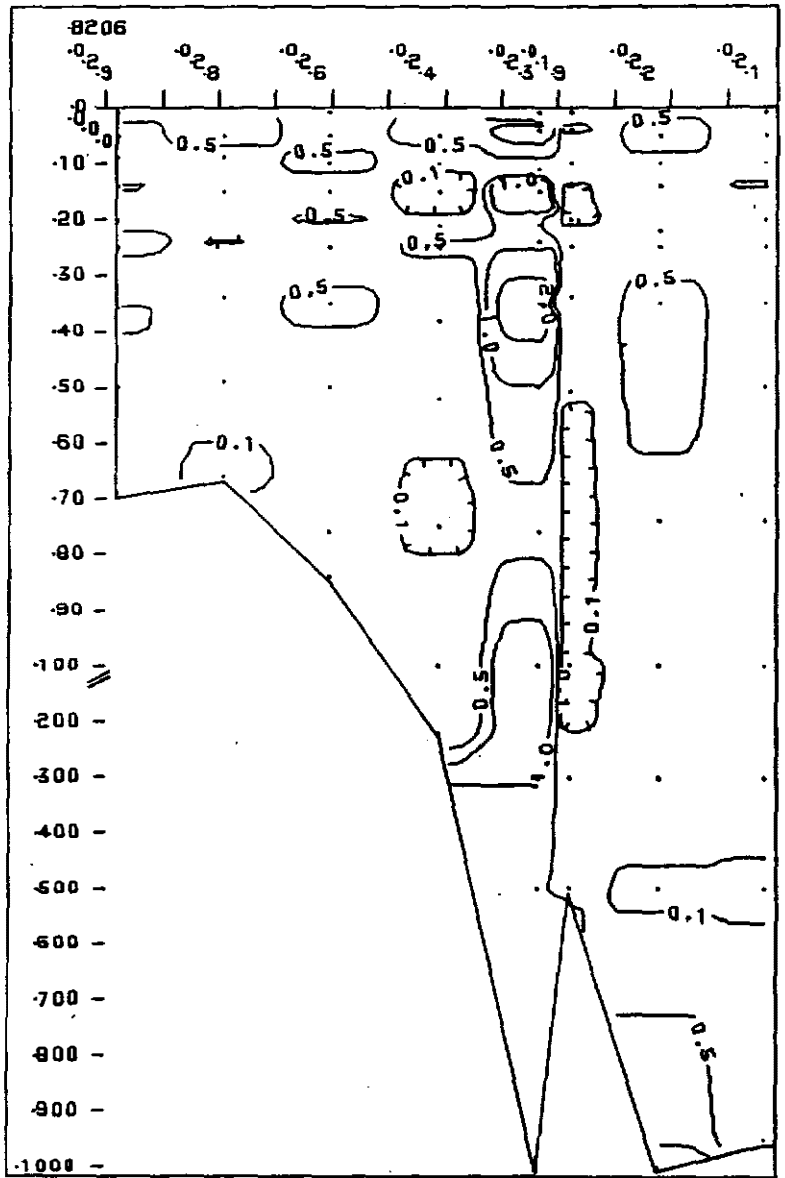
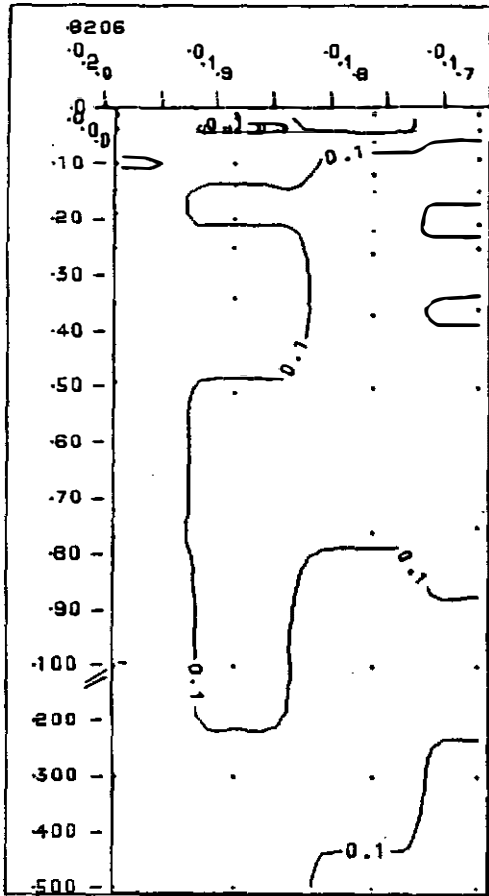
Nitrite (uM)



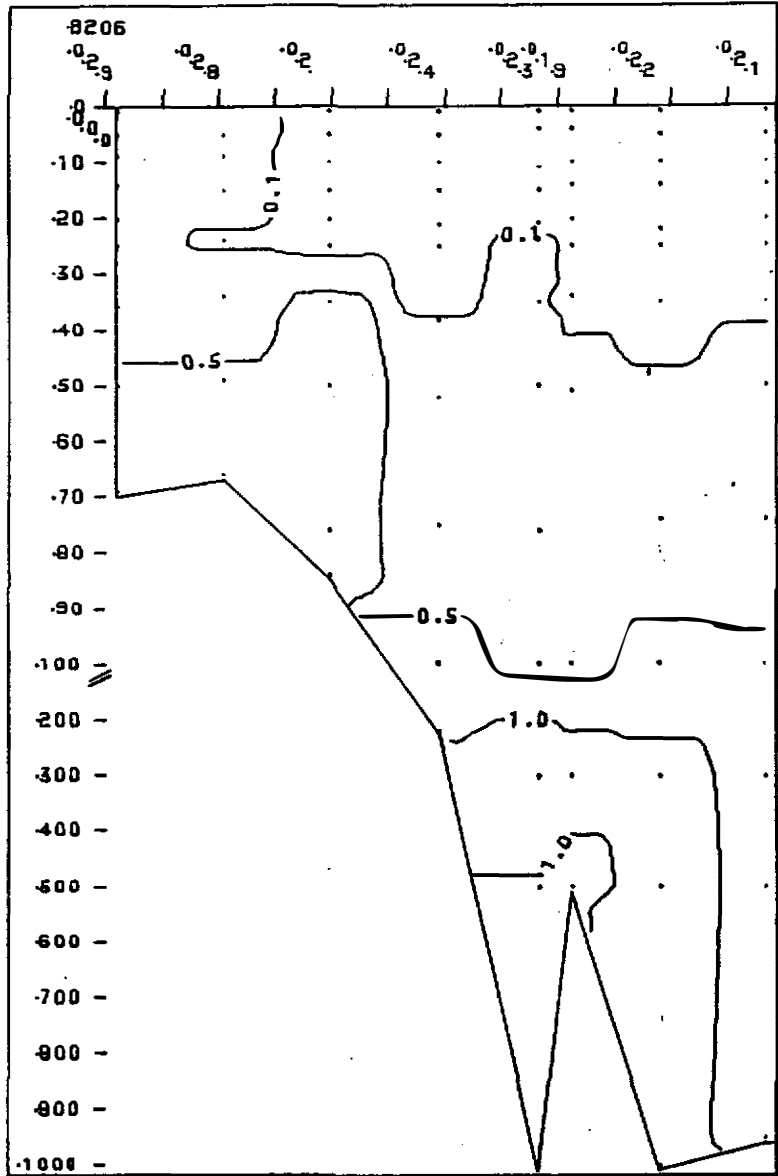
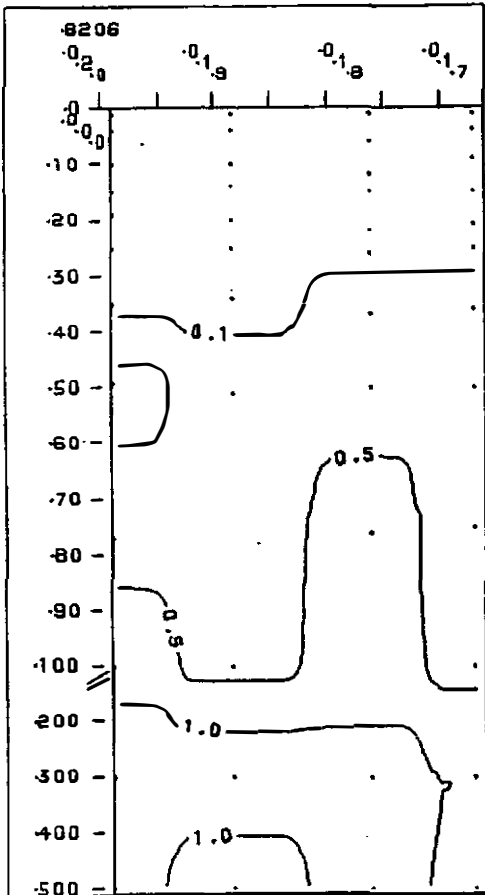
Nitrate (uM)



Ammonium (uM)



Phosphate (uM)



Silicate (uM)

