

WATER COLUMN ADENOSINE TRIPHOSPHATE

Paul A. La Rock
Florida State University

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The Adenosine Triphosphate (ATP) technique is present in Section IX. LABORATORY TECHNIQUES - METHODOLOGY; 1. WATER COLUMN STUDIES; 3. Total Living Biomass (including microbial) Analysis.

General Comments:

1. ATP surface values for tract Areas 1, 2, and 3 were equivalent to or twice the concentrations found in other areas of the Gulf of Mexico, the Florida Straights and the Caribbean. The normal range of ATP concentrations for surface samples (0-25m) in the open ocean range between 80 to 120 rig/l.
2. The mid-water and bottom ATP concentrations for Areas 1, 2, and 3 should be compared to the surface values of the open ocean because of the shallow depths of these stations. The mid-water and bottom concentrations for Stations 2 to 9 ranged between 100 to 300 rig/l. These values are equal to or three times the open ocean ATP surface concentrations.
3. Areas 4 and 5 are apparently subjected to heavy particulate or suspended silt burdens. My reasons for this statement are:
 - a) The cloudiness evident in the underwater photographs of Dr. Tom Hopkins.
 - b) The clogging of the membrane filters during sample preparation for ATP extraction.
 - c) The low extraction efficiencies for samples 10 through 15. Detrital and colloidal matter are known to adsorb ATP from solution lowering apparent recoveries (the efficiency of

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extraction is determined using internal standards).

The high ATP concentrations at Areas 4 and 5 are probably due to the concentration of microorganisms on the suspended particulate material. This phenomenon of microbial concentration on solid surfaces is well known. Some consideration should be given to determining the source of the suspended matter.

4. The ATP concentrations at some of the stations in Areas 4 and 5 are from 1 to 2 orders of magnitude greater than open ocean concentrations and 10 to 15 times those found in Areas 1, 2, and 3 (exclusive of the extremely high values at mid-depth at Station 14 and at the surface at Station 15).
5. The vertical distribution of ATP in Area 5 suggests some sort of stratification occurring.
6. Control Station 4 does not appear to reflect in any way the conditions in Areas 4 and 5.

Water Column ATP Concentrations

Station	Uncorrected ATP, rig/l	Extraction Efficiency ^a	Corrected ^b ATP, rig/l
1-surface	44	83%	53
mid-depth	50		60
bottom	78		94
2-surface	128*	70%	183
mid-depth	133 ⁺		190
bottom	207		296
3-surface	219	87%	252
mid-depth	119		137
bottom	176		202
4-surface	108	94%	115
mid-depth	143		152
bottom	213		227
5-surface	202*	100%	202
mid-depth	420* ^c		420
bottom	150		150
b-surface	307	100%	30
mid-depth	181		181
bottom	206		206
7-surface	138	93%	148
mid-depth	172		185
bottom	212		228
8-surface	87	100%	8
mid-depth	155		155
bottom	138		138
9-surface	175	100%	175
mid-depth	110		110
bottom	115		115
10-surface	207	62%	334
mid-depth	238		384
bottom	597		963
n-surface	619	50%	1,238
mid-depth	733		1,466
bottom	1,000		2,000
12-surface	550*	16%	3,347
mid-depth	226		1,412
bottom	210		1,312

Water Column ATP Continued

Station	Uncorrected ATP, rig/l	Extraction Efficiency ^a	Corrected ^b ATP, rig/l
13	No Samples Collected		
14-surface.	16	20%	80
mid-depth	1,667		8,335
bottom	307		1,535
15-surface	1,342	11%	12,198
mid-depth	393		3,573
bottom	220		2,000
C1-surface	51	63%	81
mid-depth	107		170
bottom	105		167
C2-surface	141	100%	141
mid-depth	194		194
bottom	284		284
C3-surface	376	Undetermined	
mid-depth	784		
bottom	11/		
C4-surface	713	28%	2,546
mid-depth	173		618
bottom	133		475

a - Determined by the addition of an ATP standard to one of triplicate samples. Compensates for adsorption of ATP to detrital material and ionic interference in the ATP assay.

b - Uncorrected ATP value divided by the efficiency.

c - This value is based on a single sample that had an ATP content greater than the sample containing the internal standard. The extraction efficiency must be taken as 100% in this case.

* Indicates where only a single sample was measured.

+ Indicates the ATP value based on triplicate measurements.

All other ATP values are the average of duplicate measurements.