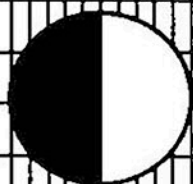


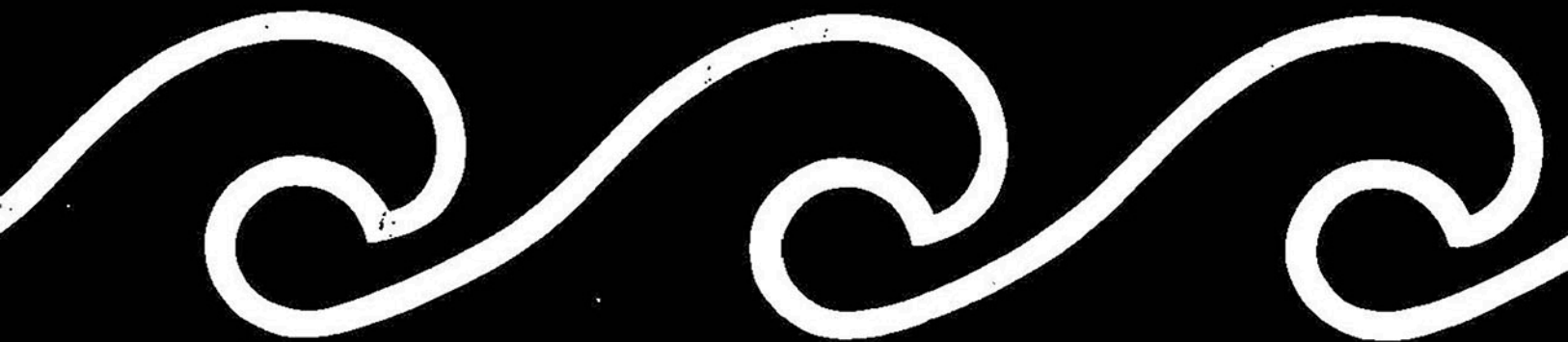
**INSTITUTO DE GEOFISICA**



**Calendario Gráfico**  
**de Mareas**



**1988**



**San Carlos, B.C.S.**  
**Cabo San Lucas, B.C.S.**

## CALENDARIO GRAFICO DE MAREAS, 1988

SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.

El conocimiento y predicción de las mareas en San Carlos es de vital importancia en la navegación de altura y cabotaje, así como para la pesca de las diferentes especies, debido a las fuertes corrientes ocasionadas por el flujo y reflujo de las aguas al introducirse por los diferentes canales.

La información mareográfica necesaria para el cálculo de las constantes armónicas utilizadas para la predicción de las mareas, fue obtenida por medio de un mareógrafo automático estándar instalado en octubre de 1967 durante el levantamiento efectuado para la elaboración del Portulano de San Carlos. Dicho mareógrafo fue instalado en colaboración entre el Instituto de Geofísica de la U.N.A.M. y la Dirección General de Oceanografía y Señalamiento Marítimo, Secretaría de Marina. La batimetría del Portulano de San Carlos (SM-227), esta referida al mismo plano de referencia del Calendario Gráfico de Mareas (nivel de bajamares medias inferiores).

### REGIMEN DE MAREAS:

El régimen de mareas para Bahía Magdalena y San Carlos es mixto semidiurno, la marea se propaga a San Carlos a través de los diferentes canales, provocando fuerte corriente de marea que llega a alcanzar velocidades máximas de hasta 3 nudos.

### TIEMPO:

La hora usada para la predicción de mareas para San Carlos, B.C.S., es la del meridiano 105° W. Se cuentan desde las 00 horas que corresponden a la media noche.

### PLANO DE REFERENCIA:

El plano de referencia que esta bajo el nivel medio del mar, al cual están referidas las alturas, es el nivel de bajamar media inferior.

SAN CARLOS, B.C.S. = 2.9 pies (0.88 m).

CABO SAN LUCAS, B.C.S. = 2.1 pies (0.64 m).

Ing. Fco. Grivel Piña  
Instituto de Geofísica,  
U.N.A.M.

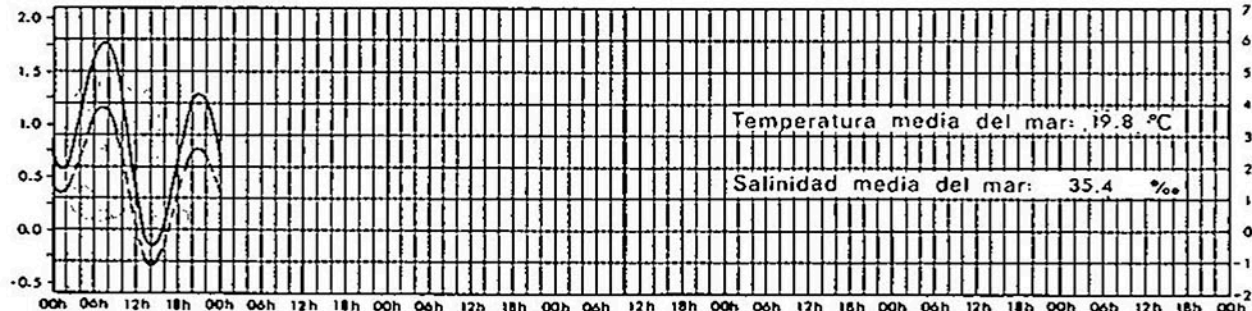
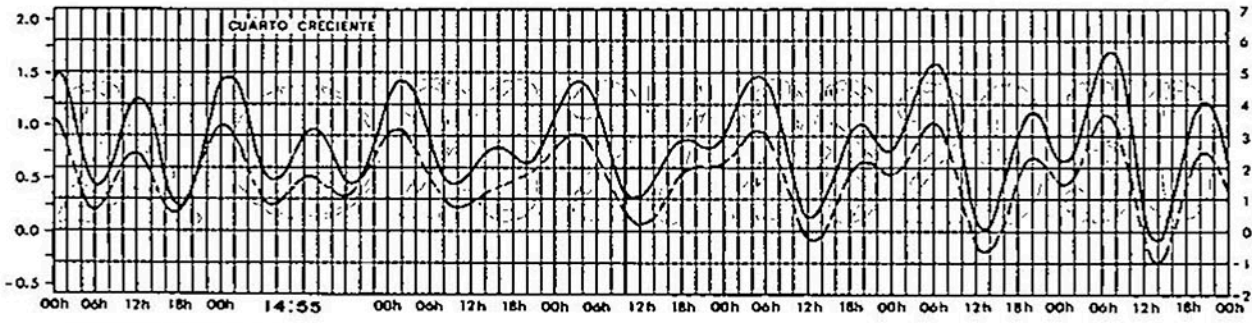
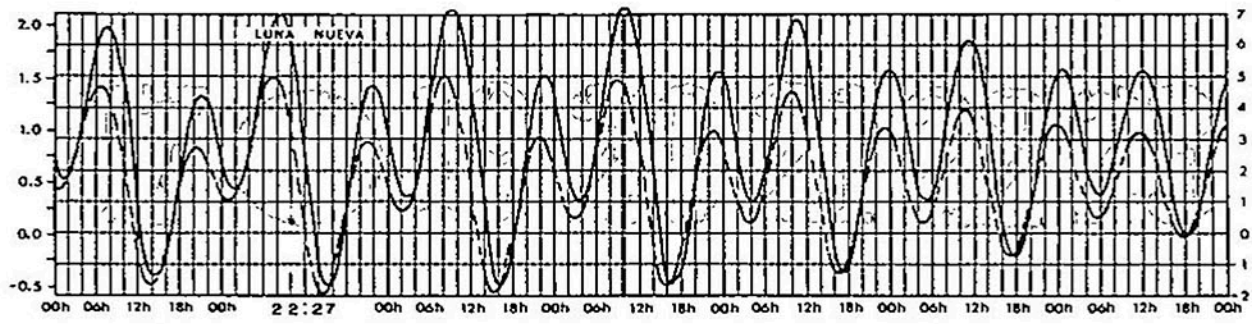
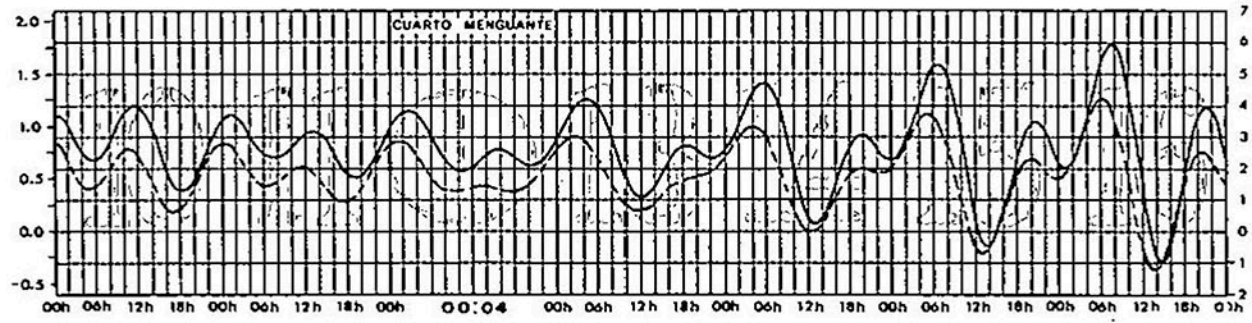
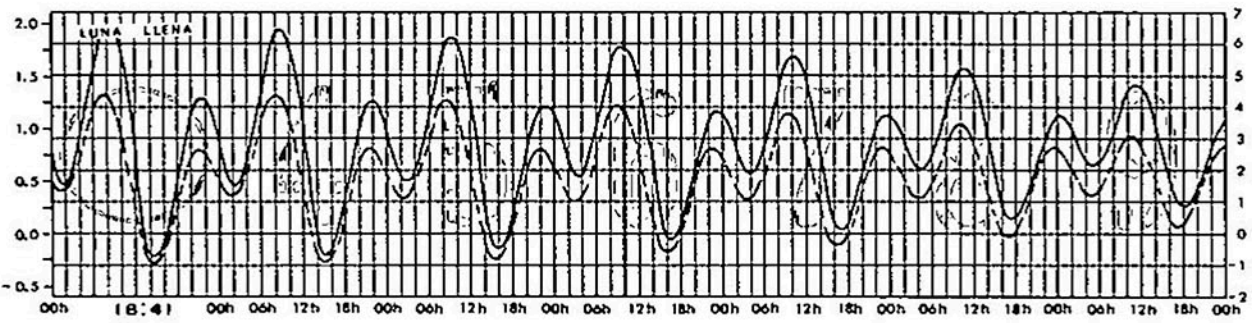
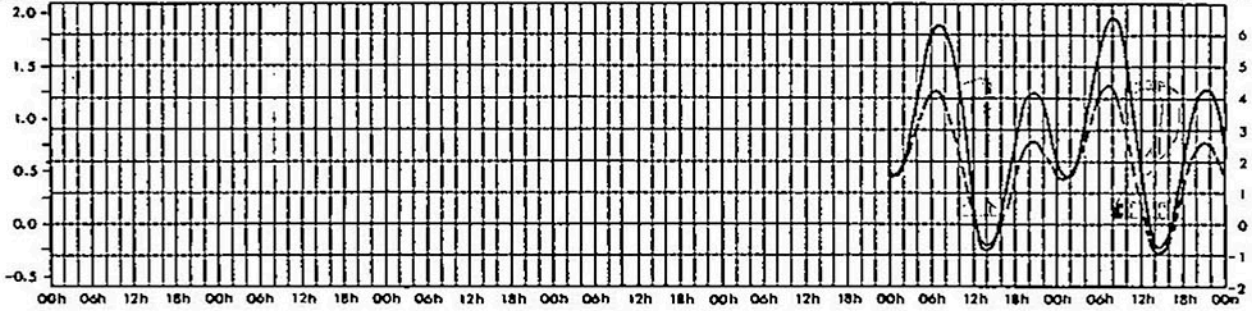


# ENERO 1988

SAN CARLOS, B.C.S.  
CABO SAN LUCAS, B.C.S.

INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



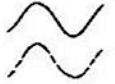
Temperatura media del mar: 19.8 °C  
Salinidad media del mar: 35.4 ‰

2013-40  
(1-2)

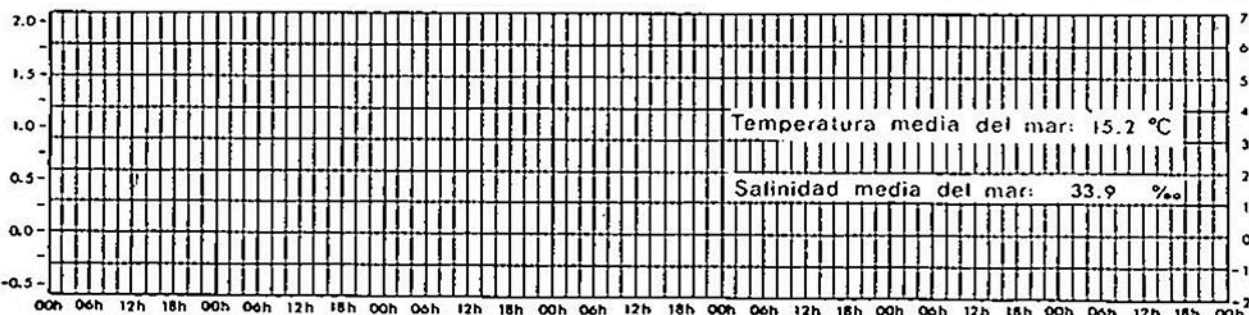
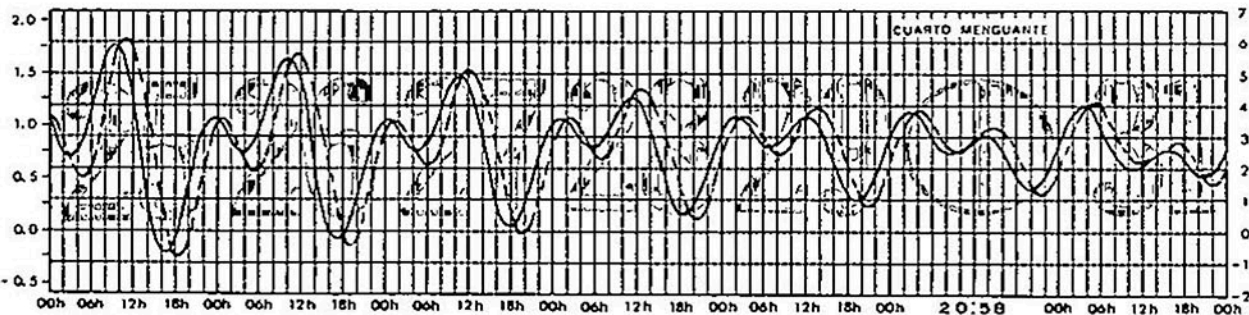
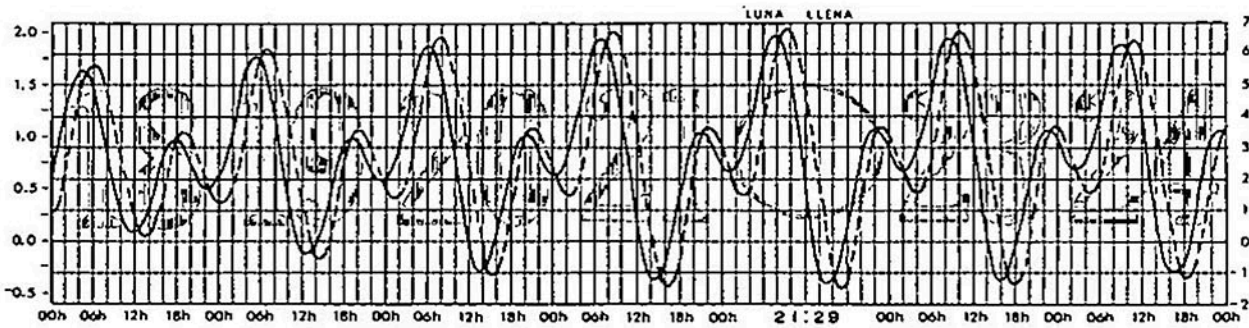
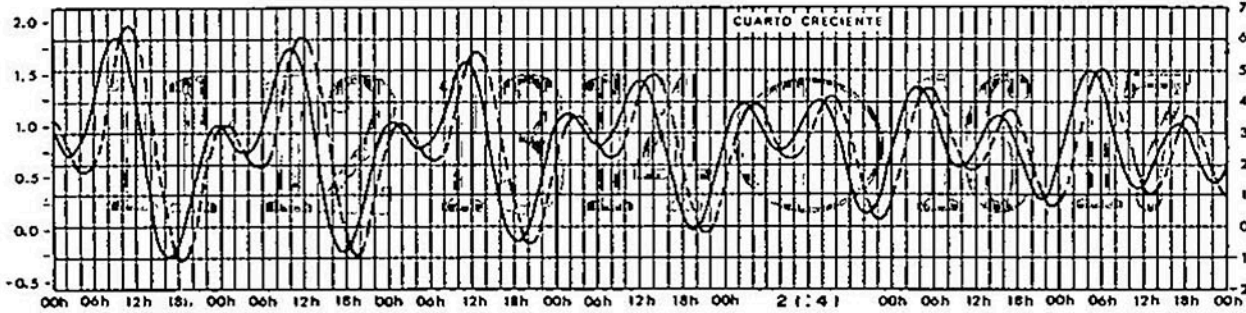
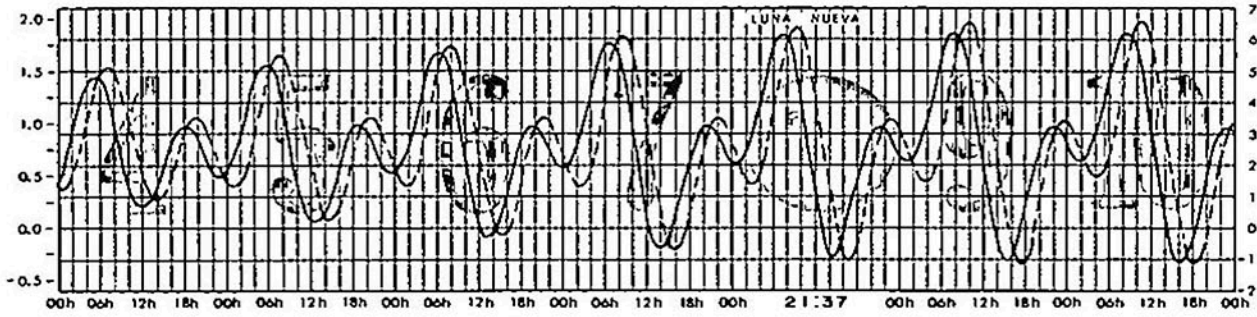
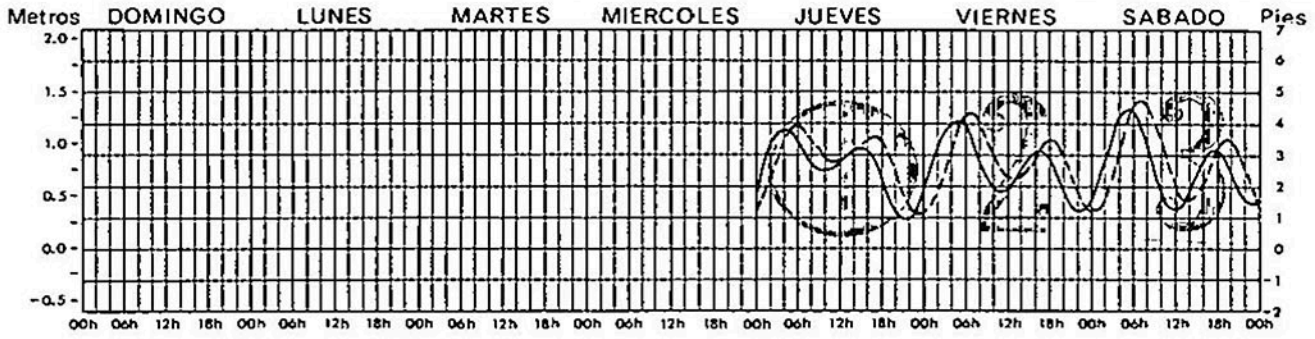


# DICIEMBRE 1988

ENSENADA, B.C.N.  
GRO. NEGRO, B.C.N.



INSTITUTO DE GEOFISICA, U. N. A. M.



HORA DEL MERIDIANO 120° W

PLANO DE REFERENCIA: N.B.M.I.

Temperatura media del mar: 15.2 °C

Salinidad media del mar: 33.9 ‰



# FEBRERO 1988

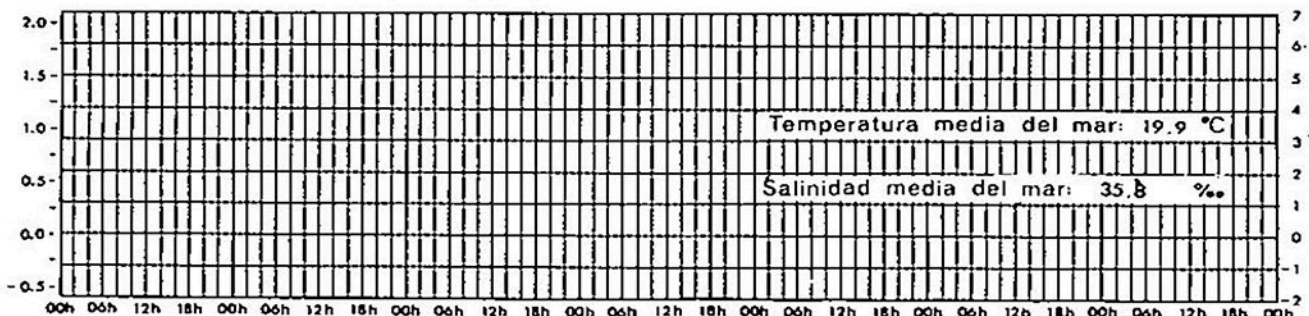
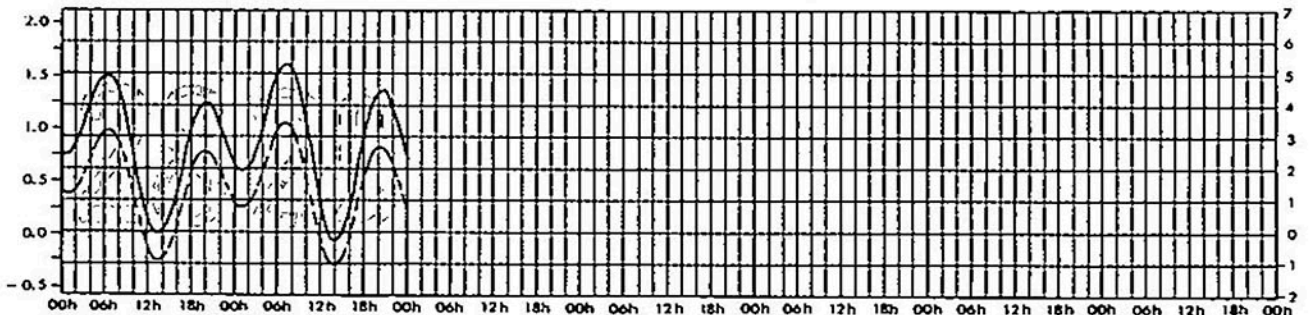
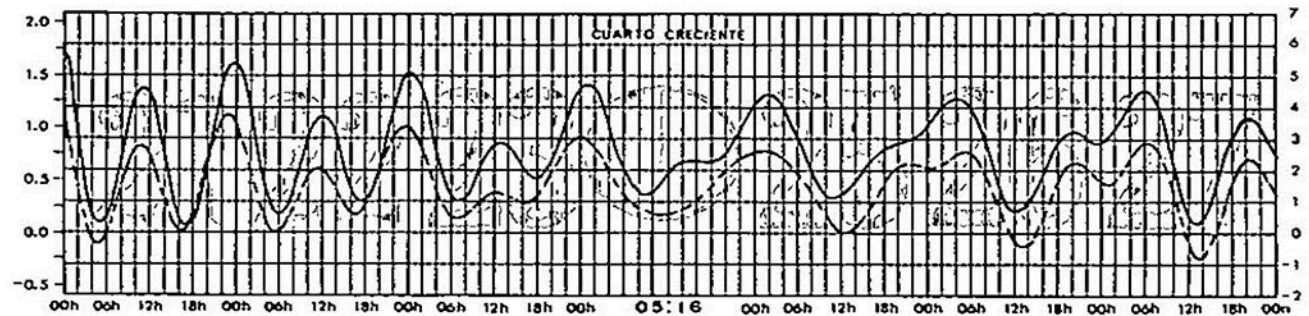
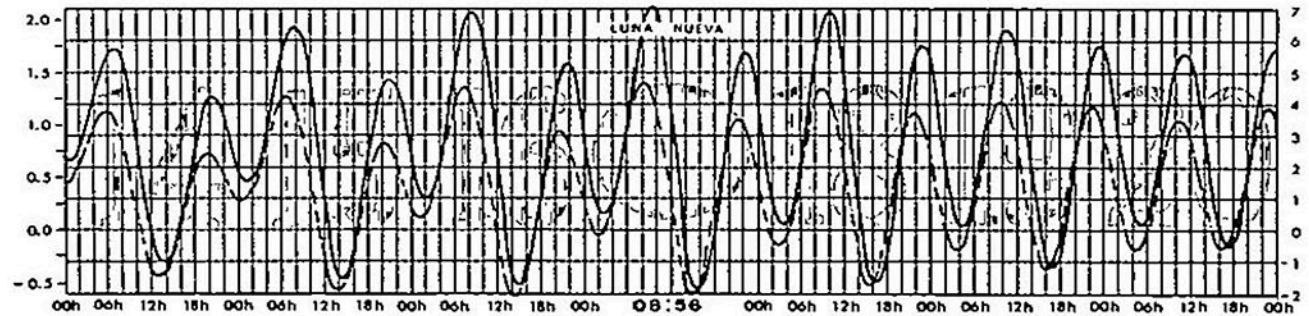
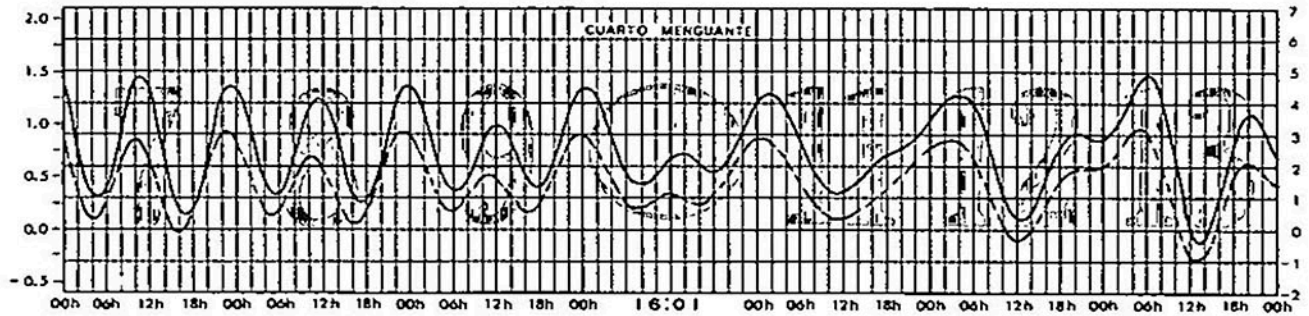
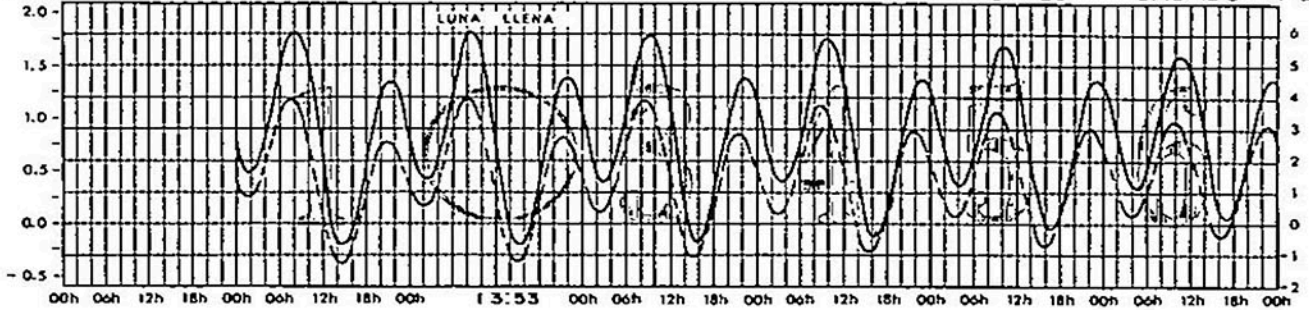
SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.

INSTITUTO DE GEOFISICA, U. N. A. M.



Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



HORA DEL MERIDIANO 105° W

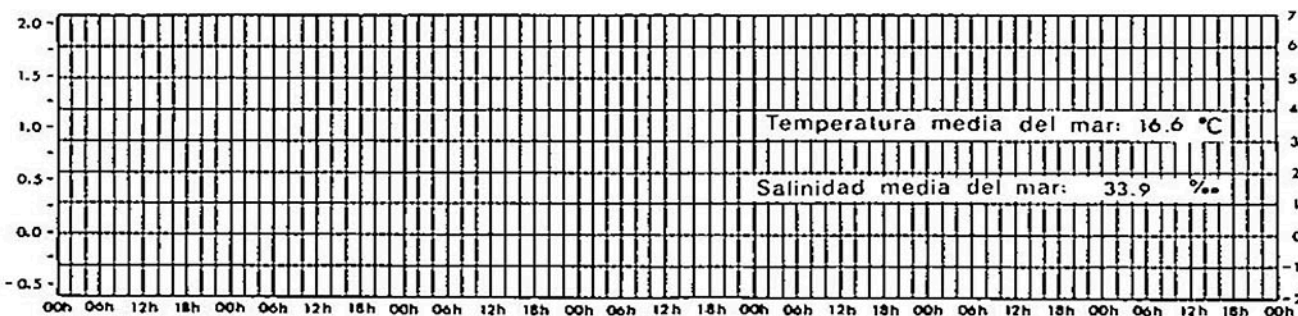
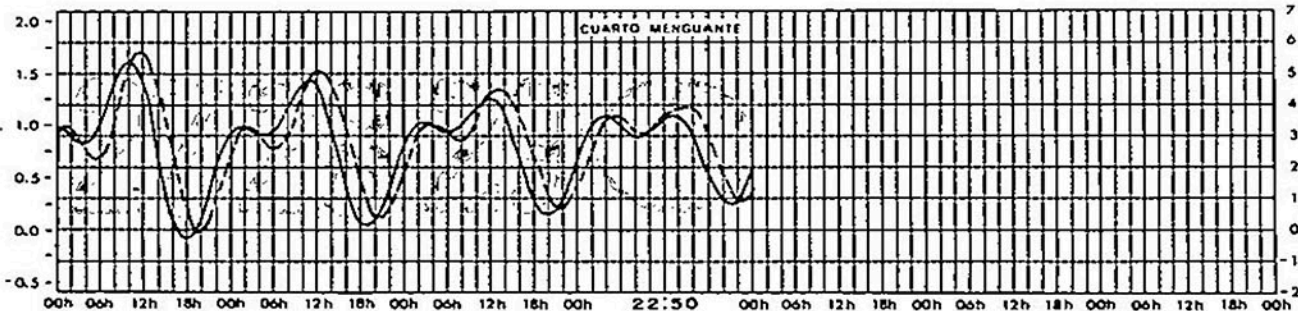
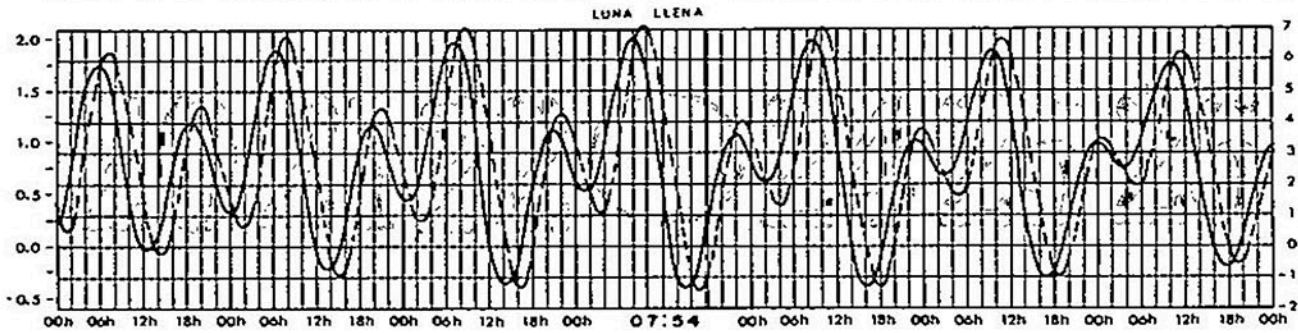
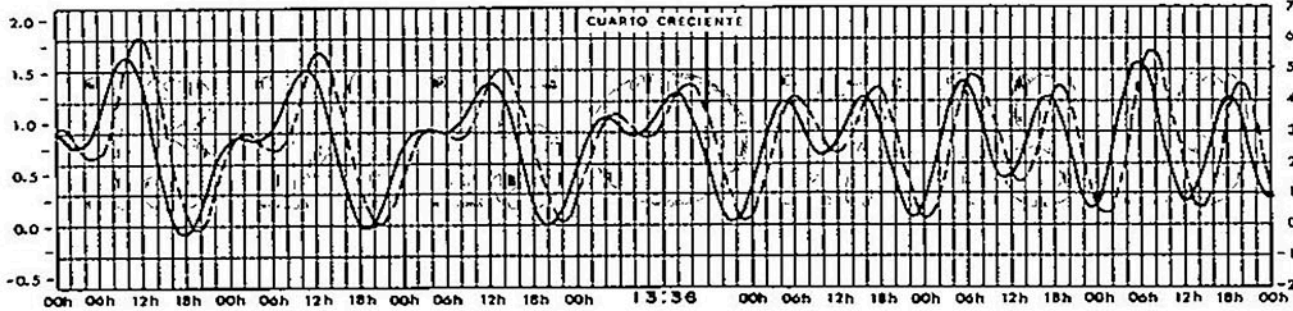
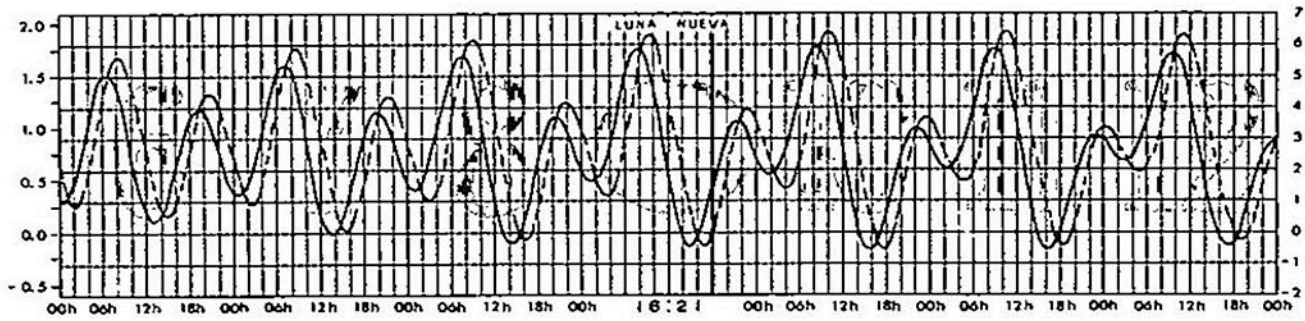
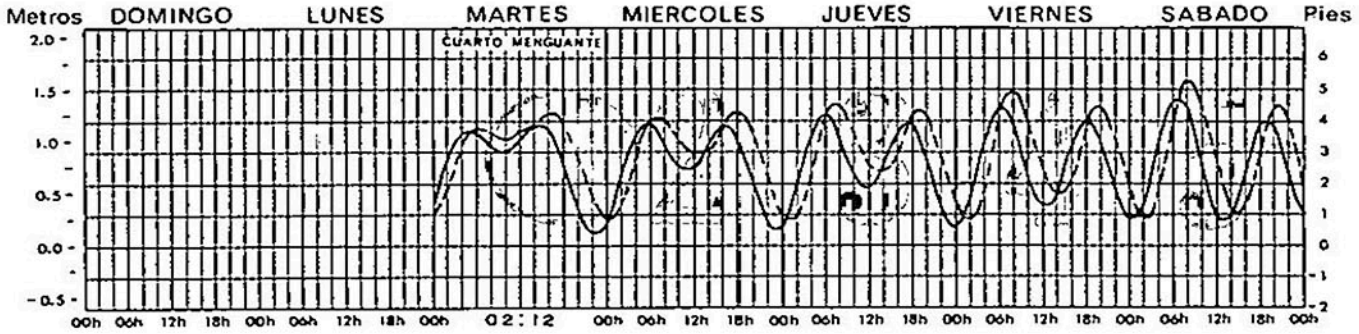
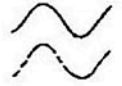
PLANO DE REFERENCIA: N. D. M. I.



# NOVIEMBRE 1988

INSTITUTO DE GEOFISICA, U. N. A. M.

ENSENADA, B. C. N.  
GRO. NEGRO, B. C. N.





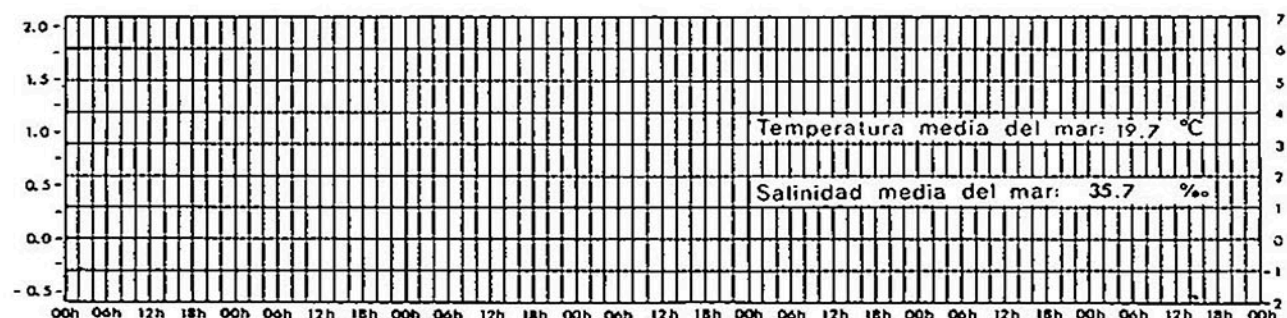
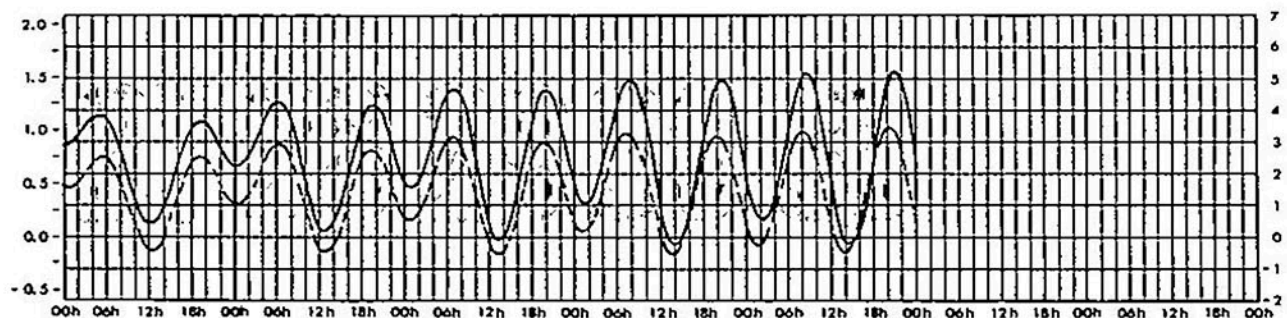
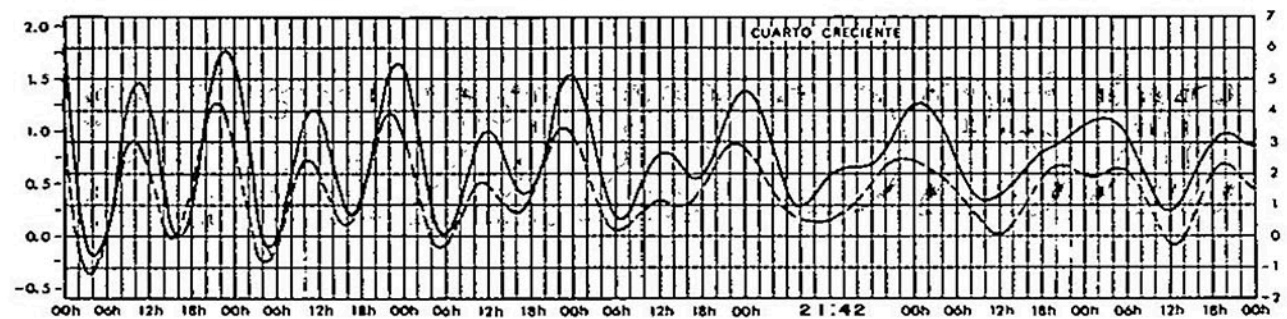
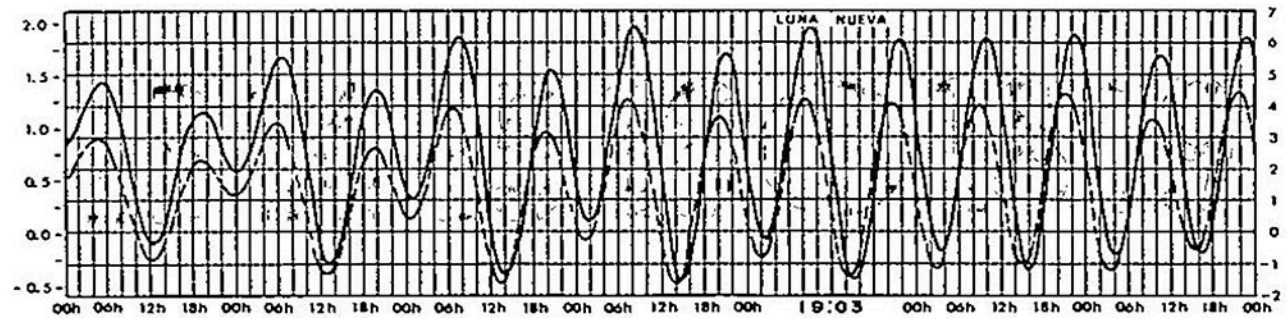
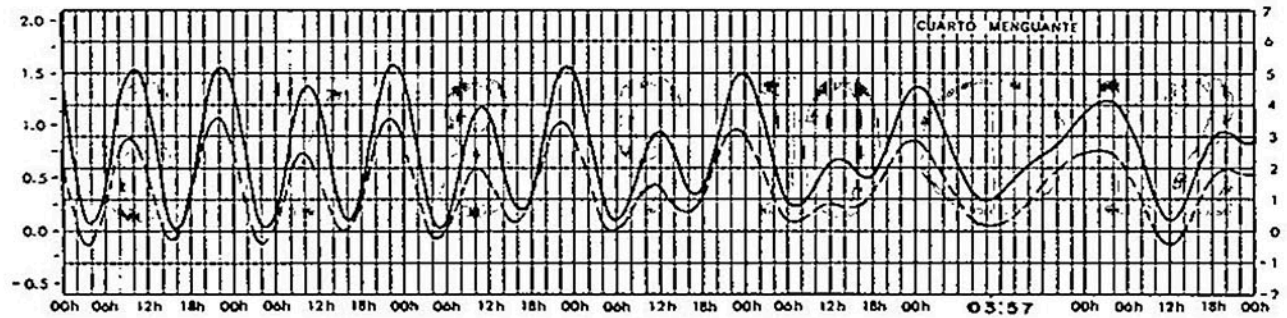
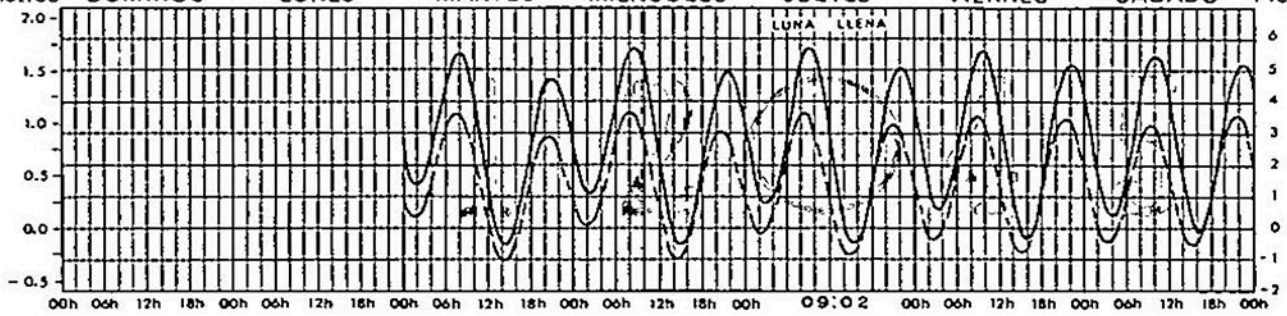
# MARZO 1988

SAN CARLOS, B.C.S.  
CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies





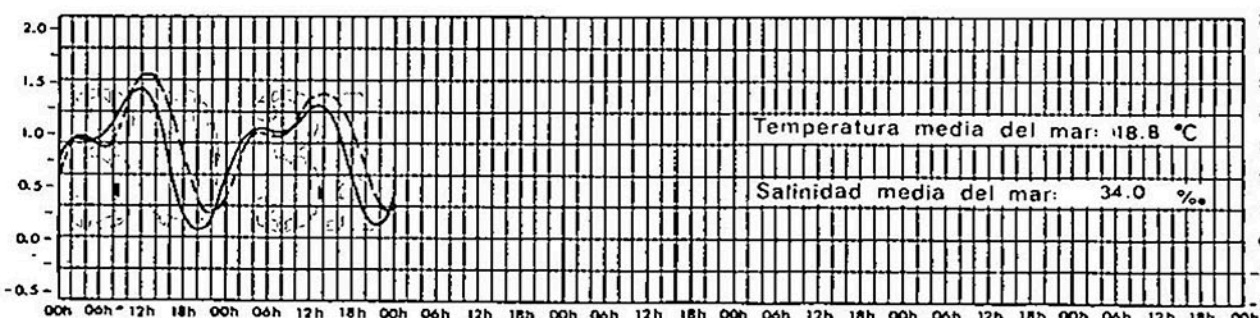
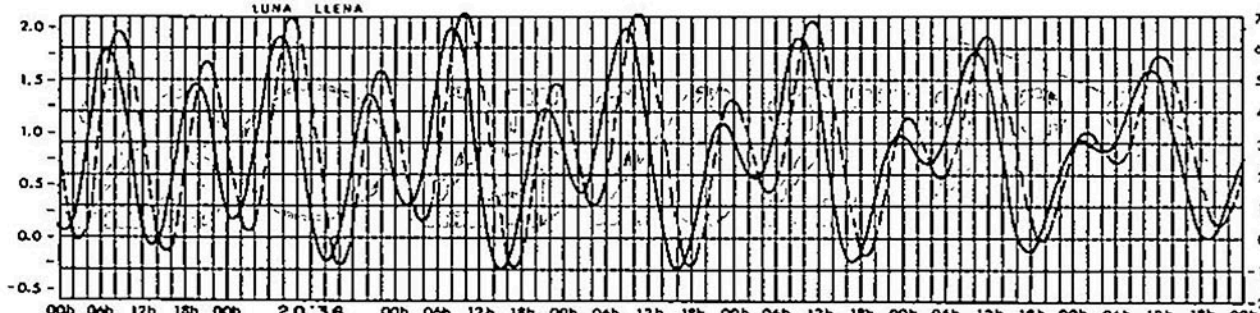
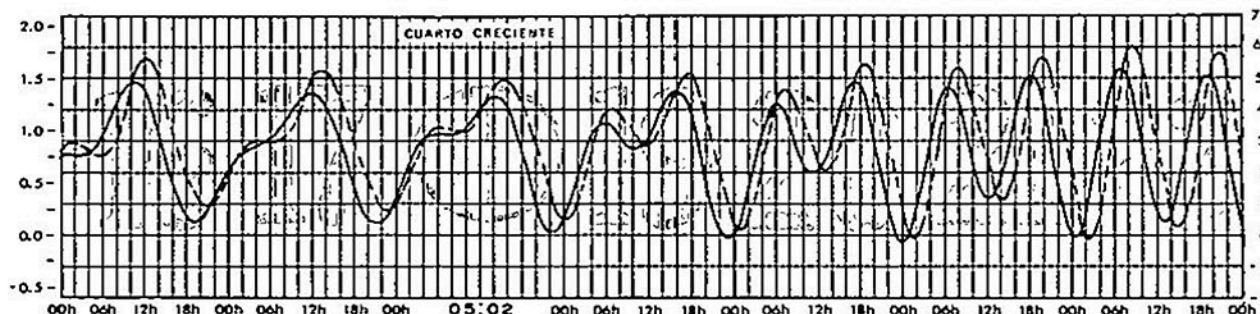
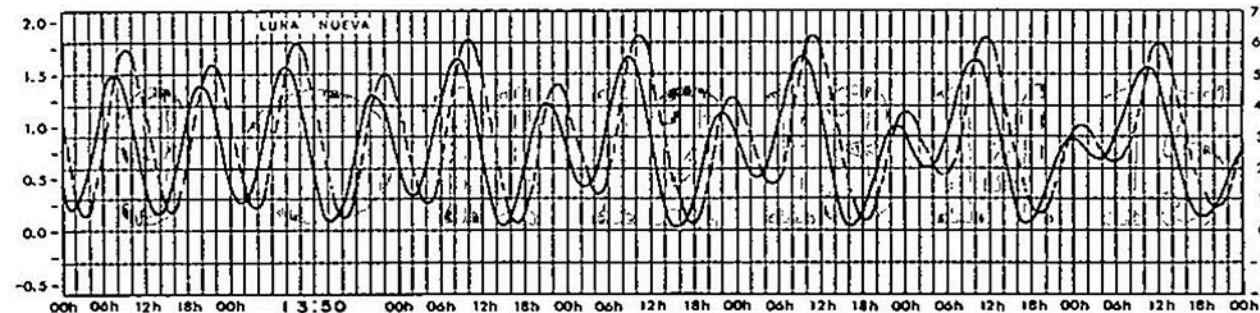
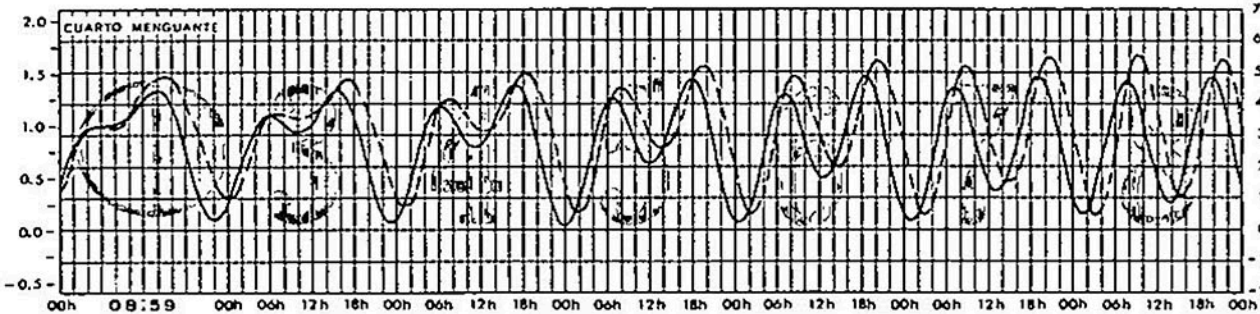
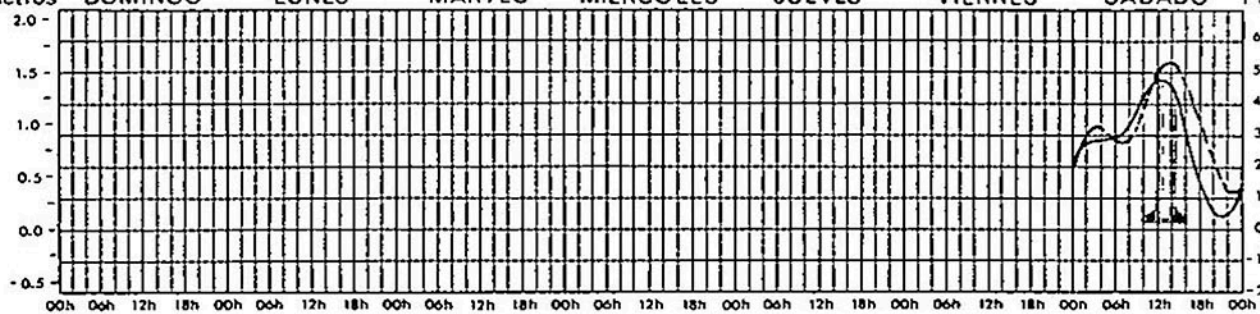
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ENSENADA, B.C.N.  
GRO. NEGRO, B.C.N.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies







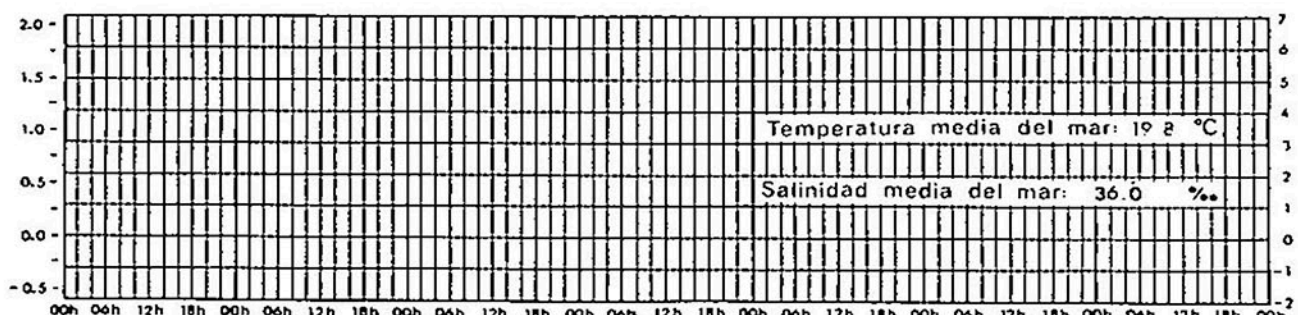
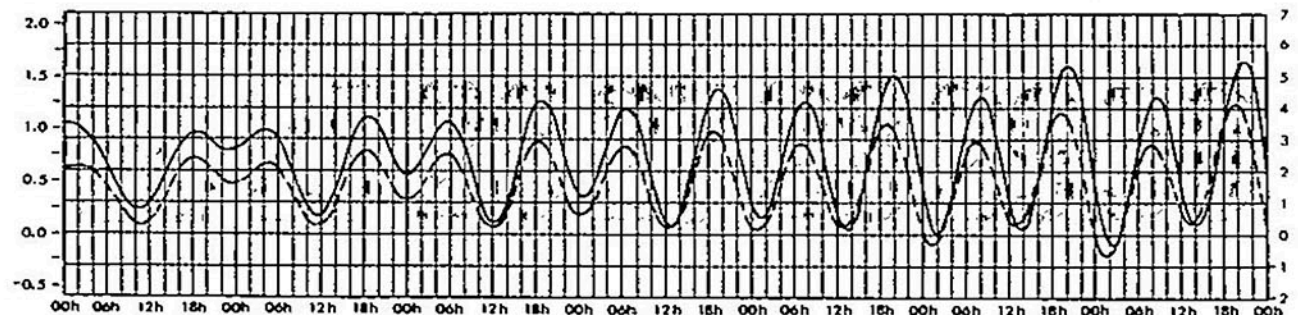
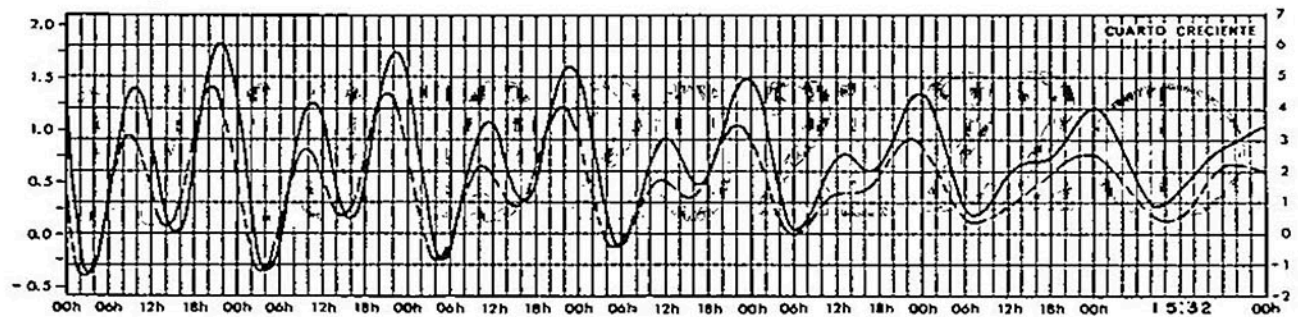
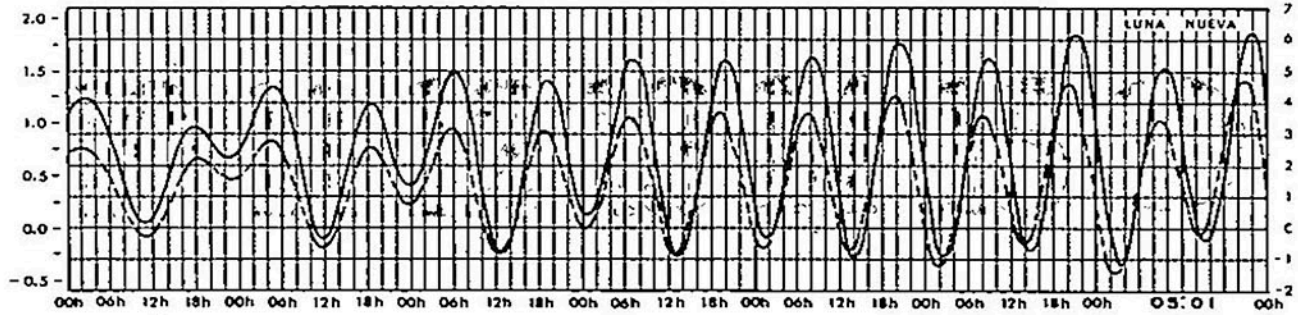
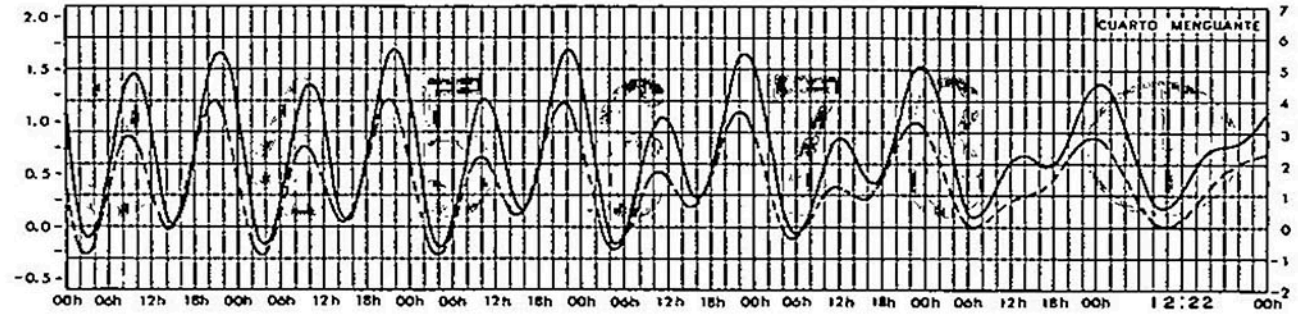
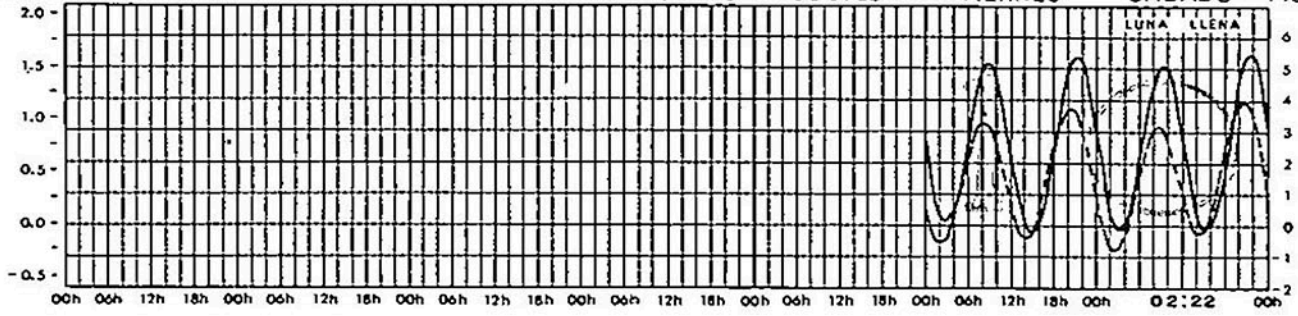
# ABRIL 1988

SAN CARLOS, B.C.S.  
CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies





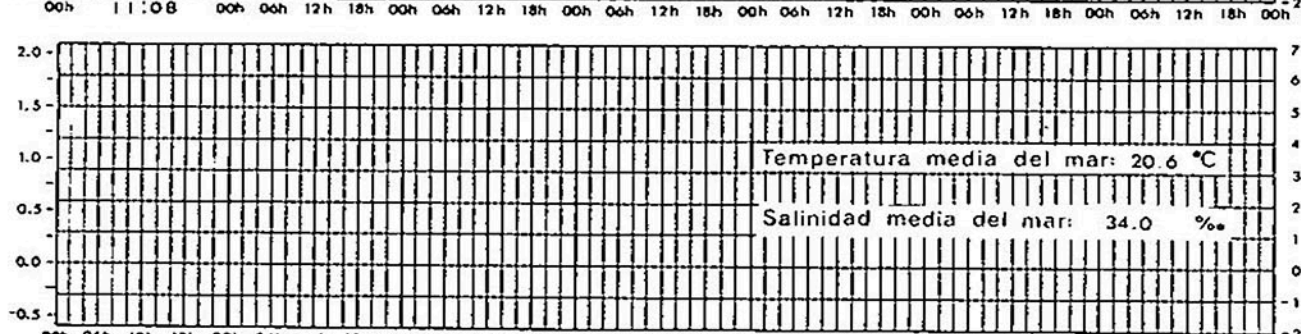
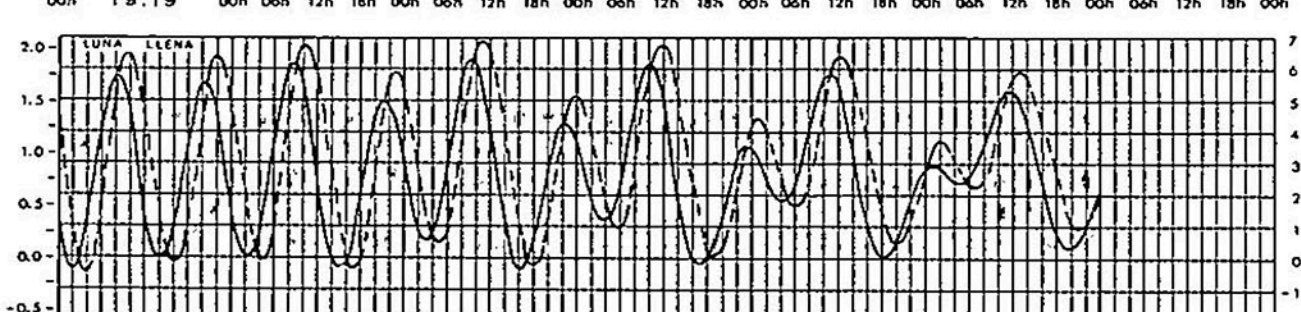
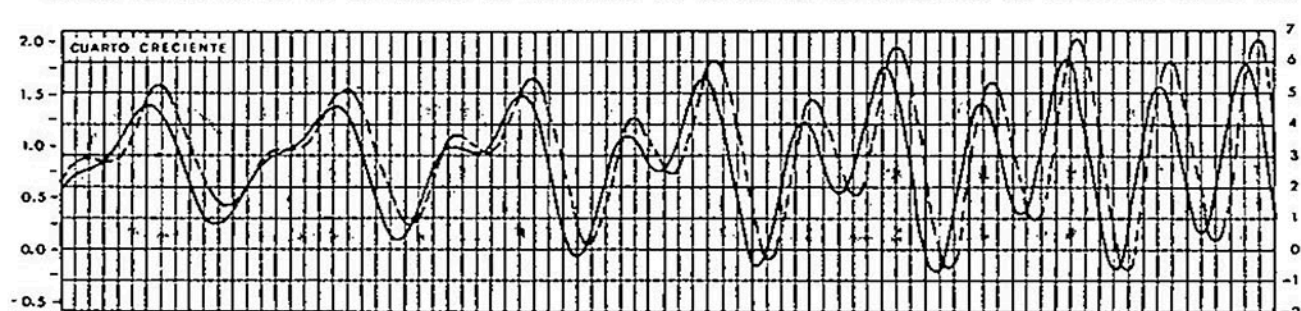
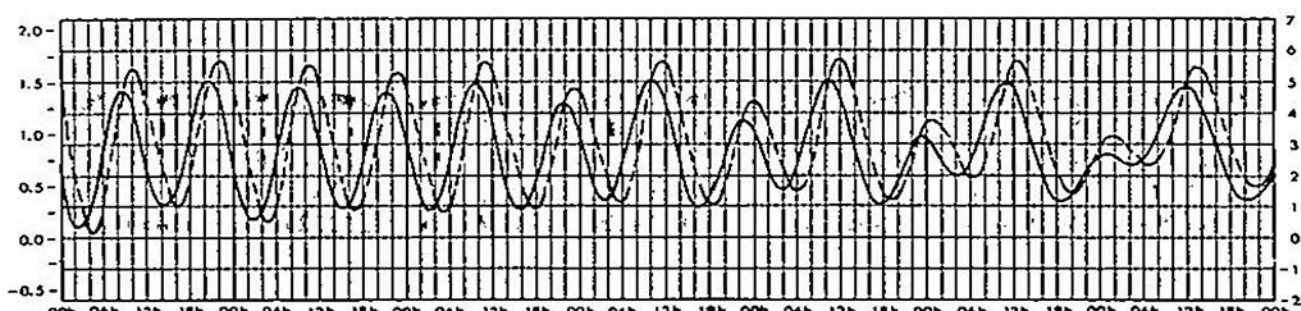
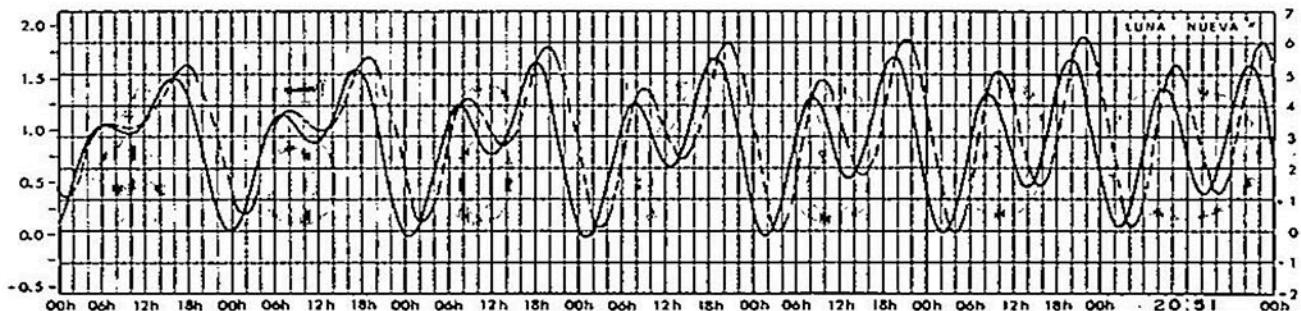
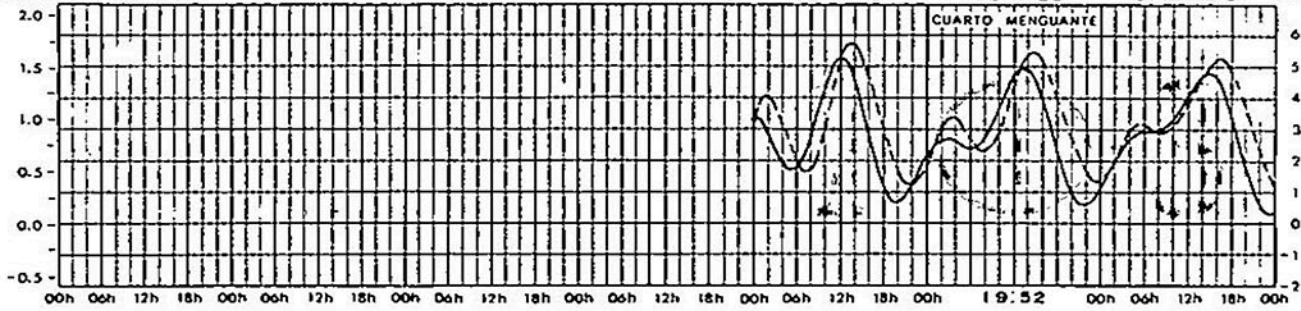
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INSTITUTO DE GEOFISICA, U. N. A. M.

ENSENADA, B. C. N.  
GRO. NEGRO, B. C. N.



Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies





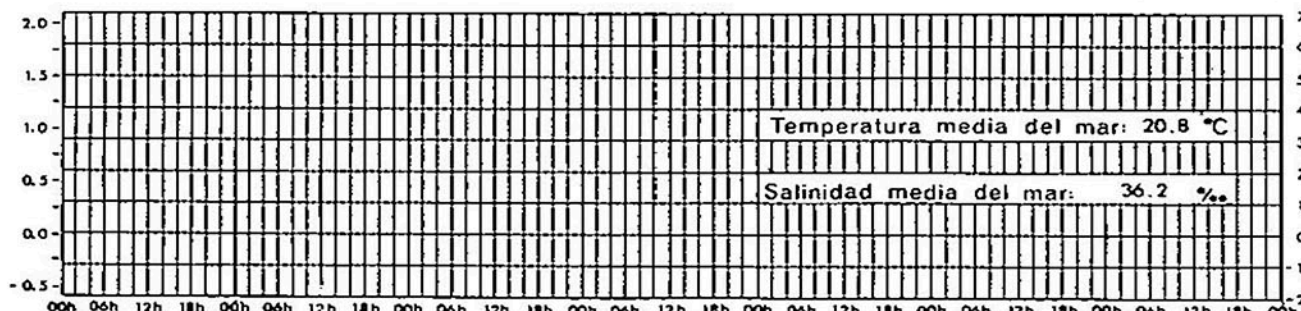
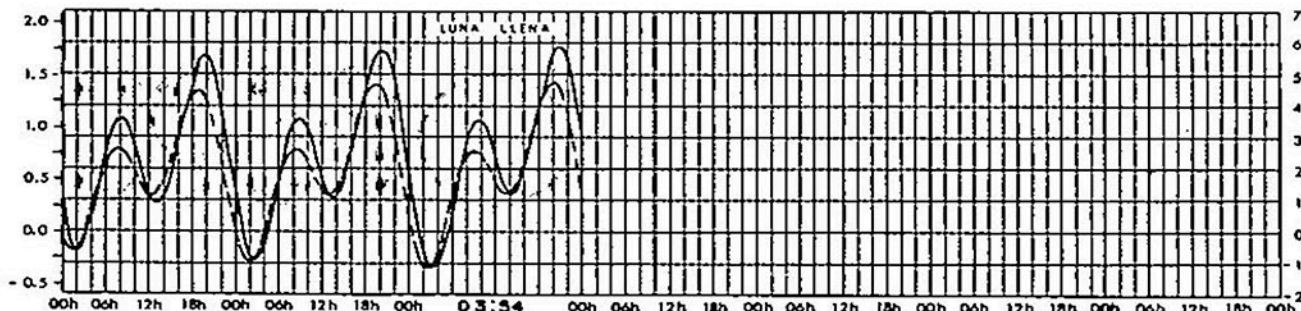
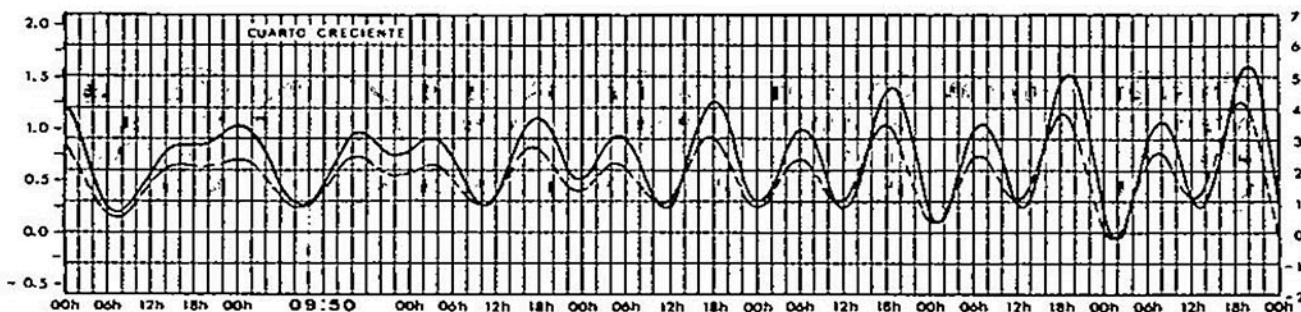
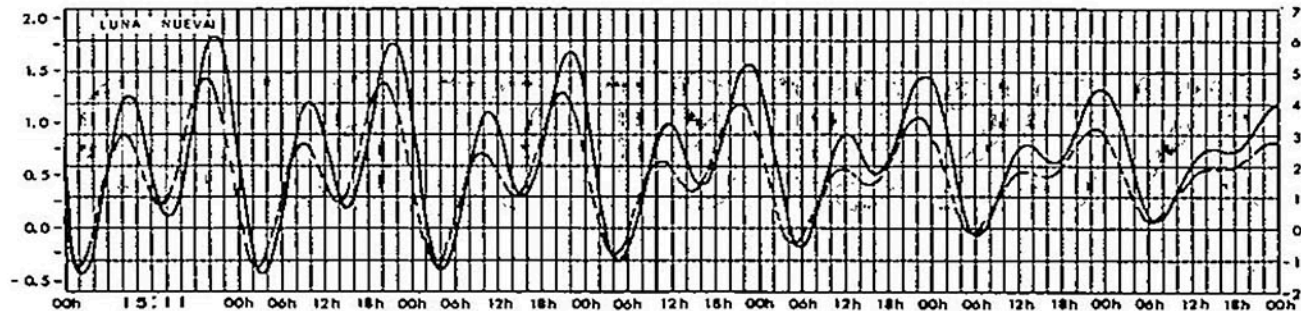
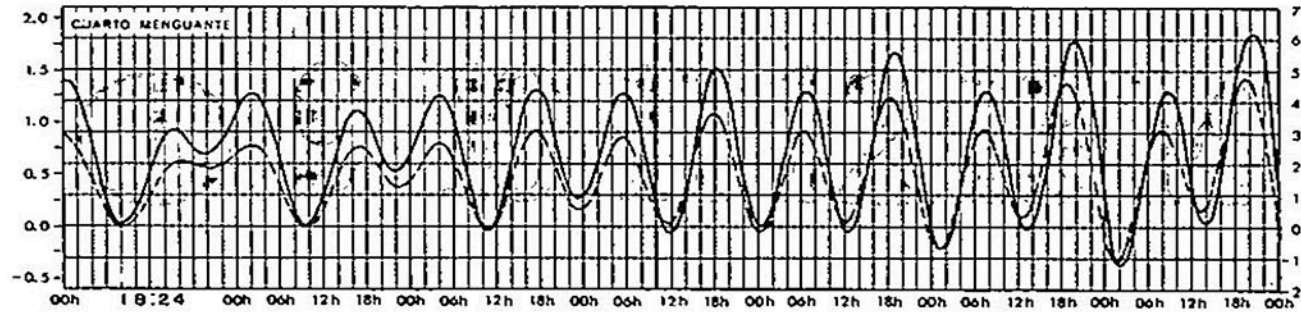
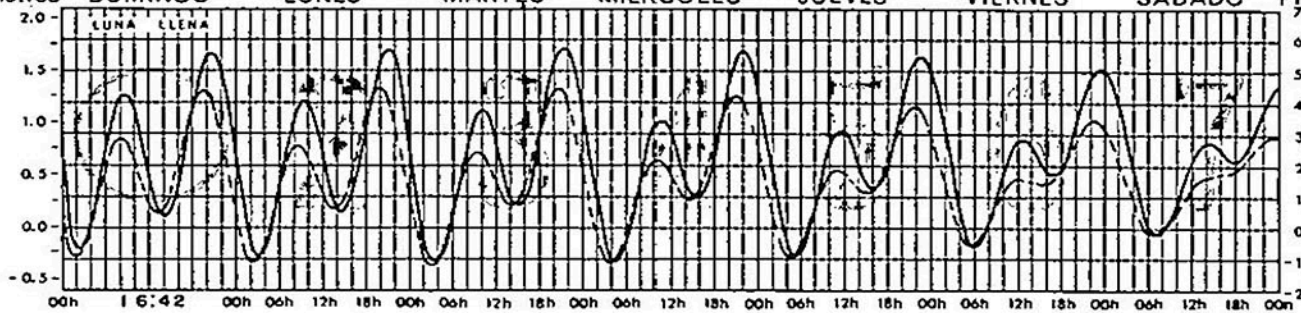
# MAYO 1988

SAN CARLOS, B.C.S.  
CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



Temperatura media del mar: 20.8 °C

Salinidad media del mar: 36.2 ‰

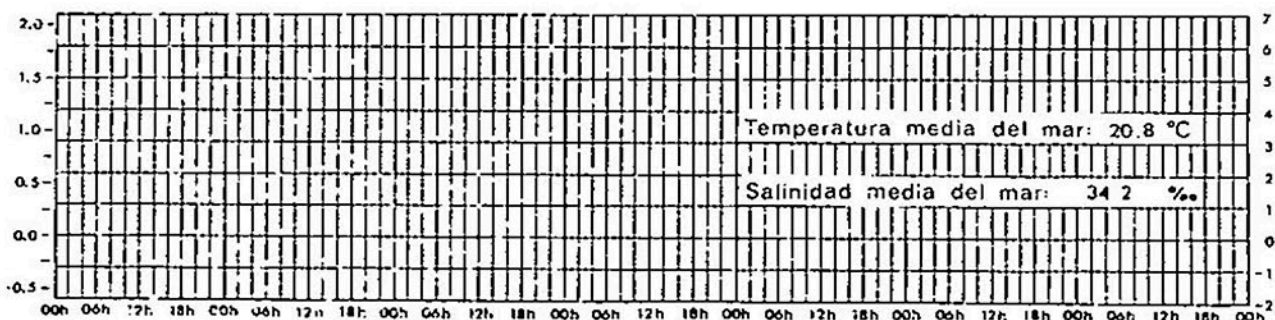
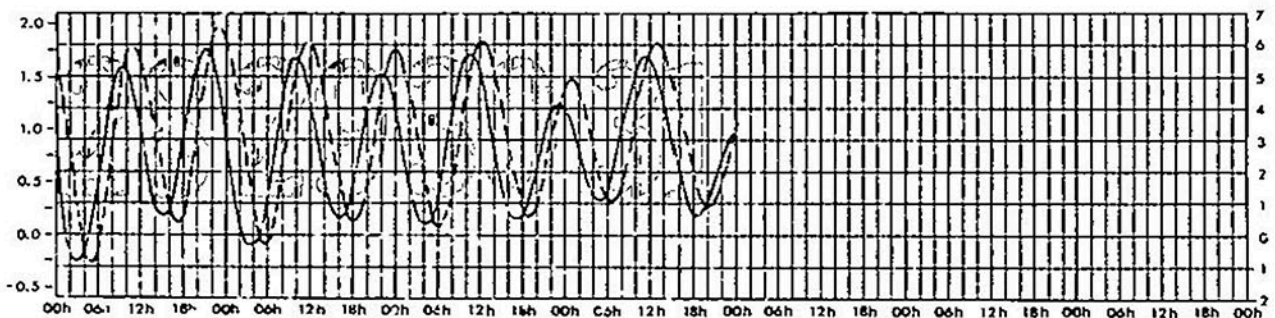
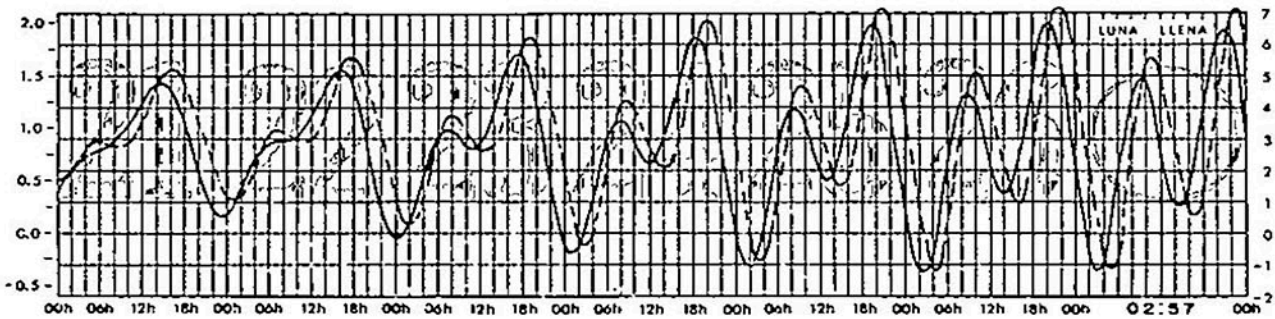
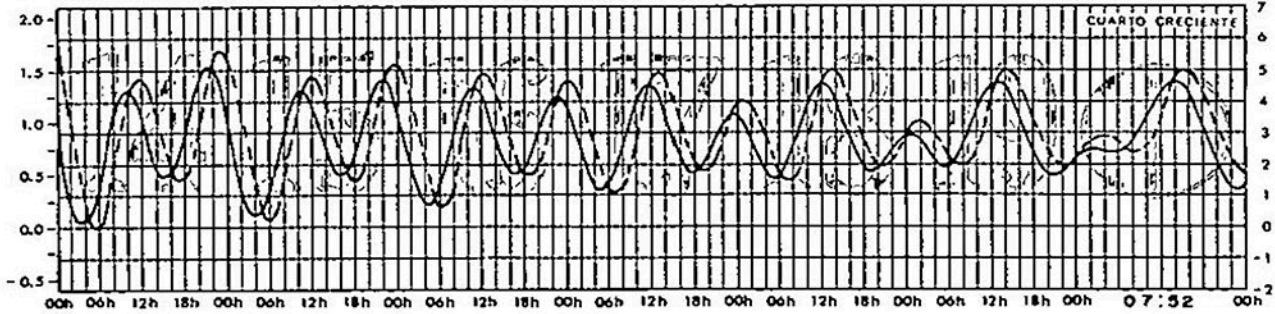
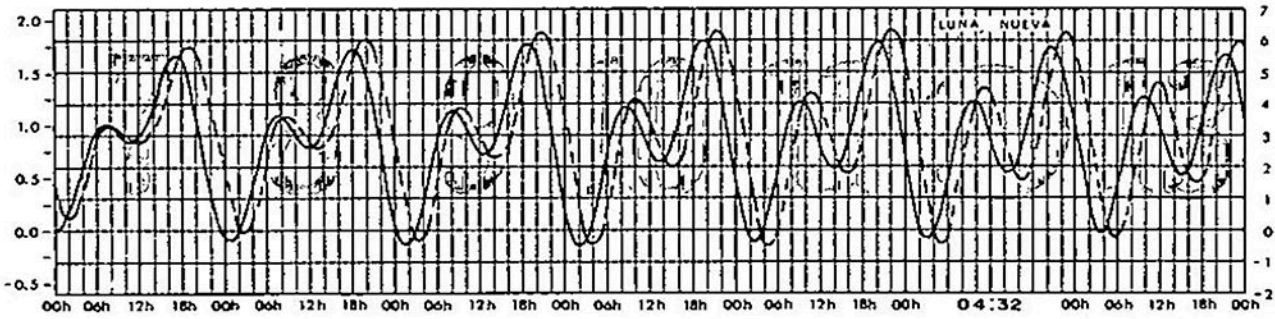
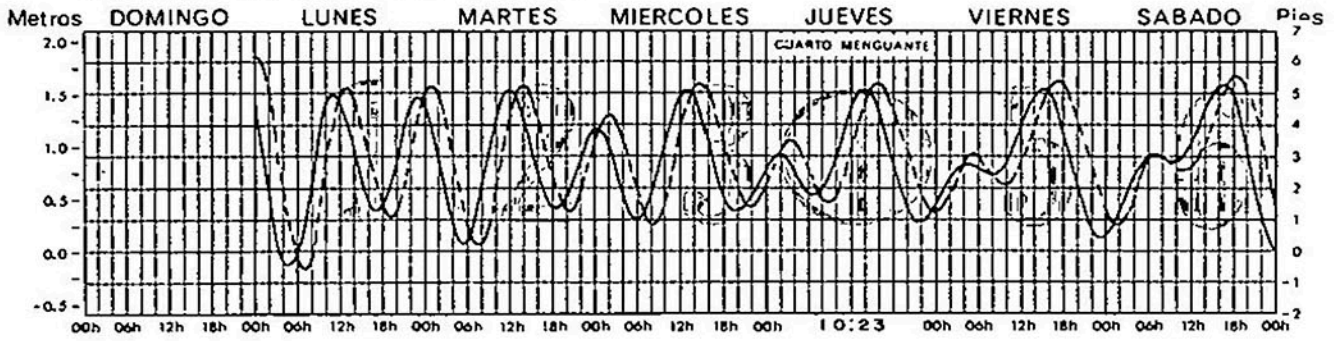


# AGOSTO 1988

ENSENADA, B. C. N.  
GRO. NEGRO, B. C. N.



INSTITUTO DE GEOFISICA, U. N. A. M.



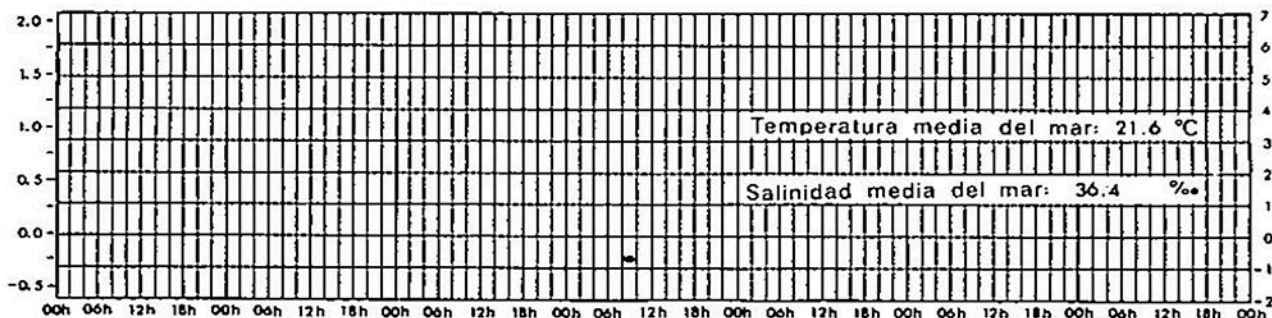
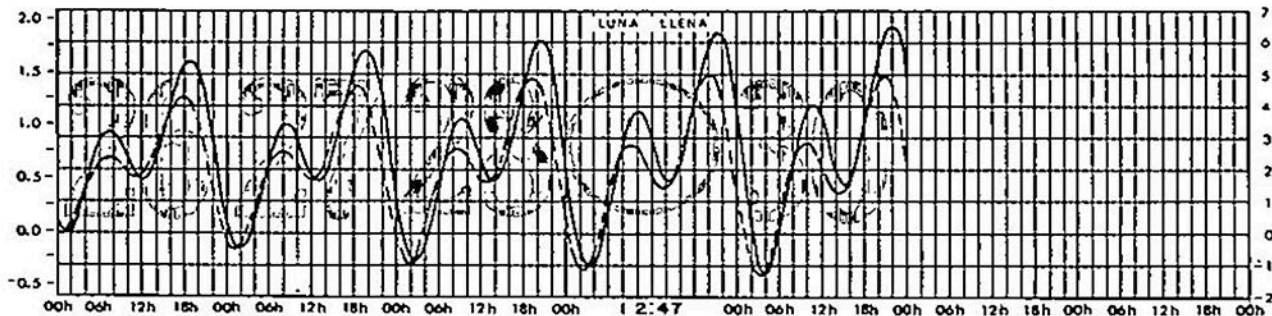
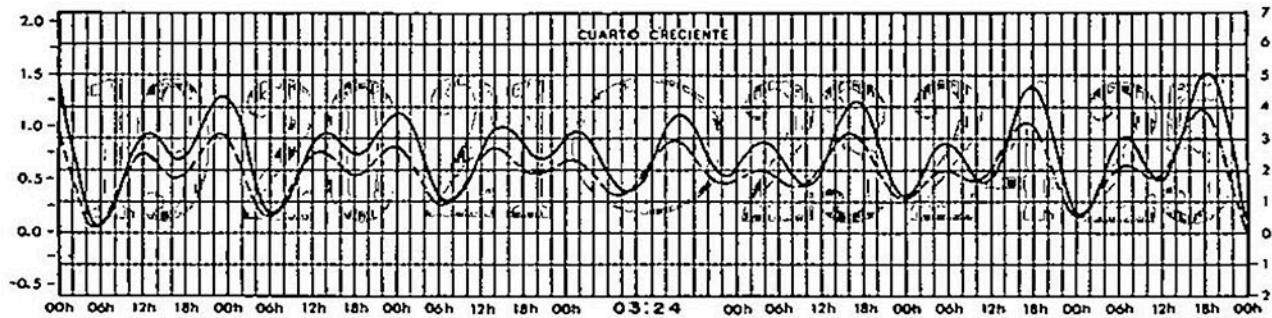
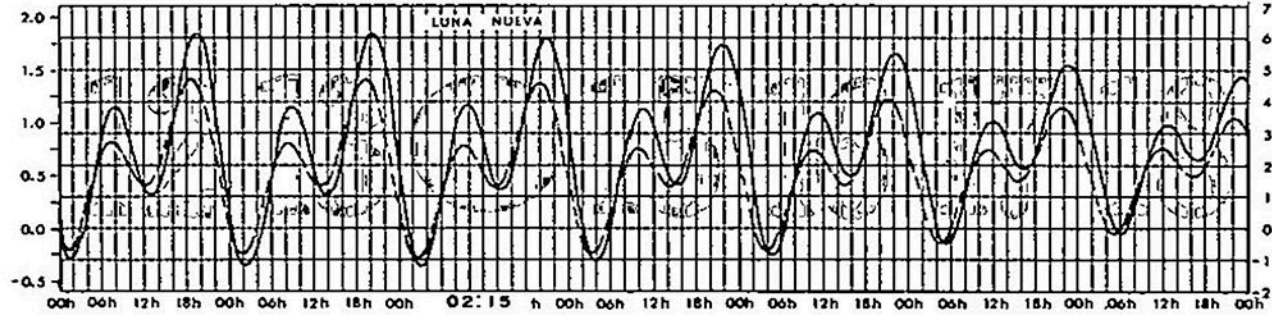
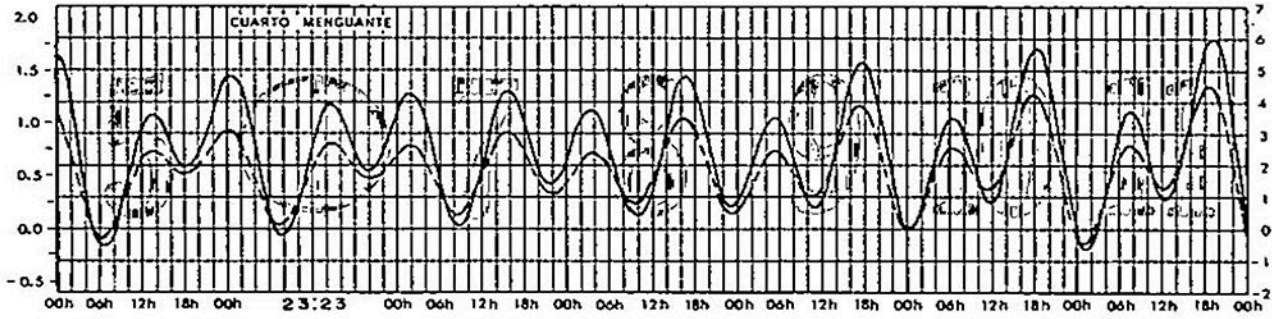
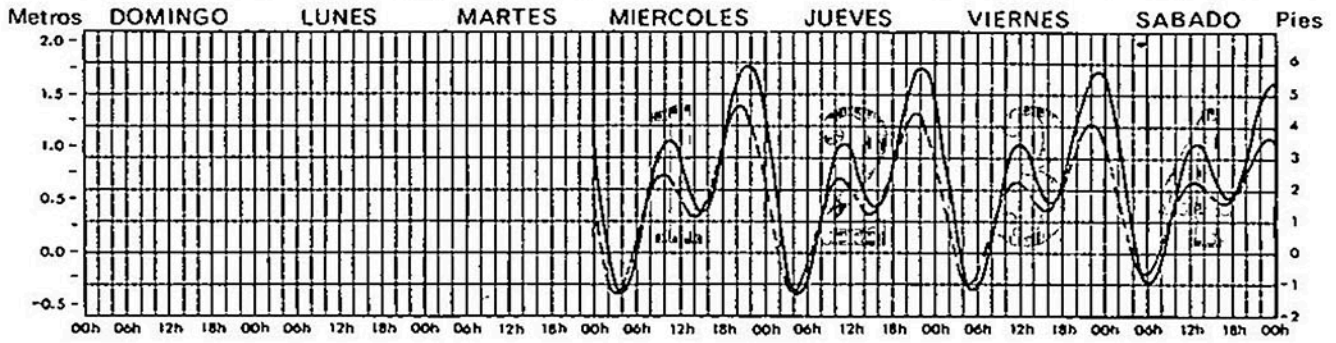


# JUNIO 1988

SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.

INSTITUTO DE GEOFISICA, U. N. A. M.

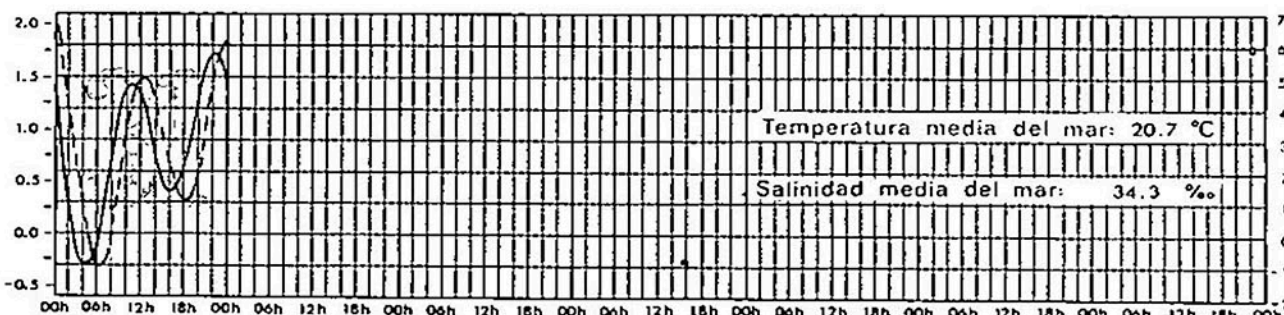
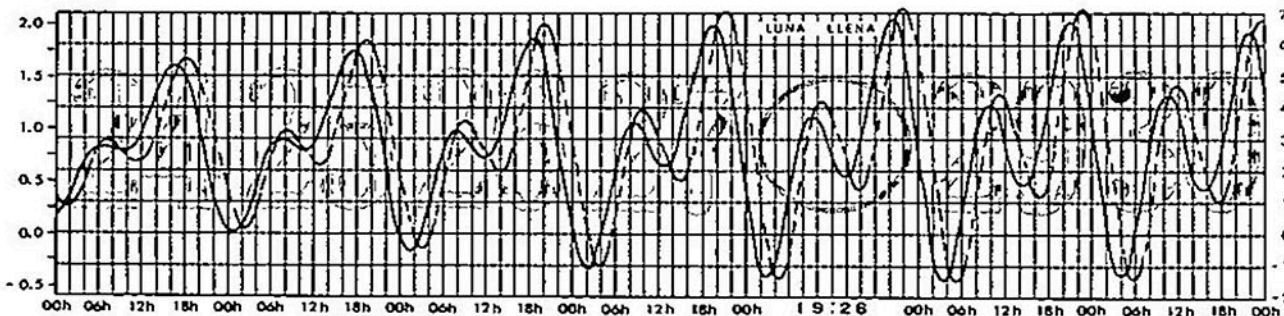
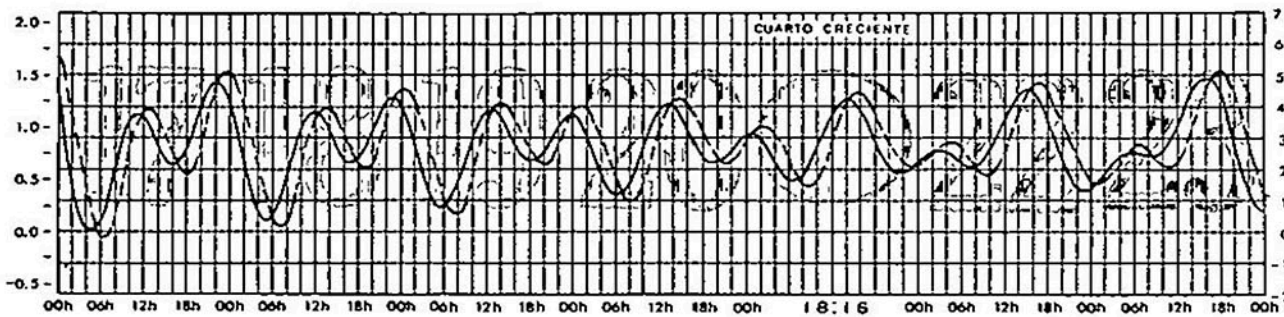
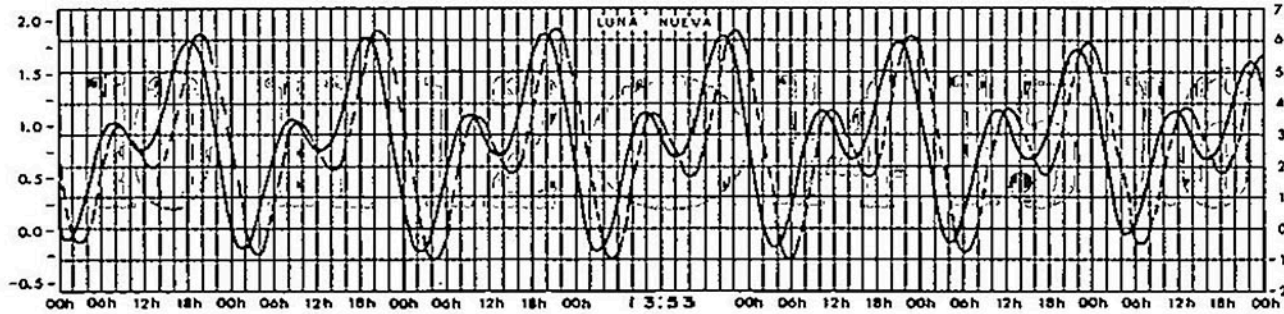
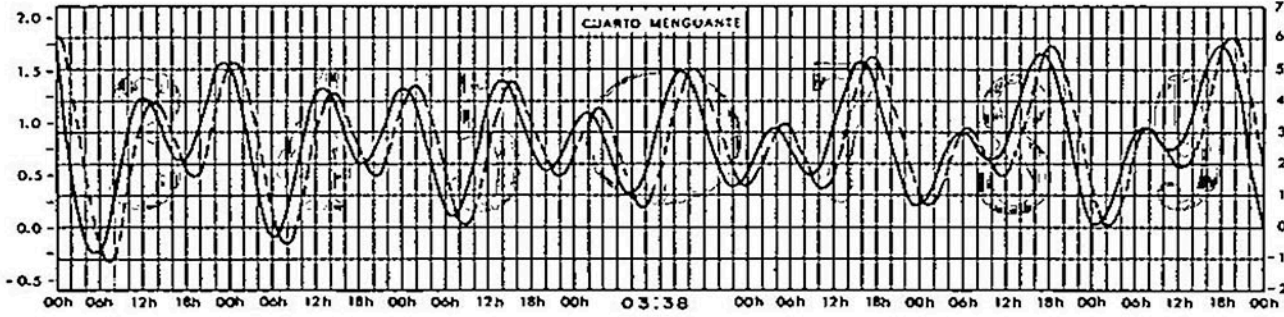
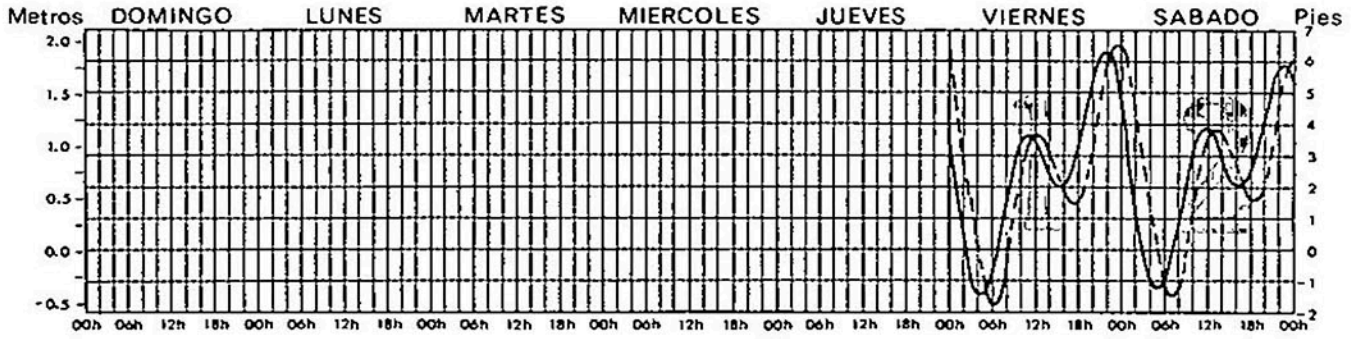




# JULIO 1988

INSTITUTO DE GEOFISICA, U. N. A. M.

ENSENADA, B. C. N.  
GRO. NEGRO, B. C. N.





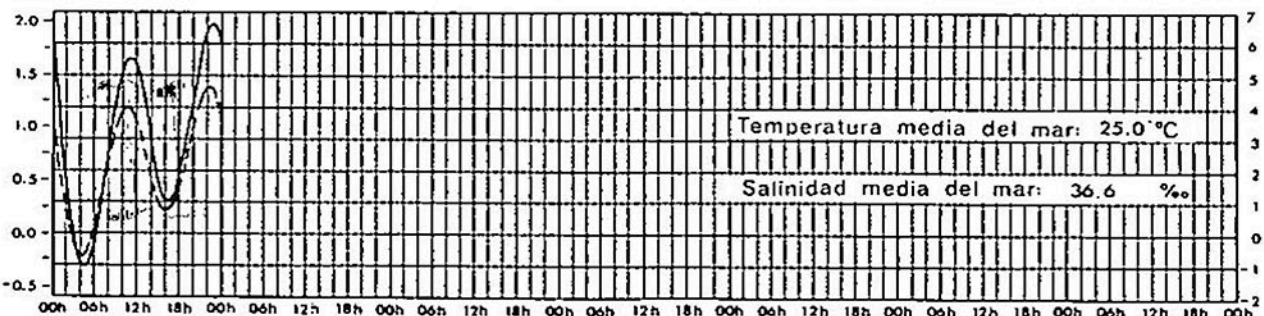
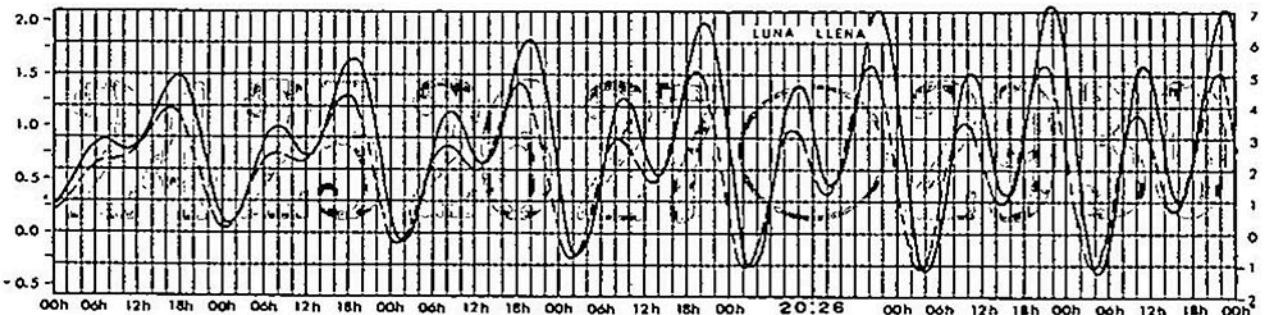
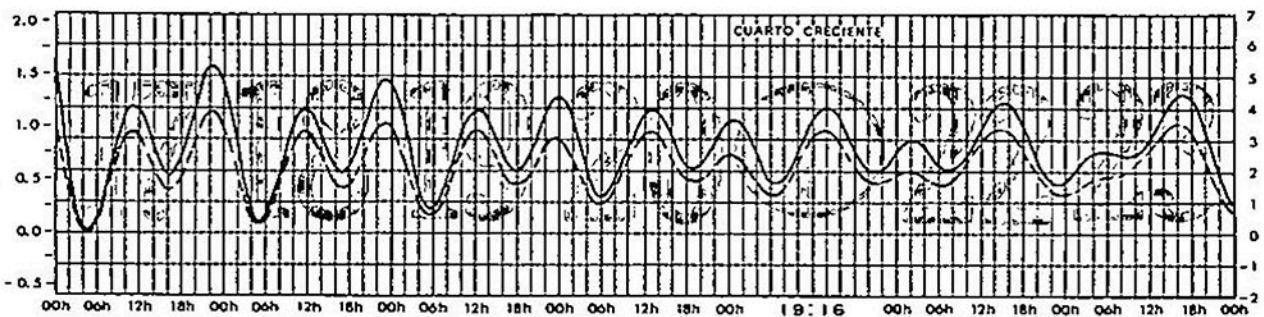
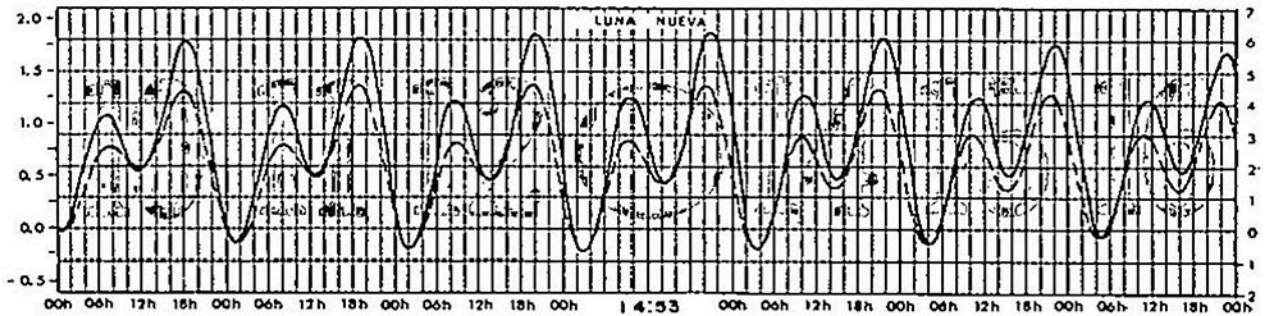
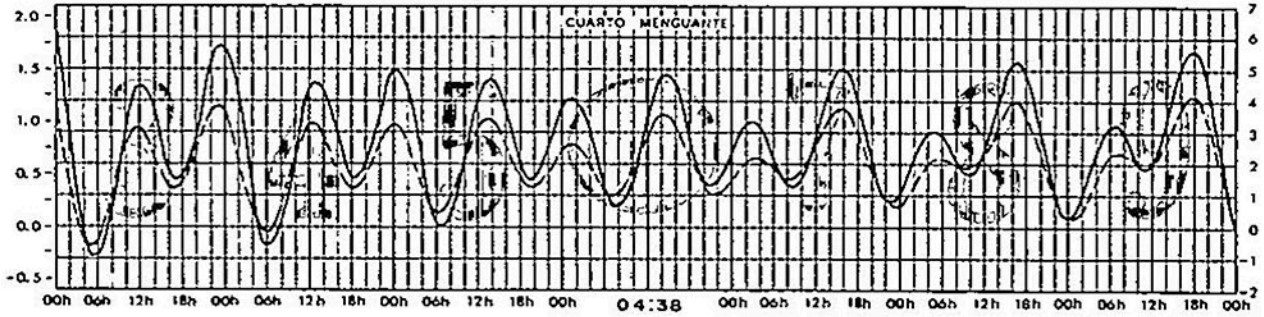
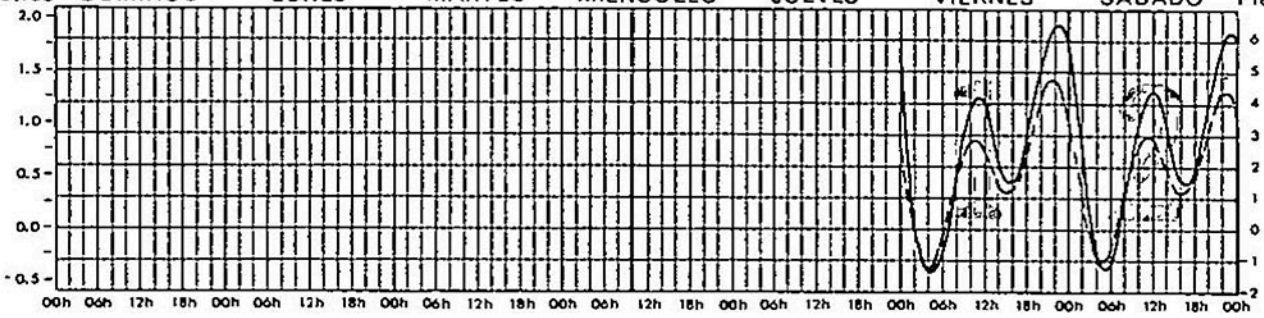
# JULIO 1988

SAN CARLOS, B.C.S.  
CABO SAN LUCAS, B.C.S.

INSTITUTO DE GEOFISICA, U. N. A. M.



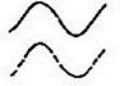
Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



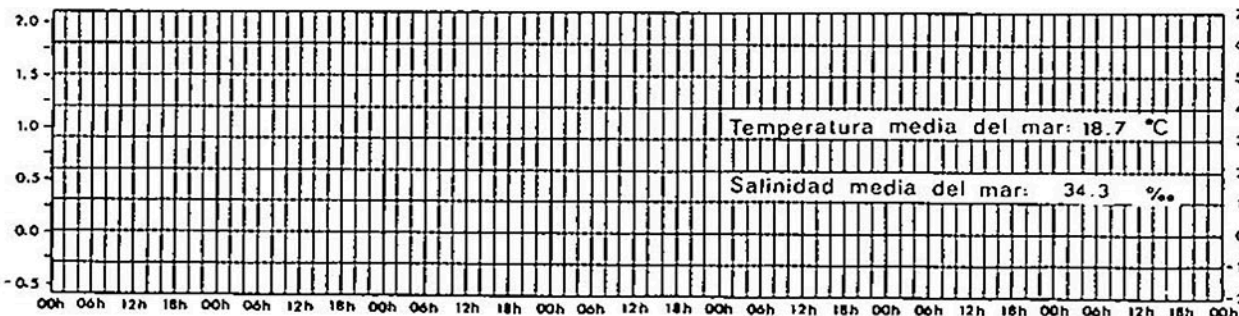
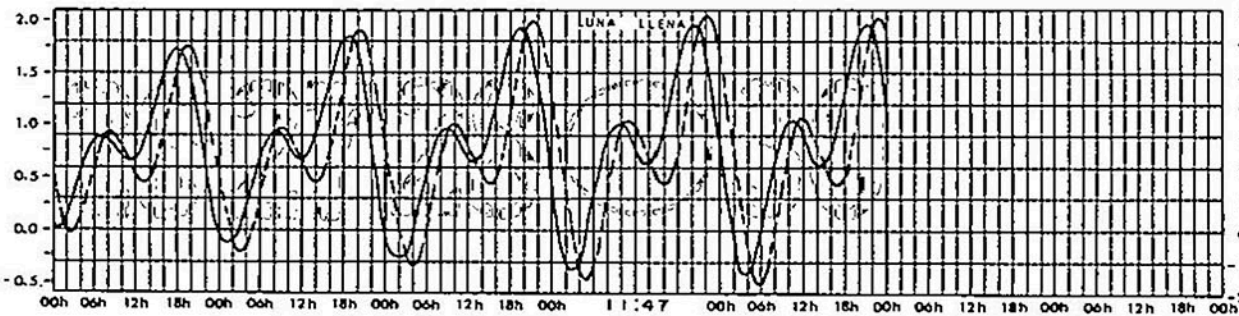
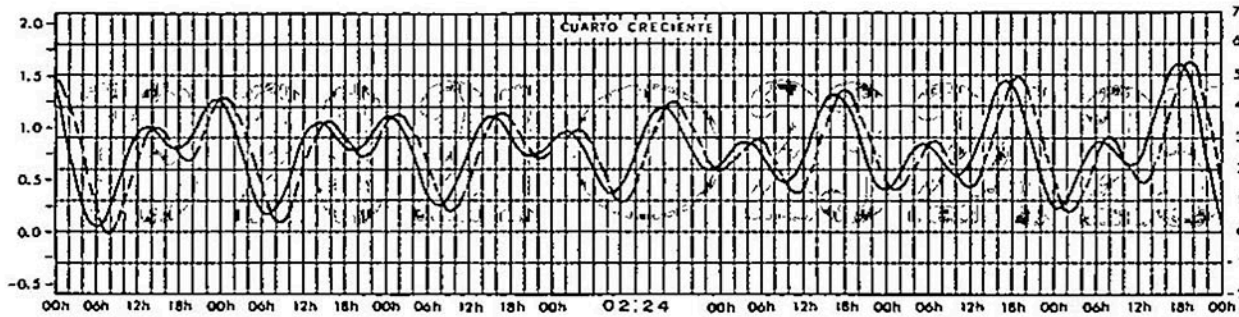
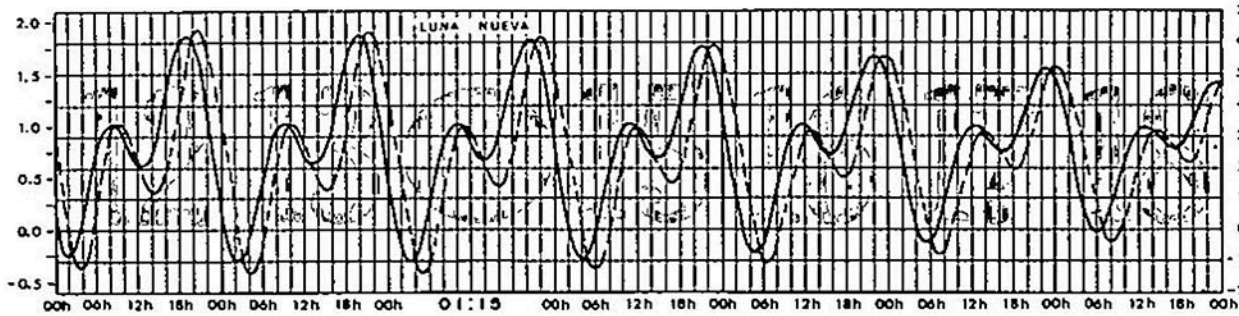
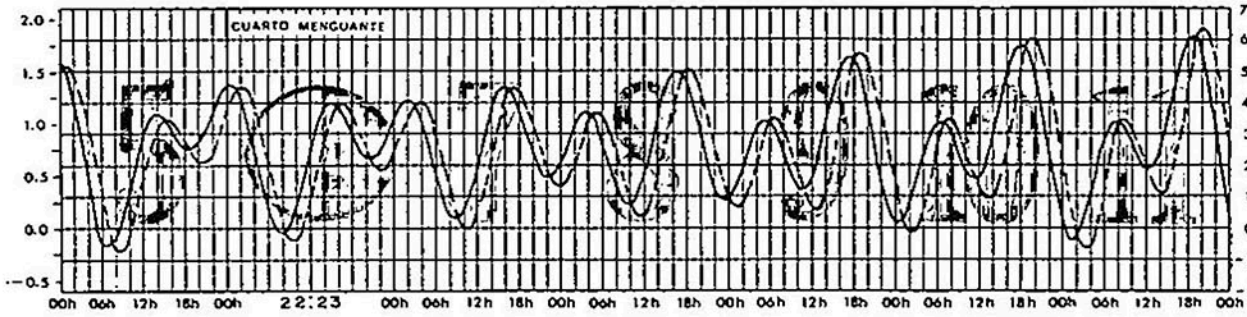
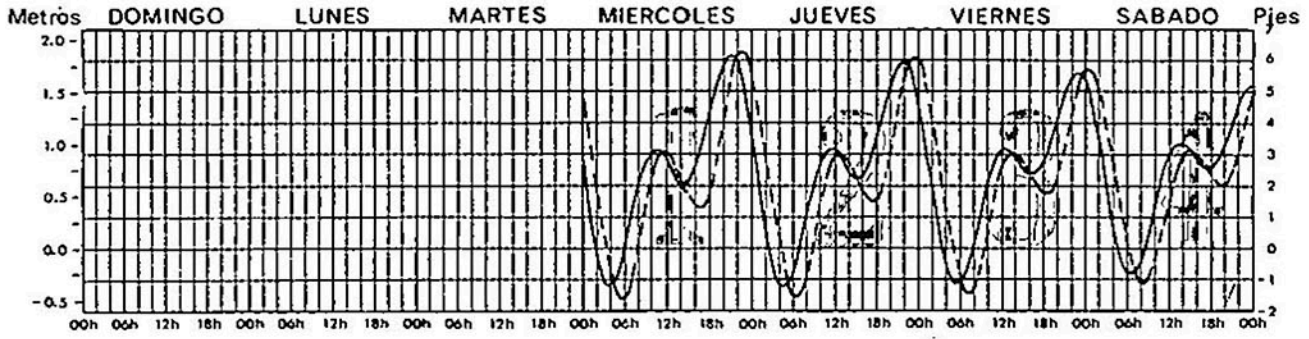


# JUNIO 1988

ENSENADA, B.C.N.  
GRO. NEGRO, B.C.N.



INSTITUTO DE GEOFISICA, U. N. A. M.



Temperatura media del mar: 18.7 °C

Salinidad media del mar: 34.3 ‰





# AGOSTO 1988

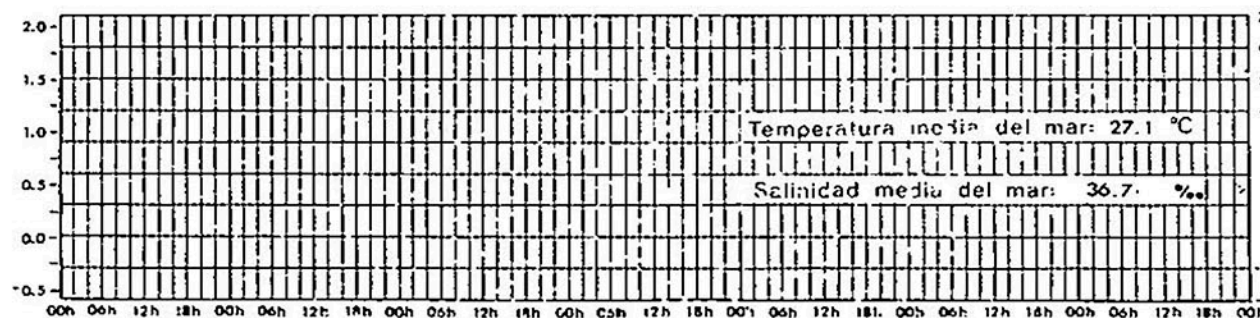
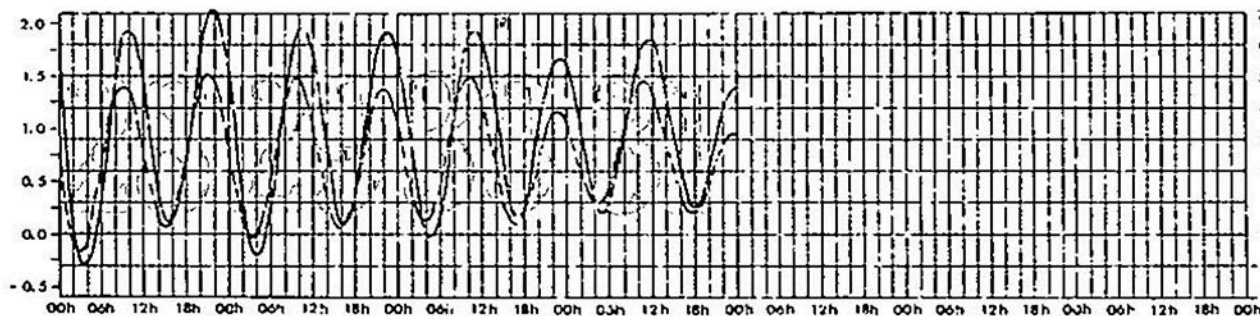
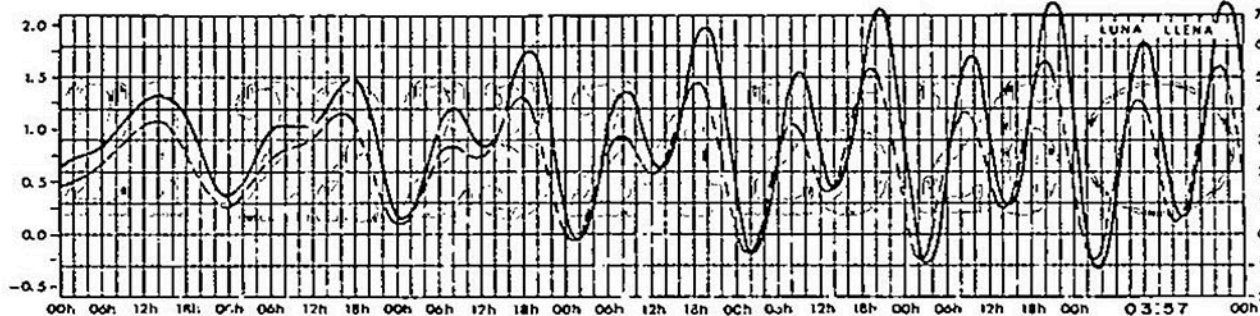
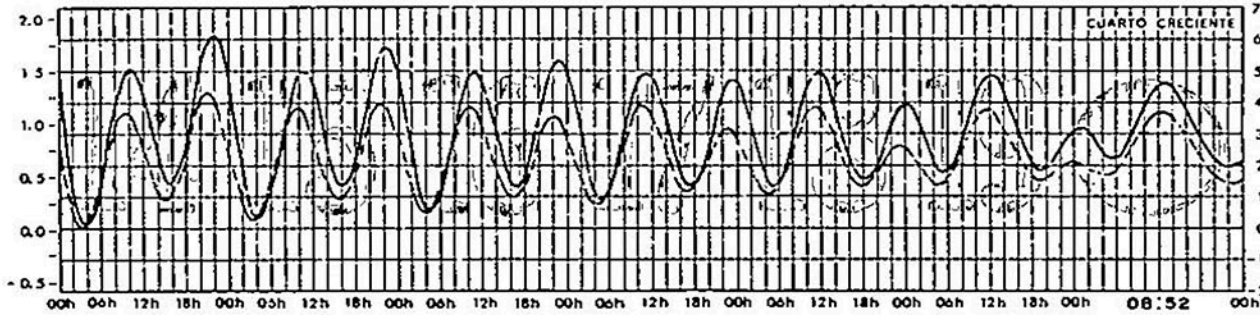
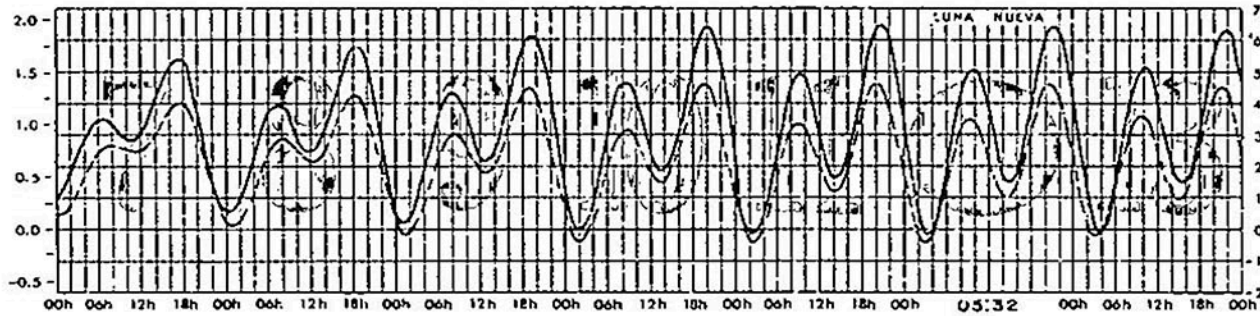
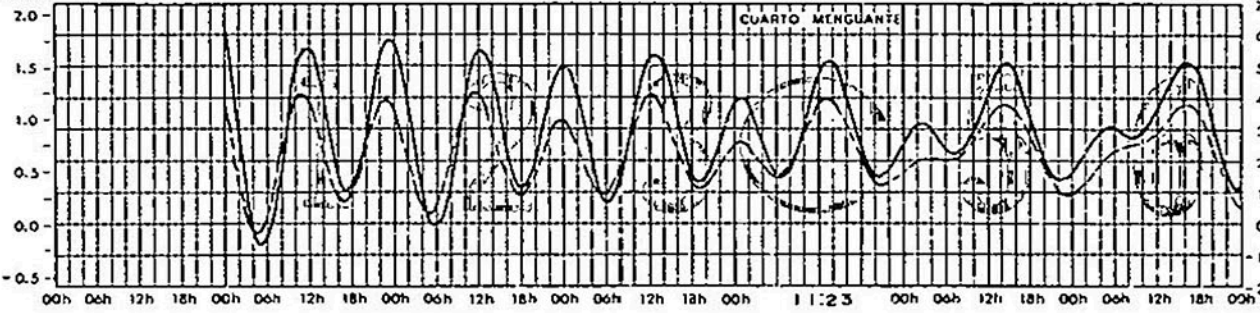
SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.

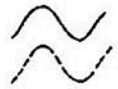
Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies





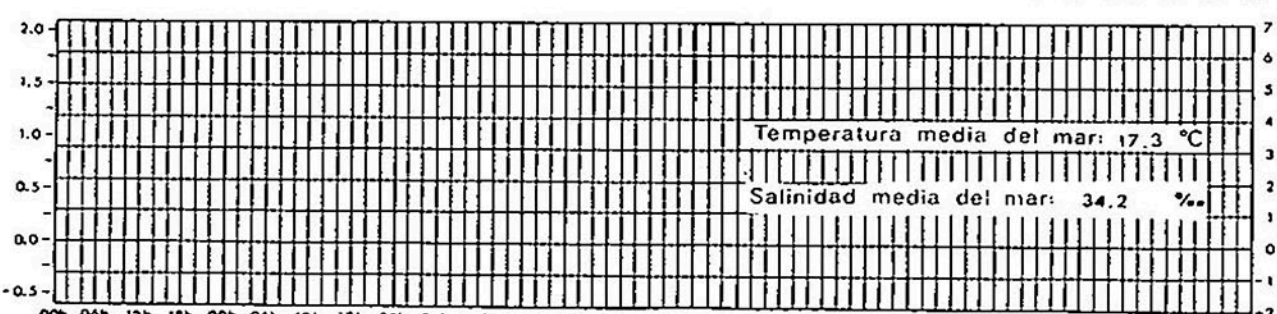
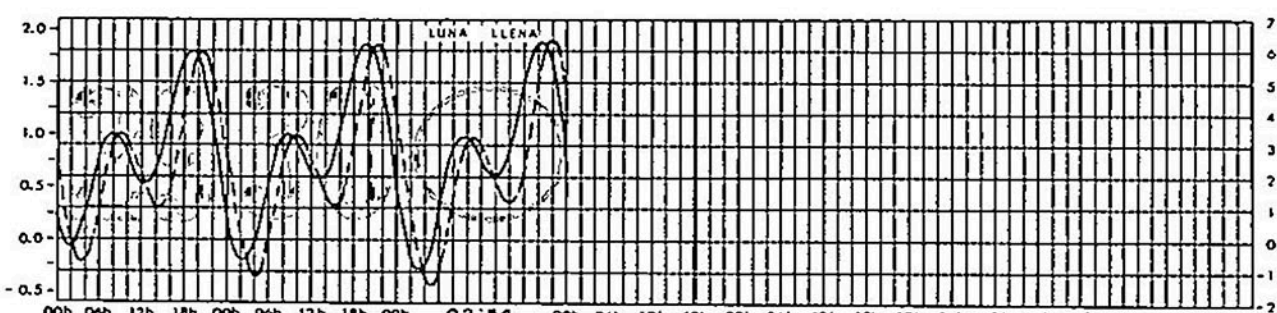
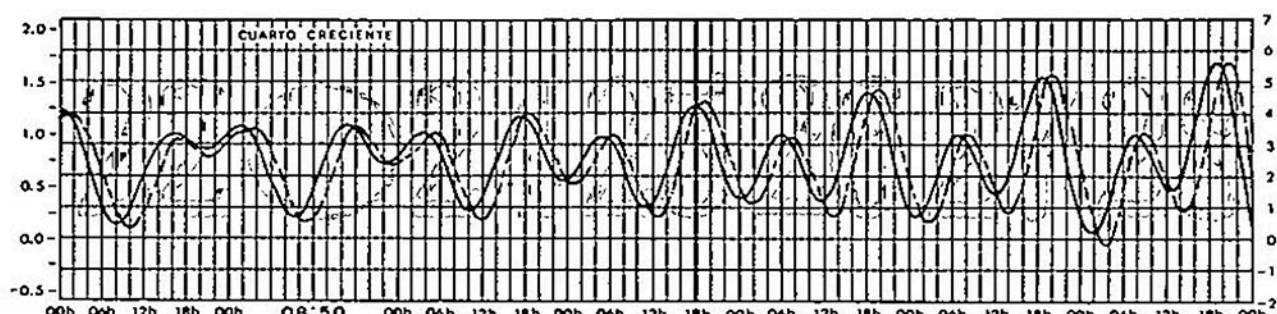
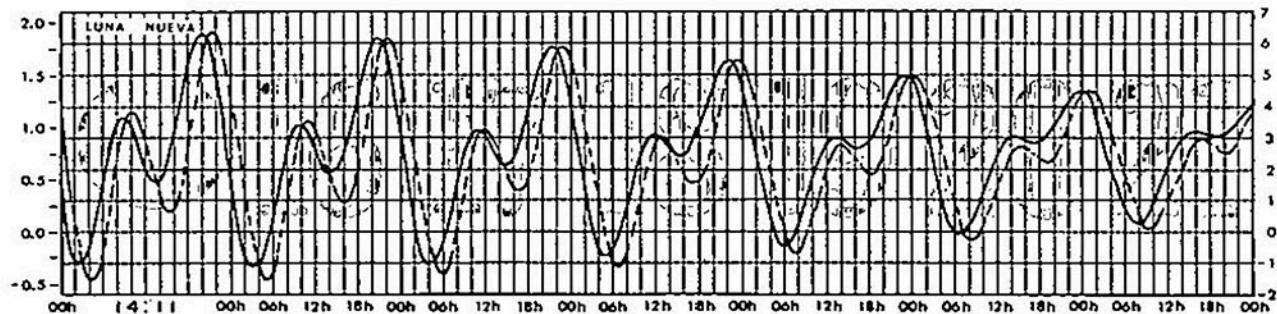
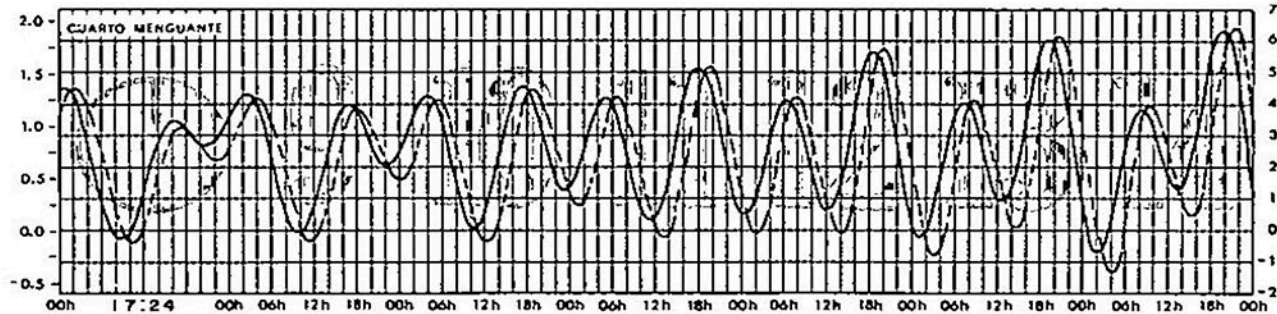
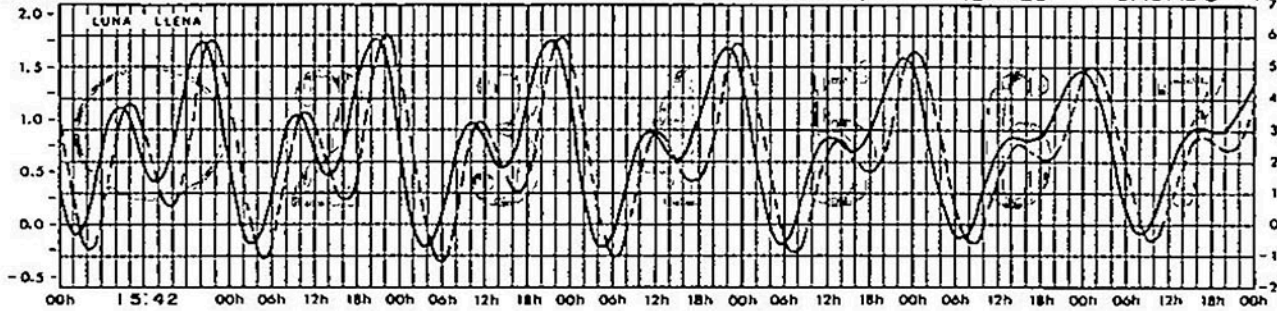
# MA 1988

ENSENADA, B.C.N.  
GRO. NEGRO, B.C.N.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



Temperatura media del mar: 17.3 °C

Salinidad media del mar: 34.2 ‰



# SEPTIEMBRE 1988

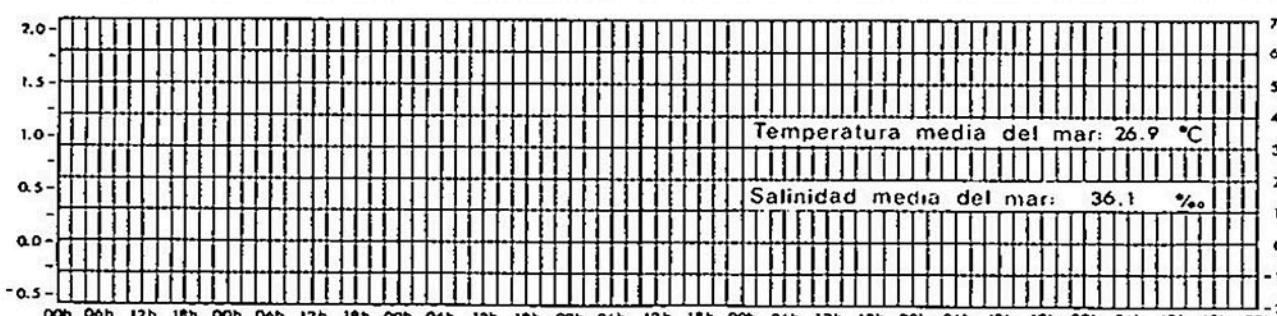
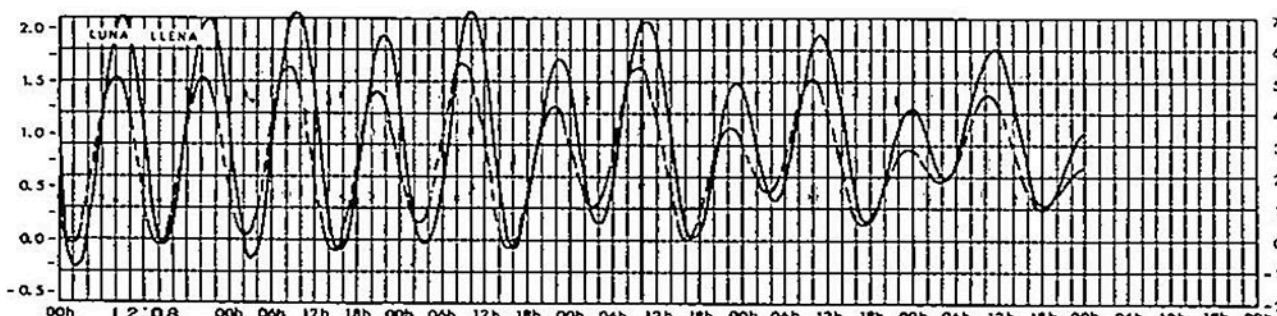
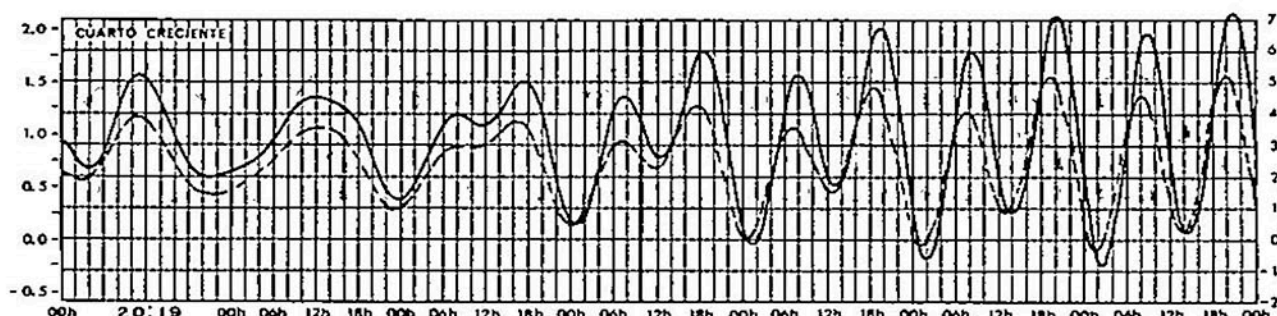
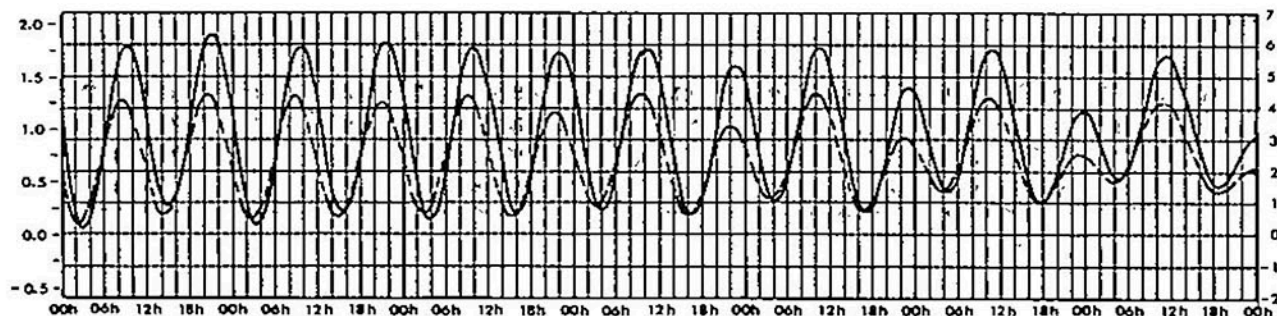
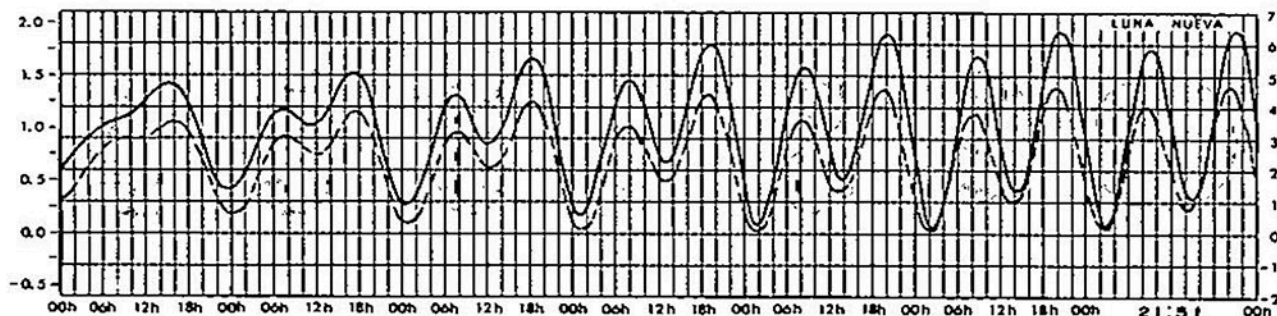
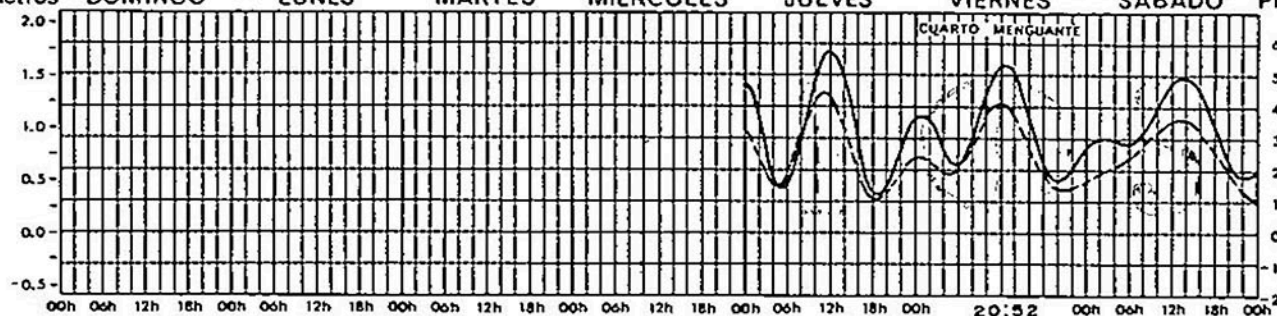
SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO **Pies**







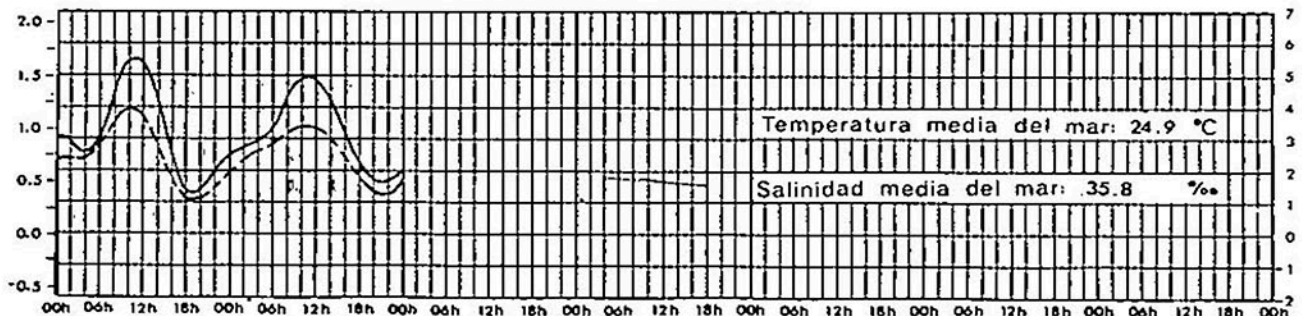
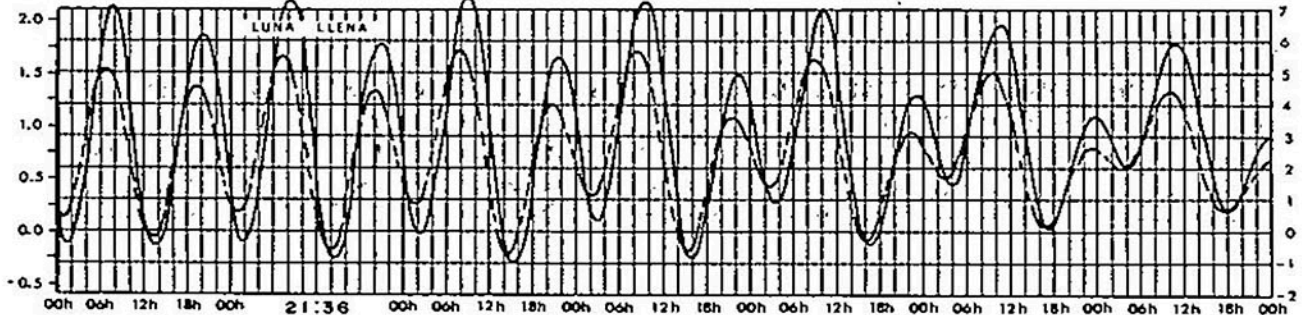
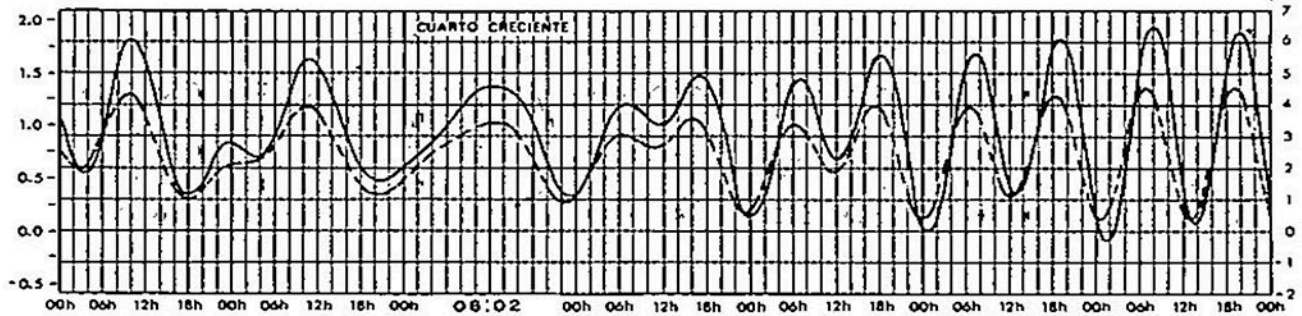
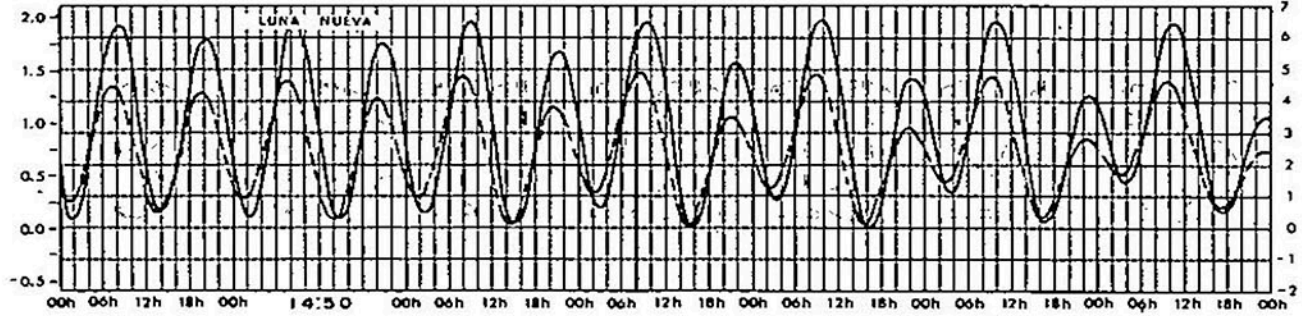
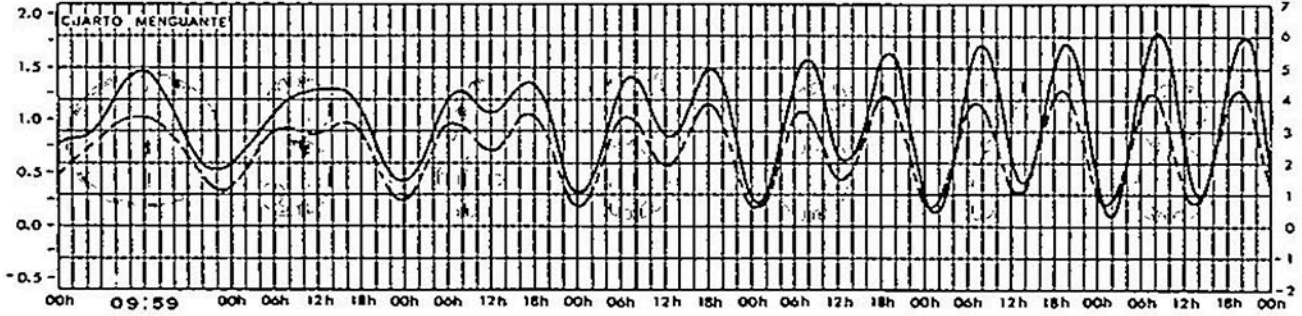
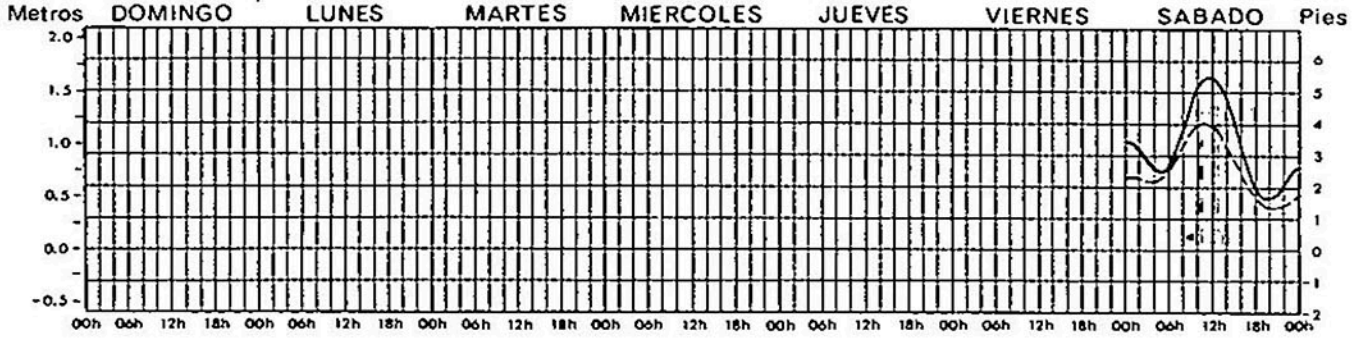
# OCTUBRE 1988

SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.





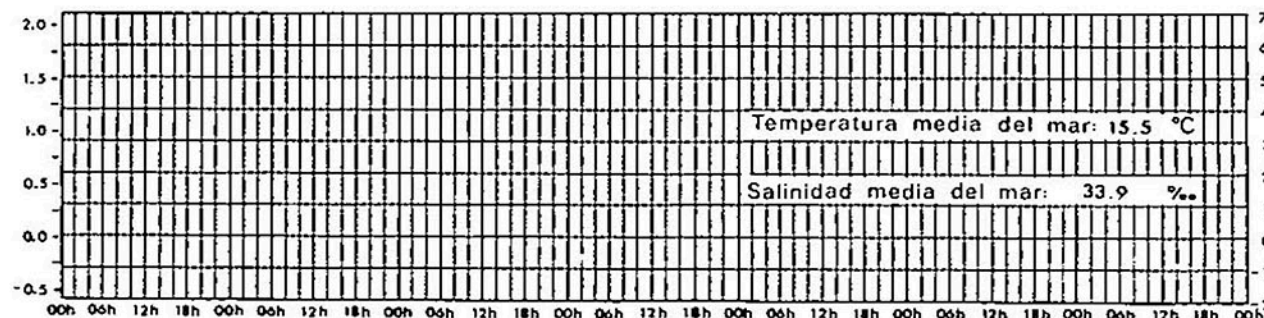
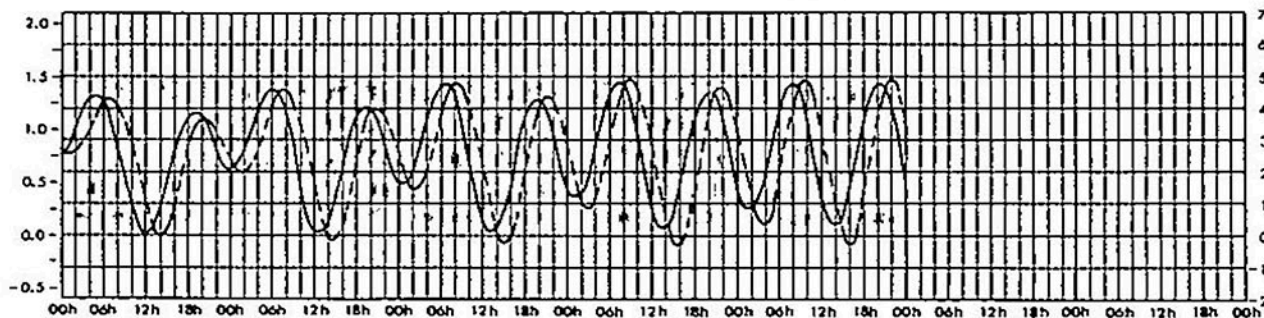
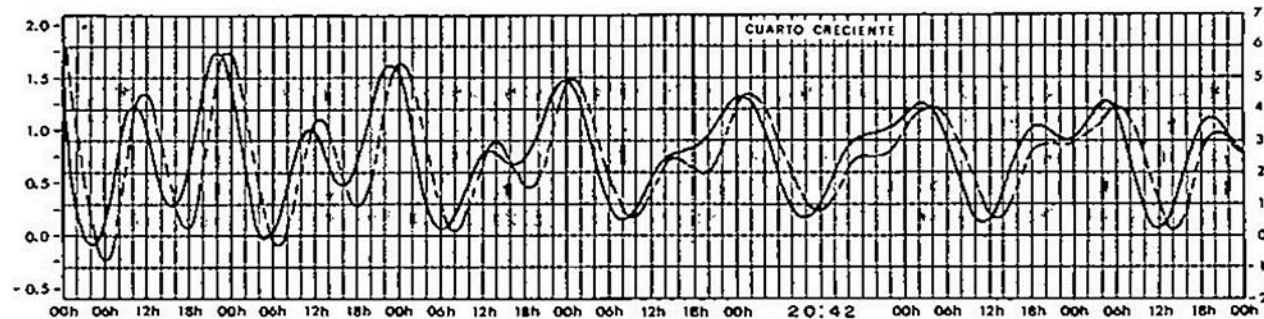
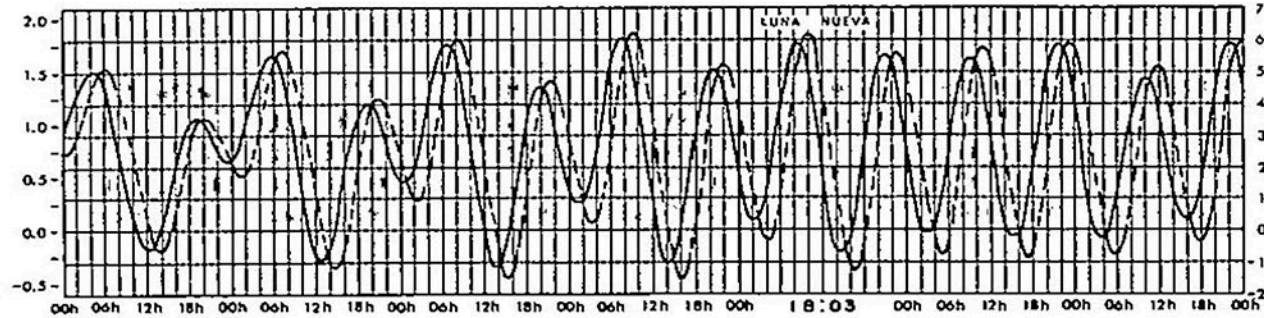
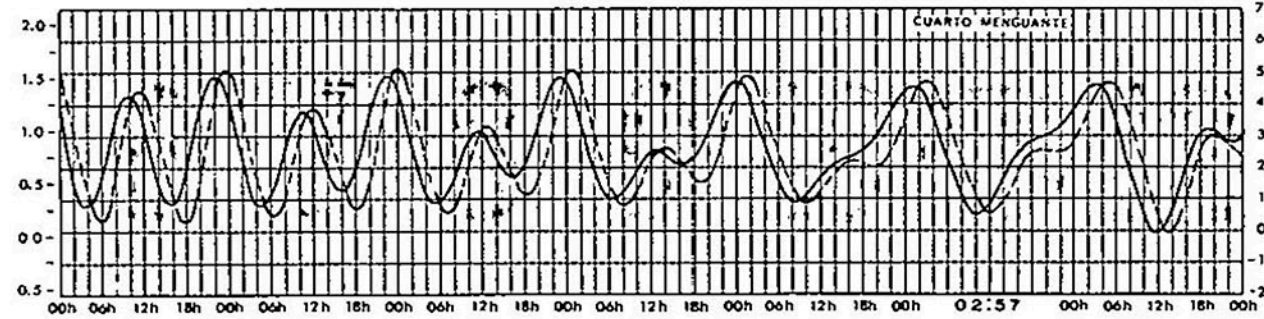
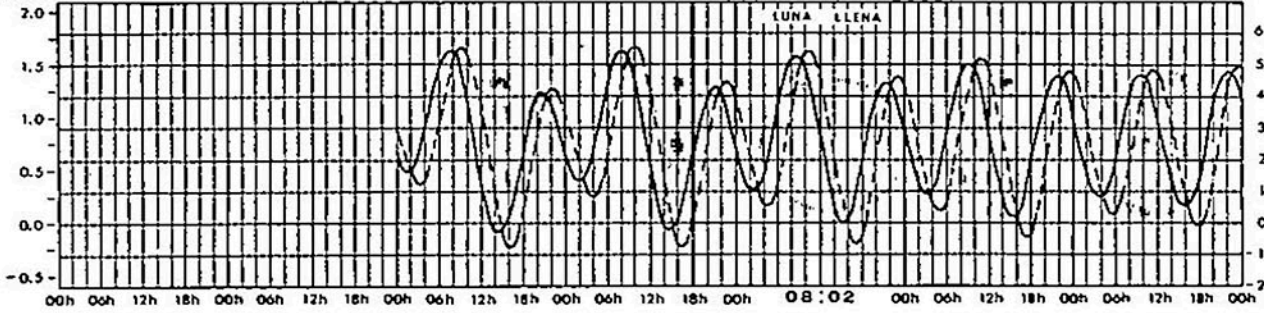
# MARZO 1988

ENSENADA, B. C. N.  
GRO. NEGRO, B. C. N.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



Temperatura media del mar: 15.5 °C

Salinidad media del mar: 33.9 ‰



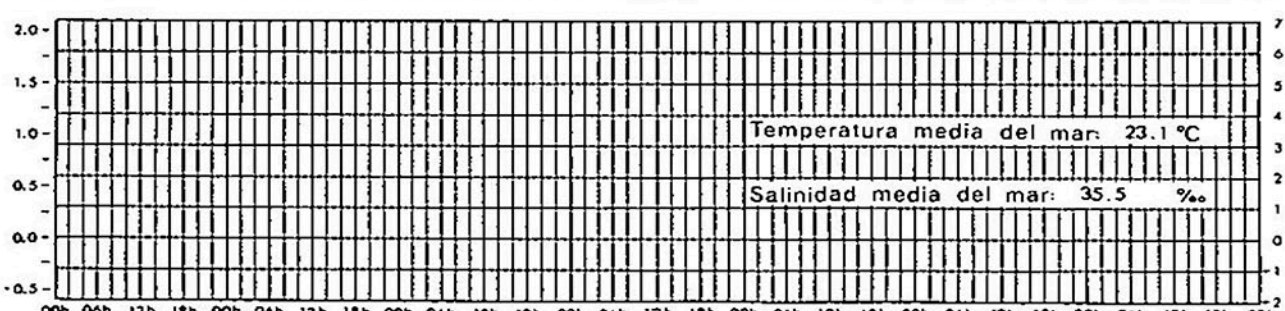
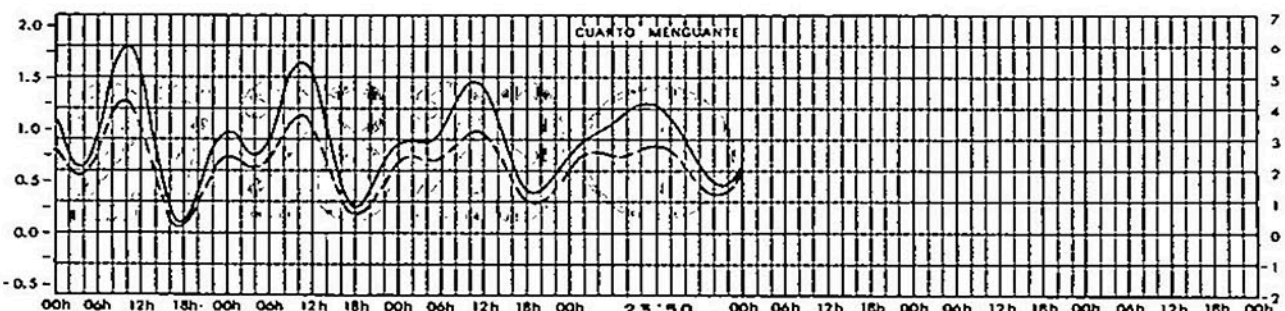
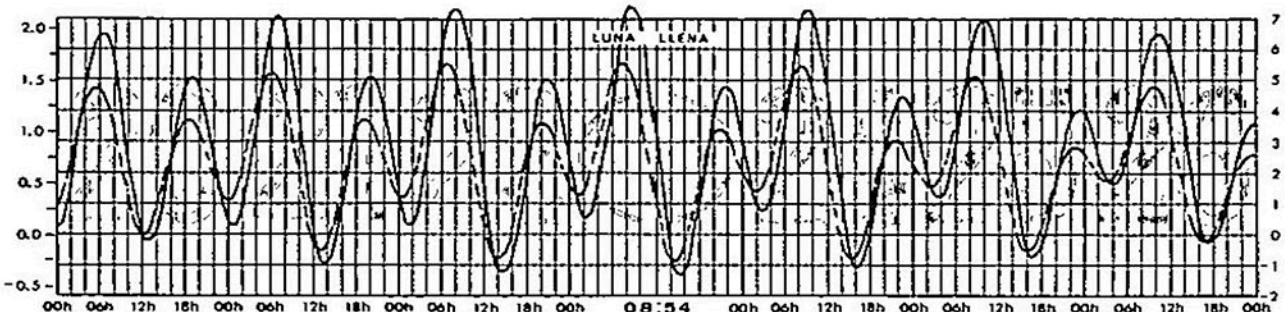
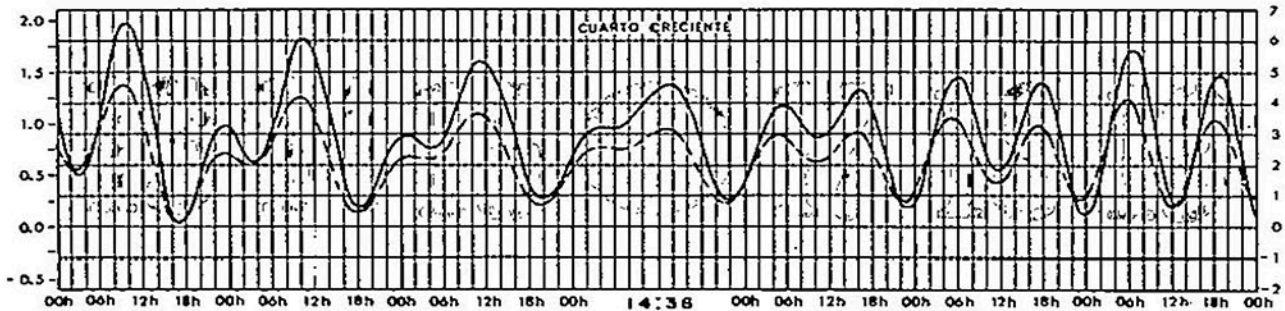
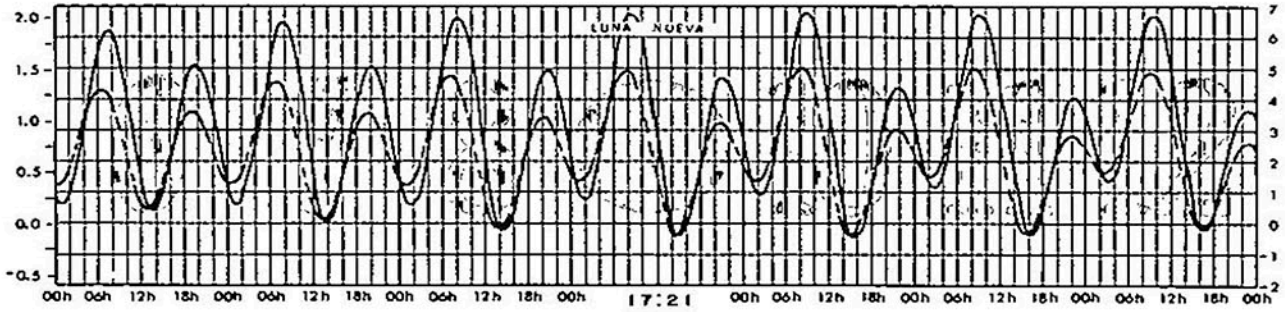
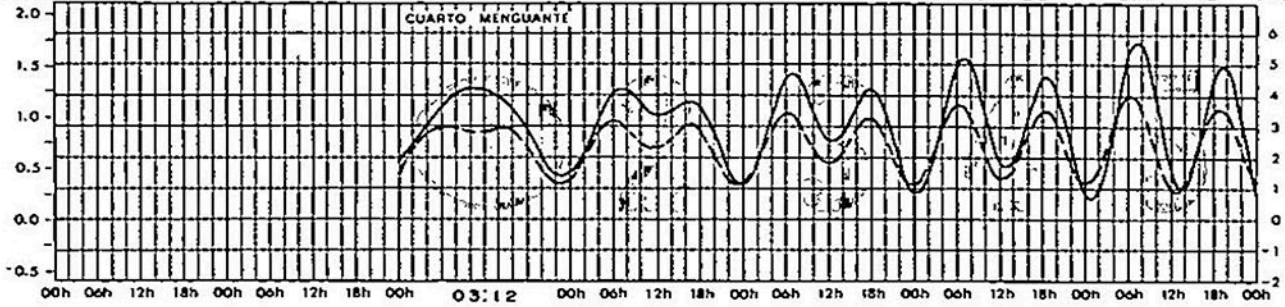
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SAN CARLOS, B.C.S.  
CABO SAN LUCAS, B.C.S.

INSTITUTO DE GEOFISICA, U. N. A. M.



Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies

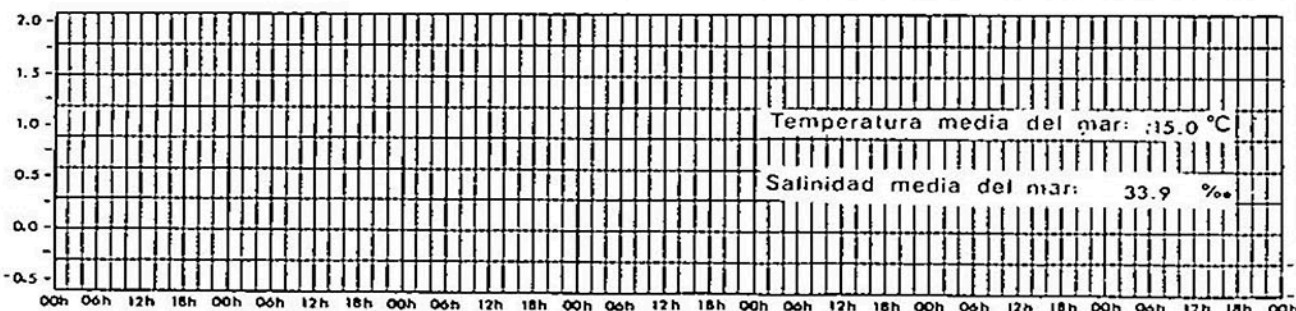
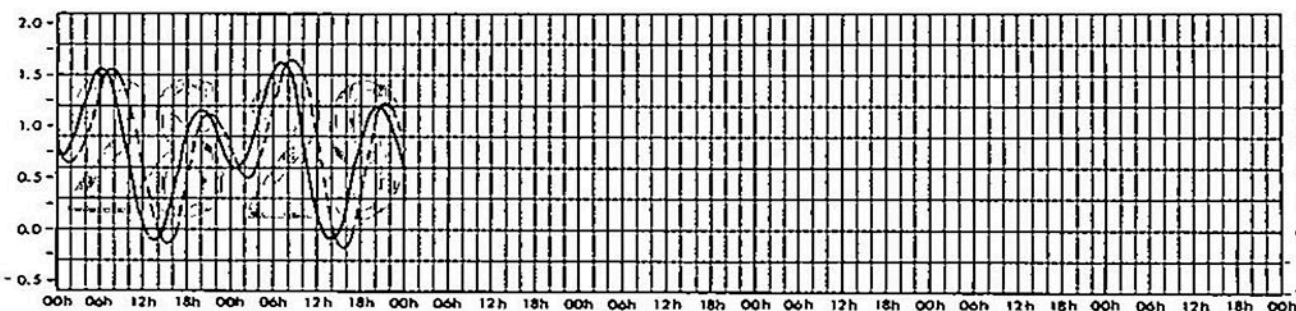
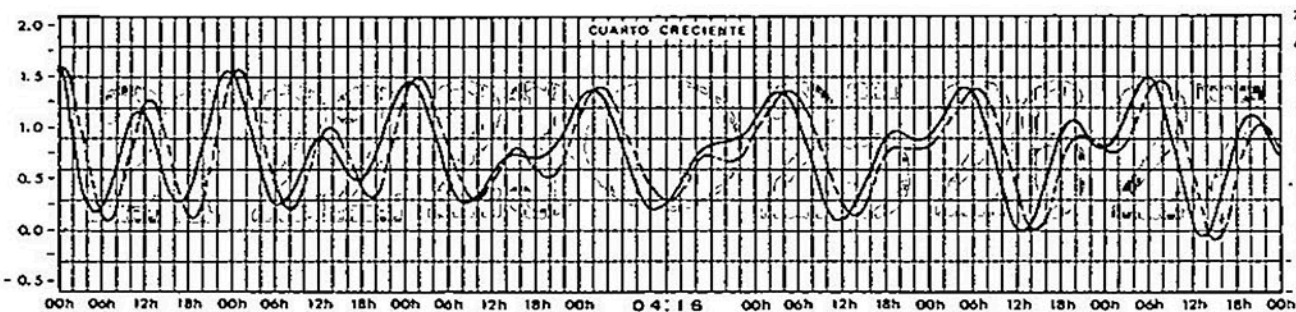
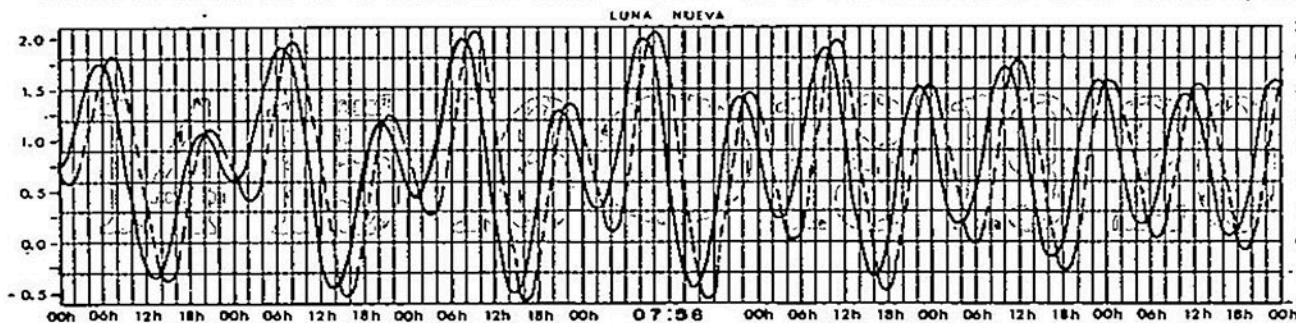
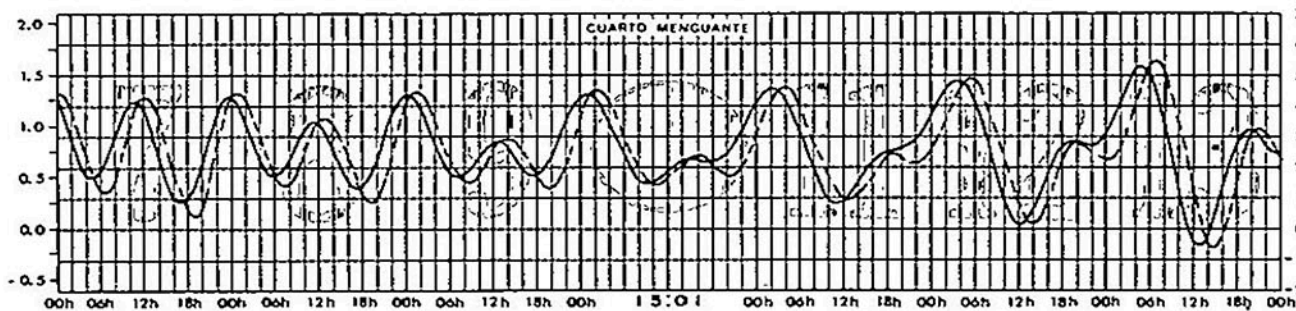
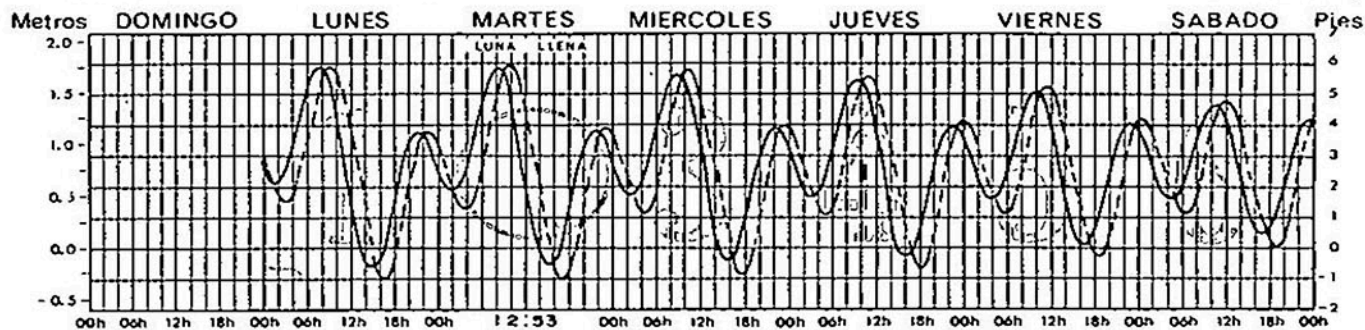




# FEBRERO 1988

INSTITUTO DE GEOFISICA, U. N. A. M.

ENSENADA, B. C. N.  
GRO. NEGRO, B. C. N.



Temperatura media del mar: 15.0 °C  
 Salinidad media del mar: 33.9 ‰





# DICIEMBRE 1988

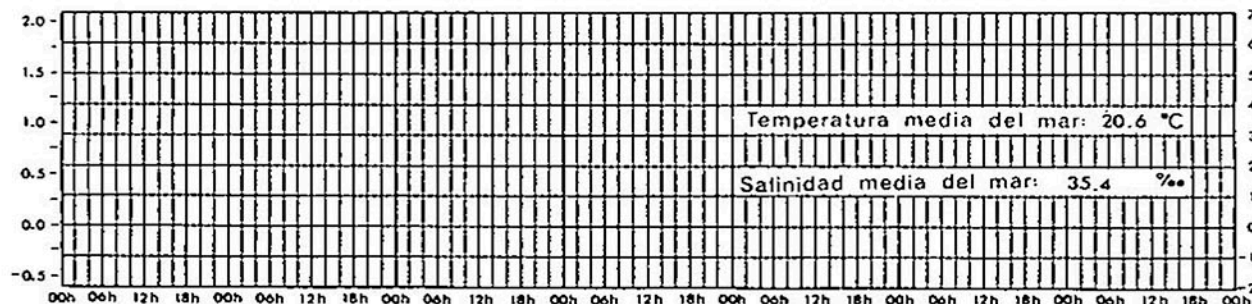
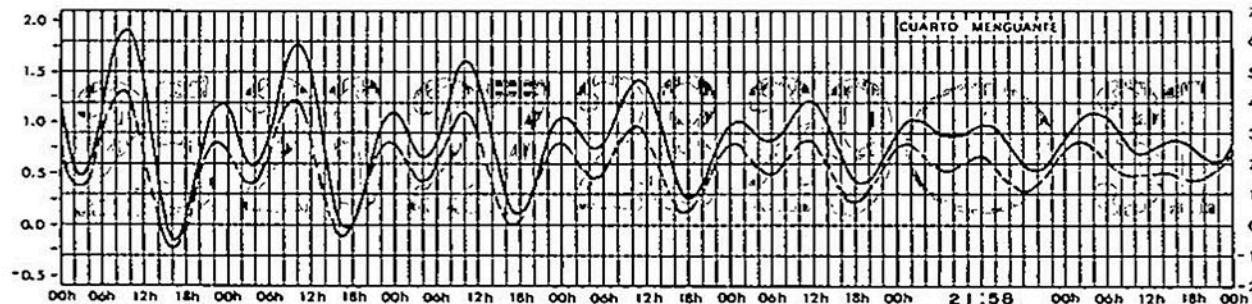
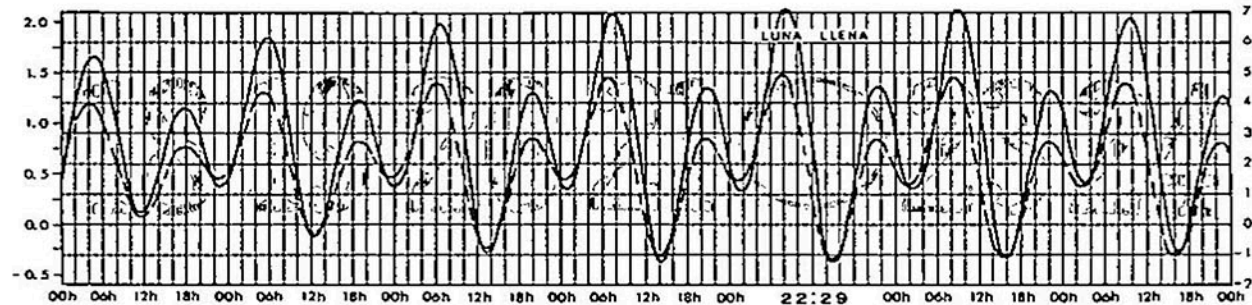
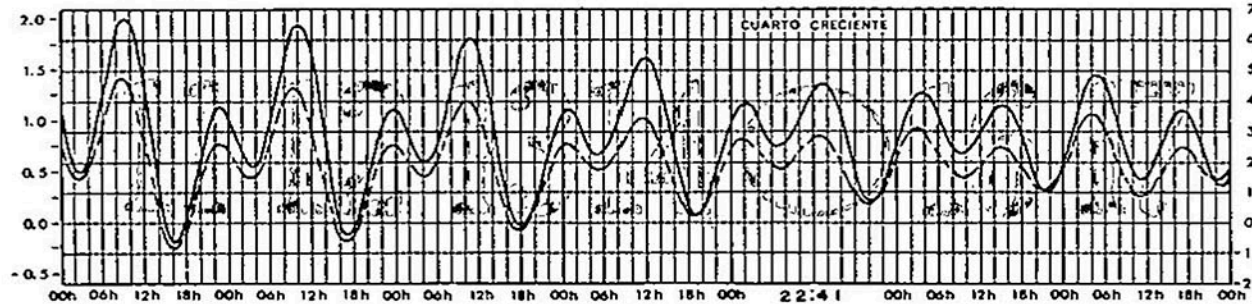
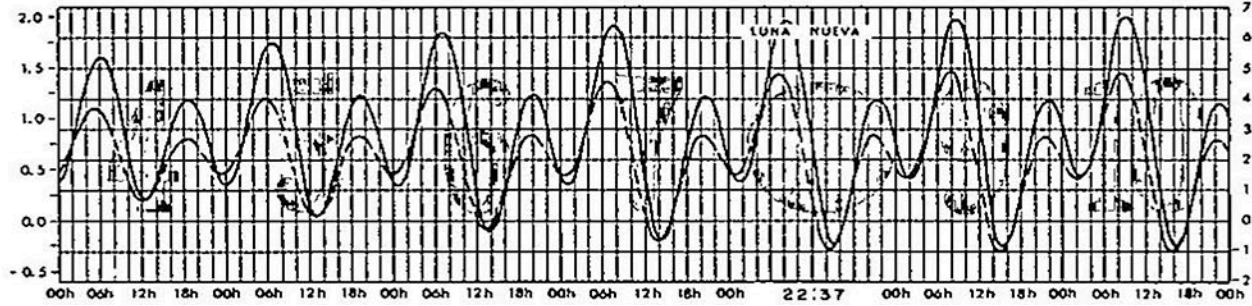
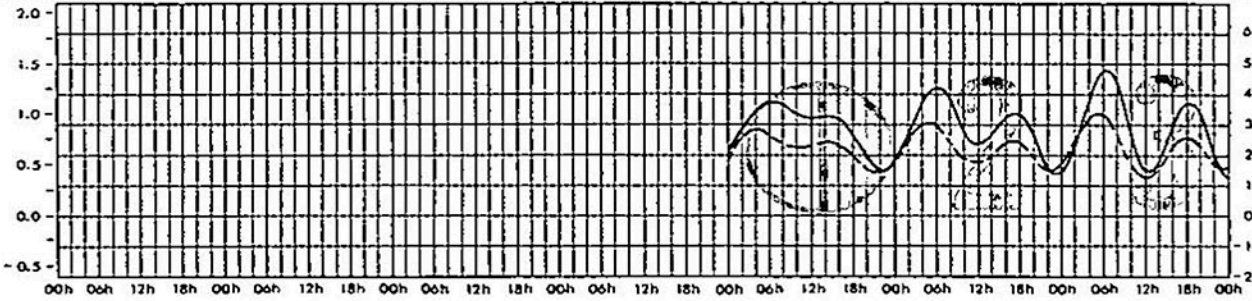
SAN CARLOS, B.C.S.

CABO SAN LUCAS, B.C.S.



INSTITUTO DE GEOFISICA, U. N. A. M.

Metros DOMINGO LUNES MARTES MIERCOLES JUEVES VIERNES SABADO Pies



Temperatura media del mar: 20.6 °C  
 Salinidad media del mar: 35.4 ‰

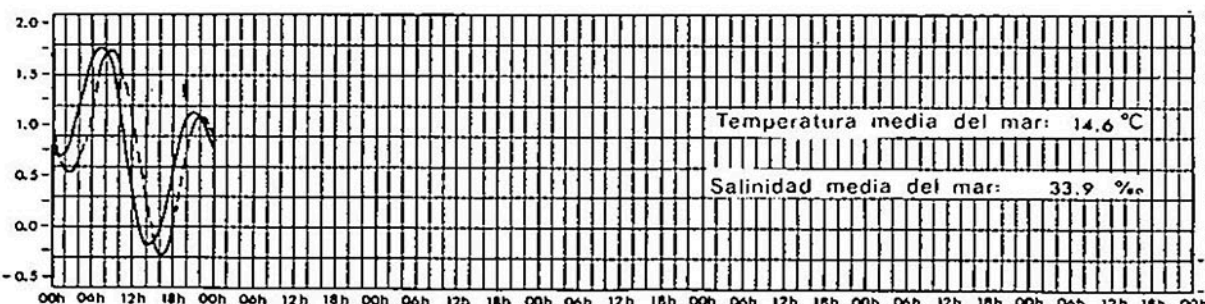
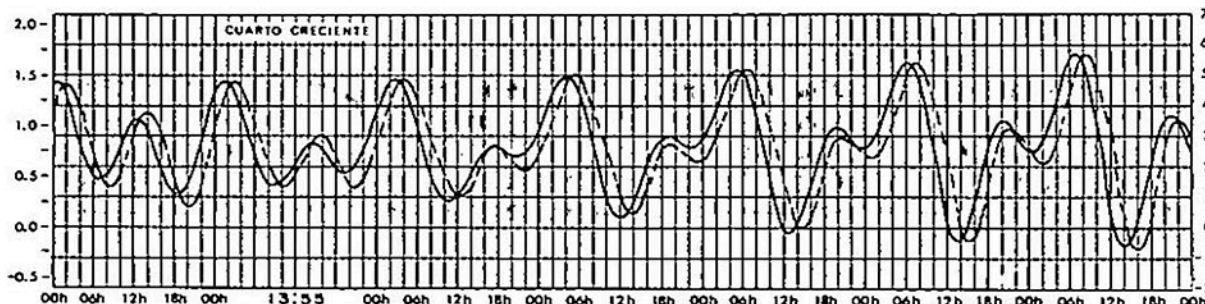
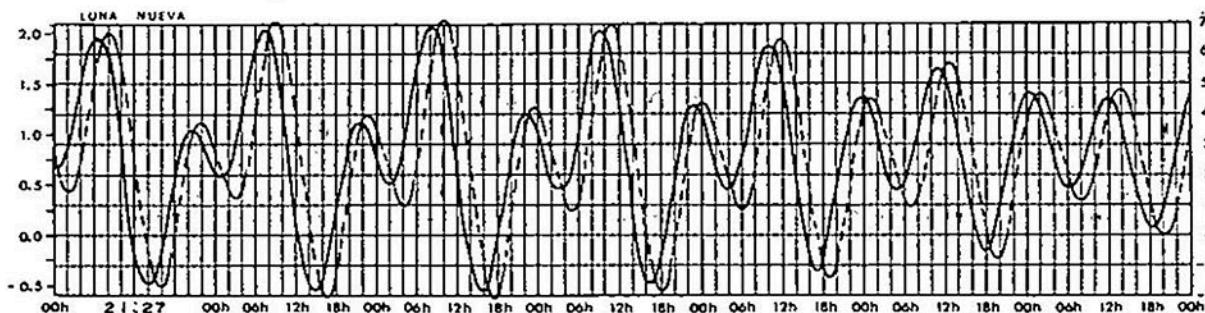
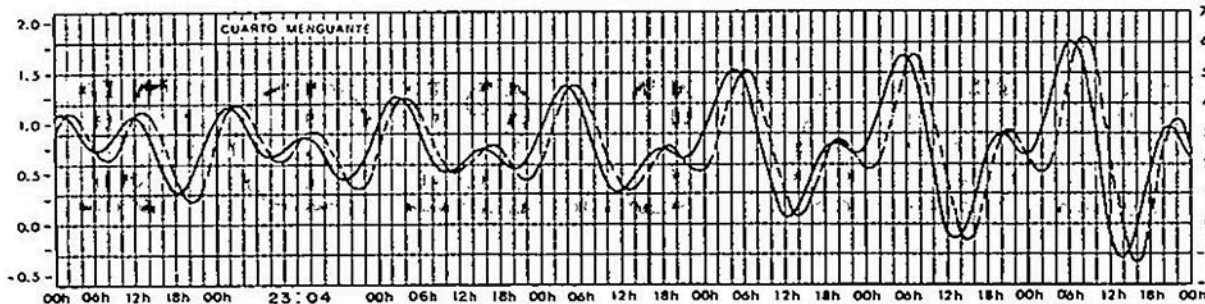
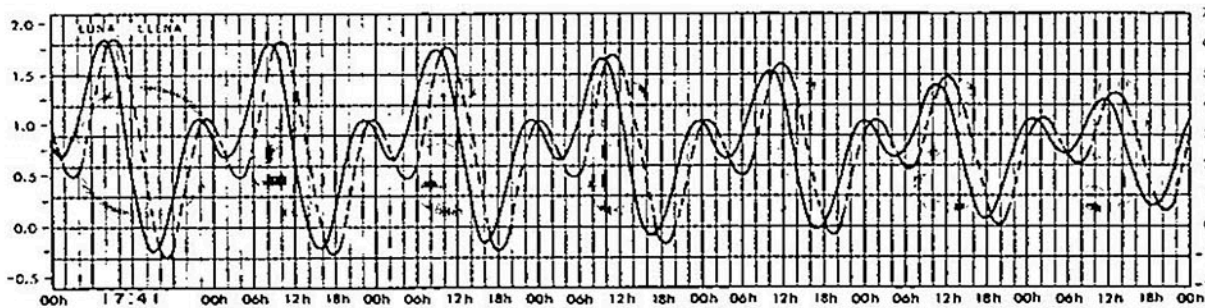
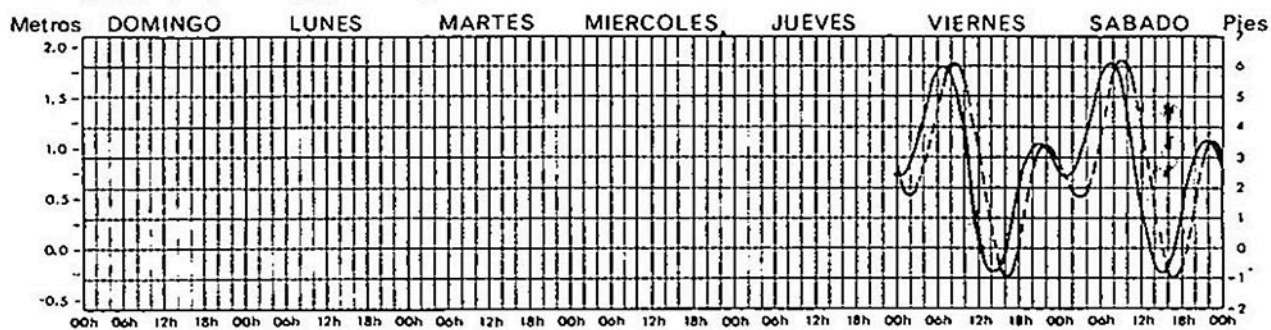


# ENERO 1988

ENSENADA, B.C.N.  
GRO. NEGRO, B.C.N.

VK 775  
C-345  
Eq. 1/2017

INSTITUTO DE GEOFISICA, U. N. A. M.



HORA DEL MERIDIANO 119° W

PLANO DE REFERENCIA: N.B.M.L.

1/18/88  
(12)

30  
19209  
1213

## CALENDARIO GRAFICO DE MAREAS, 1988

SAN QUINTIN, B.C.

ENSENADA, B.C.

ISLA GUADALUPE, B.C.

Este Calendario Gráfico de Mareas puede ser utilizado para todos los lugares de la Costa Occidental de la Península de Baja California, aplicando correcciones a las horas y a las alturas de las pleamares y bajamares (puntos máximos y mínimos de la gráfica de mareas).

### REGIMEN DE MAREAS.

El régimen de mareas para la Costa Occidental de la Península de Baja California es mixta semidiurna, con una gran desigualdad diurna; generalmente ocurren dos pleamares y dos bajamares en cada día de marea. Las amplitudes de marea van aumentando desde Ensenada hasta alcanzar su valor máximo aproximadamente en Punta Abrejos, para después volver a disminuir hacia Cabo San Lucas. La amplitud de marea en Isla Guadalupe es menor a la de la costa debido a que sufre menos distorsión.

### DIFERENCIAS.

Se dan correcciones al tiempo y a las alturas, únicamente para aquellos lugares en que se tiene información mareográfica fidedigna.

Las diferencias en tiempo y altura se aplicarán según su signo a las pleamares y bajamares de Ensenada, para obtener las del lugar deseado.

#### DIFERENCIAS DE TIEMPO

Estaciones	Pleamar Sup.		Pleamar Inf.		Bajamar Inf.		Bajamar Sup.	
	Hora	Min.	Hora	Min.	Hora	Min.	Hora	Min.
San Quintín, B.C.	+00	10	+00	20	+00	20	+00	45
Isla Gpe., B.C.	-00	10	-00	15	-00	15	-00	10

#### DIFERENCIAS DE ALTURA

Estaciones	Pleamar Sup.		Pleamar Inf.		Bajamar Inf.		Bajamar Sup.	
	Pies	m.	Pies	m.	Pies	m.	Pies	m.
San Quintín, B.C.	+0.4	+0.12	+0.5	+0.15	0.0	0.00	-0.2	-0.06
Isla Gpe. B.C.	-0.6	-0.18	-0.4	-0.12	-0.2	-0.06	-0.5	-0.15

### DEFINICIONES:

Pleamar Superior (P.S.). La más alta de las dos pleamares en cualquier día de marea.  
 Pleamar Inferior (P.I.). La más baja de las dos pleamares en cualquier día de marea.  
 Bajamar Inferior (B.I.). La más baja de las dos bajamares en cualquier día de marea.  
 Bajamar Superior (B.S.). La más alta de las dos bajamares en cualquier día de marea.

NOTA: Cuando en determinado día del Calendario las dos mareas altas o las dos mareas bajas del mismo día fueren iguales en altura; puede escogerse cualquiera de ellas como la pleamar superior o la bajamar inferior.

Si la marea pasa a ser diurna y solamente ocurren una pleamar y una bajamar, ambas deberán considerarse como pleamar superior y bajamar inferior.

### TIEMPO:

La hora usada para la predicción de marea para Ensenada, B.C., es la del meridiano 120° W. Se cuenta desde las 00 horas que corresponden a la media noche.

### PLANO DE REFERENCIA:

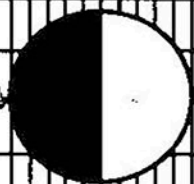
El plano de referencia que está bajo el nivel medio del mar, al cual están referidas las alturas, es el nivel de bajamar media inferior.

ENSENADA, B. C.      2.7 pies (0.82 m)  
 GUERRERO NEGRO, B.C. 2.7 pies (0.82 m)

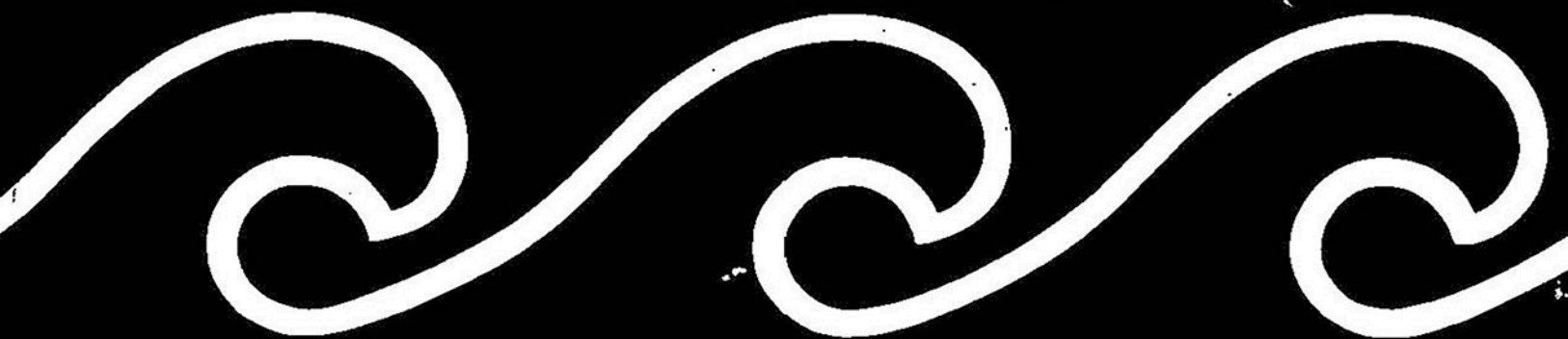
Ing. Fco. Grivel Piña  
 Instituto de Geofísica,  
 U.N.A.M.

**INSTITUTO DE GEOFISICA**

125-40  
(-2)



**Calendario Gráfico  
de Mareas 1988**



**Ensenada, B.C.N.  
Guerrero Negro, B.C.N.**