ESTIMACIÓN DEL CLIMA DE OLEAJE EN LA V REGIÓN:

CONSIDERACIONES DE DISEÑO

Gobierno de Chile

Instituto Nacional de Hidráulica

Dirección de Obras Portuarias

Ministerio de Obras Públicas

Gobierno de Chile

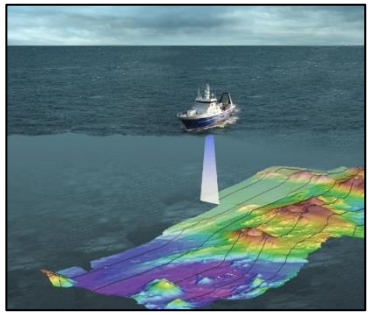
Instituto Nacional de Hidráulica

Ministerio de Obras Públicas

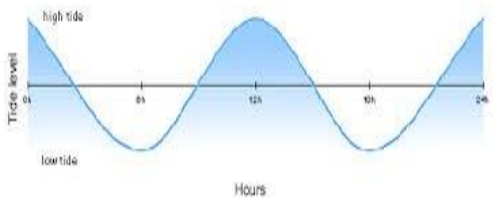
Gobierno de Chile

Estudio INH - Av. Perú y paseo Juan de Saavedra.

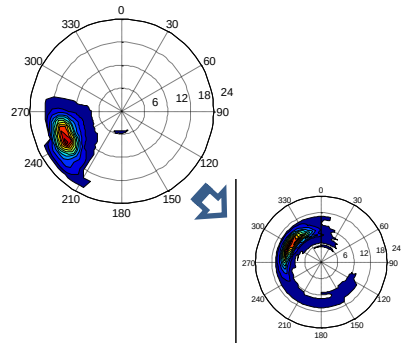
1.- Estudios básicos



Topo-batimetría



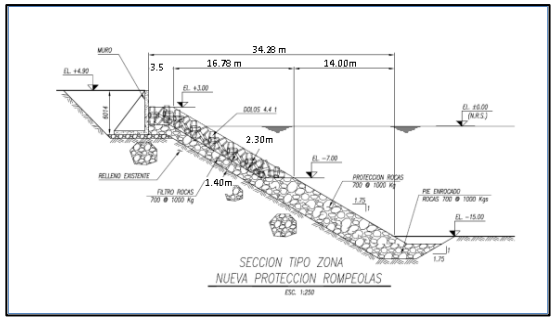
Análisis variables meteoceaográficas

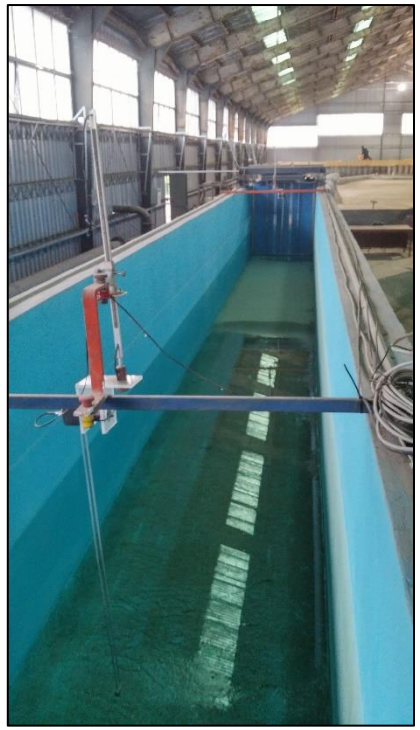


Estudio de oleaje

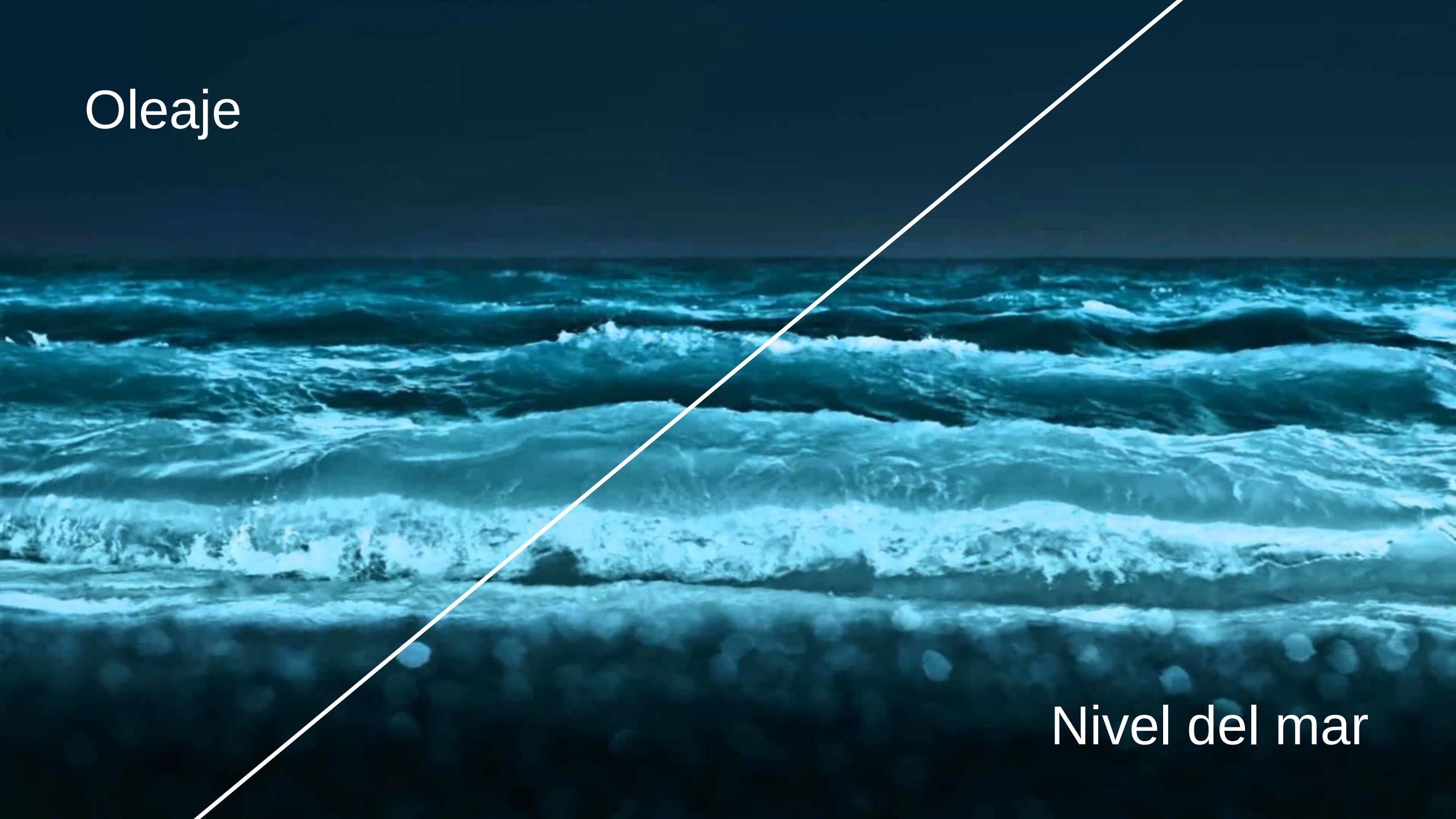
2.- Diagnostico situación actual

Modelación Física





3.- Alternativas de mejoramiento

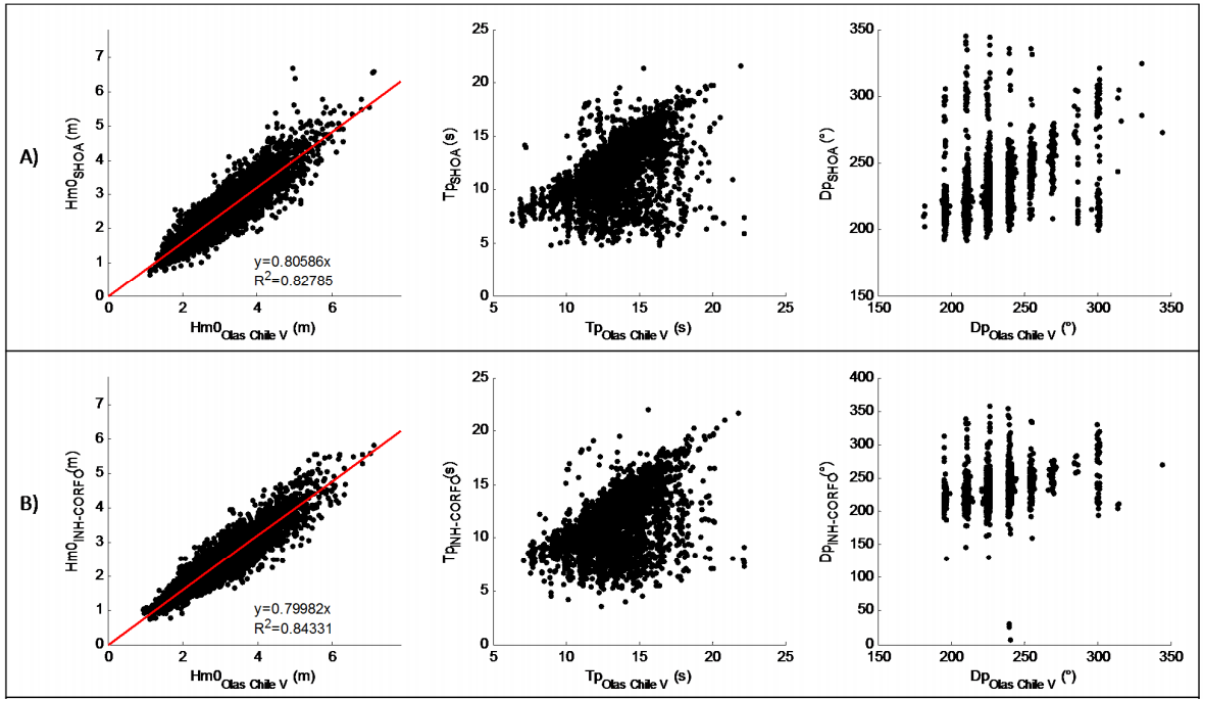

Oleaje
Nivel del mar

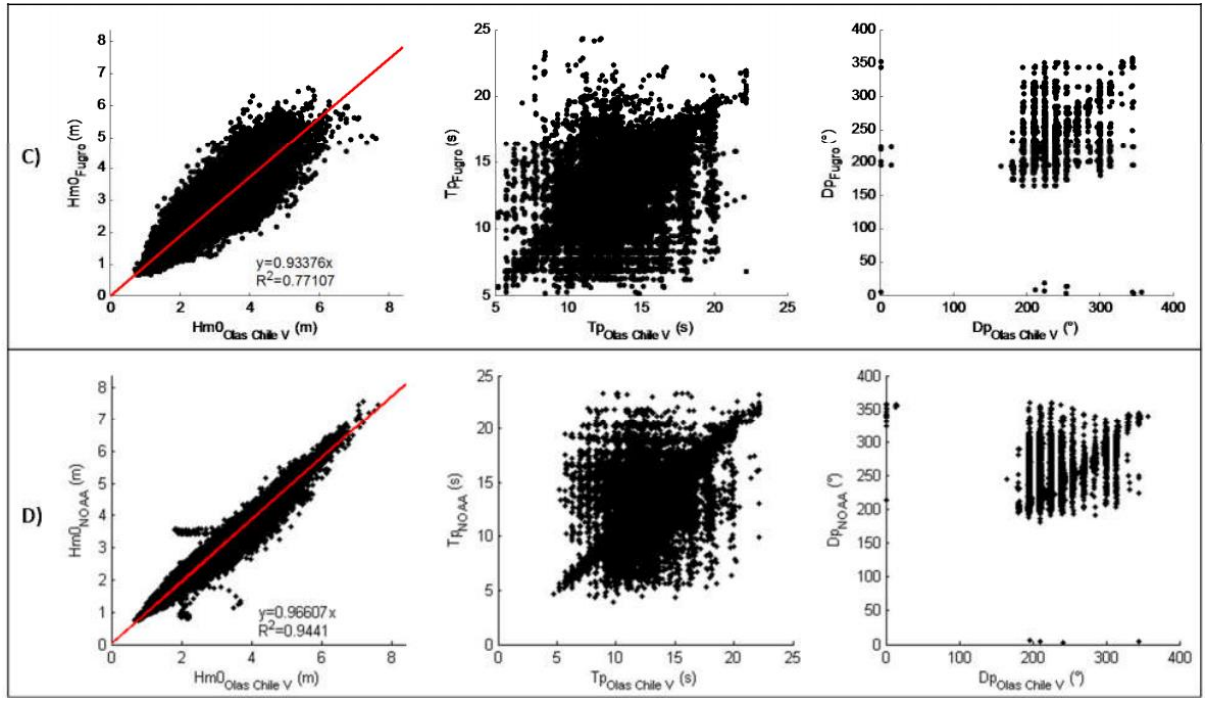
Oleaje

Fuentes de datos

Oleaje

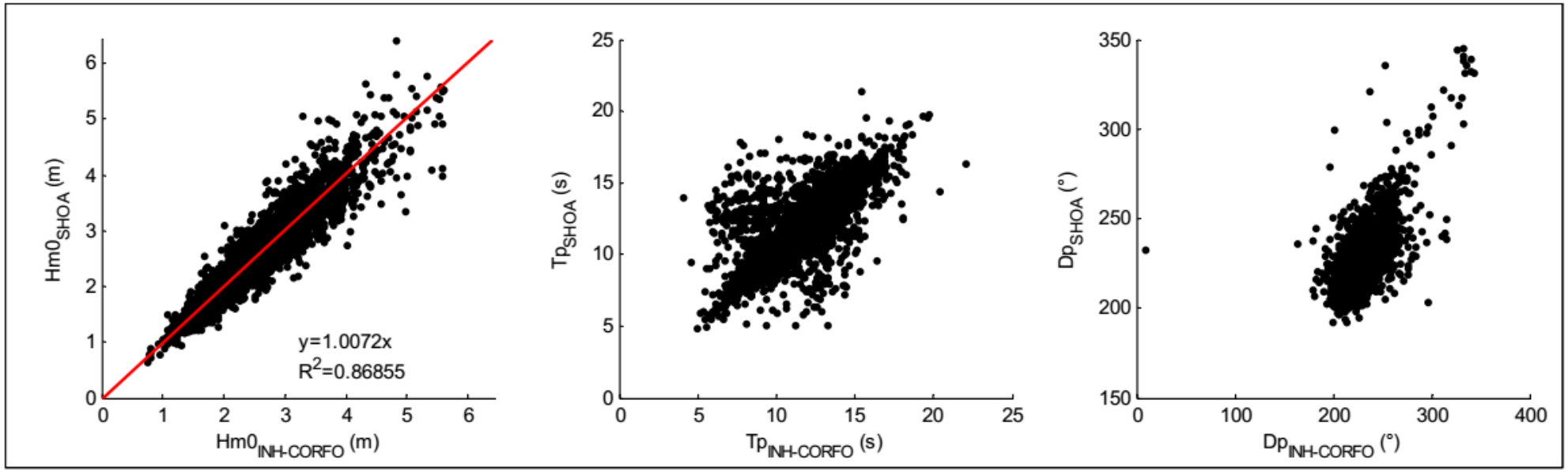
Comparación de parametros espectrales entre fuentes de datos (Hm0, Tp Dp)





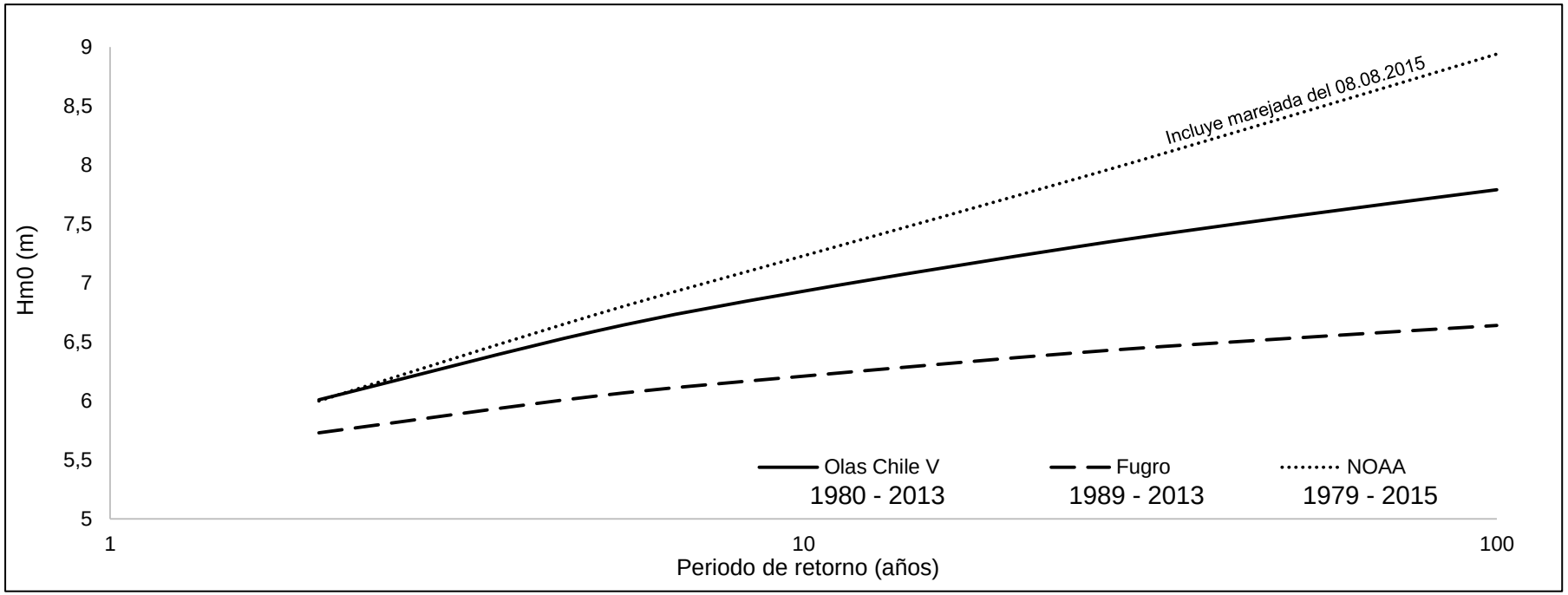
Oleaje

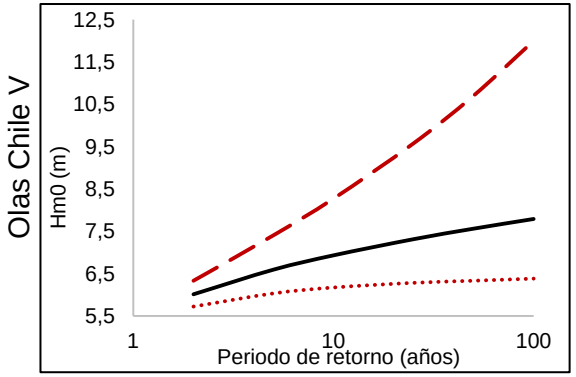
Comparación de parametros espectrales entre fuentes de datos



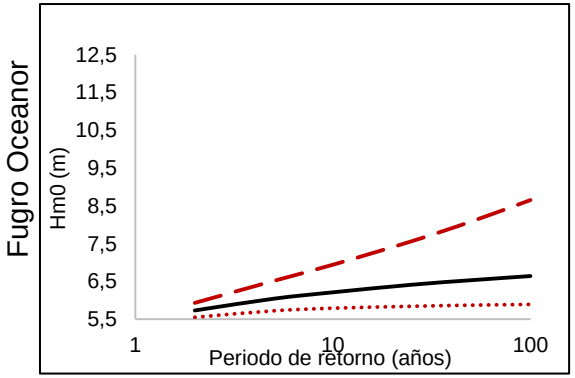
Oleaje

Análisis de extremos (Hm0) en aguas profundas

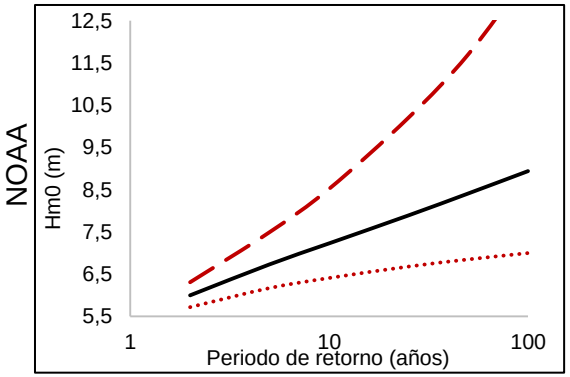




1980 - 2013



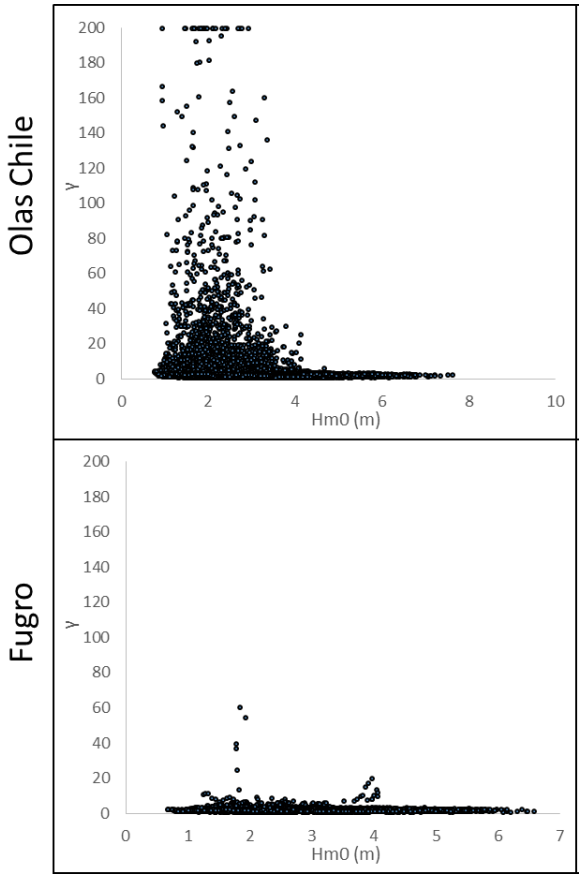
1989 - 2013

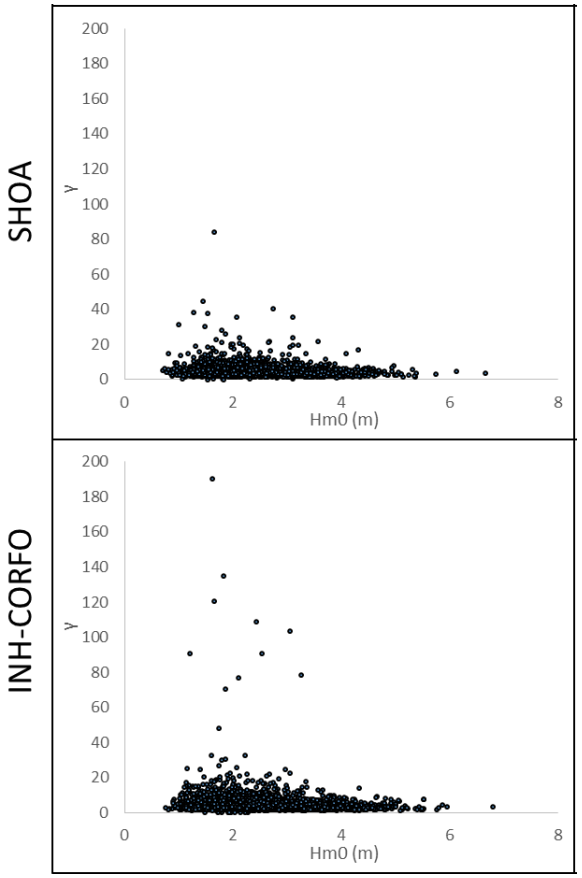


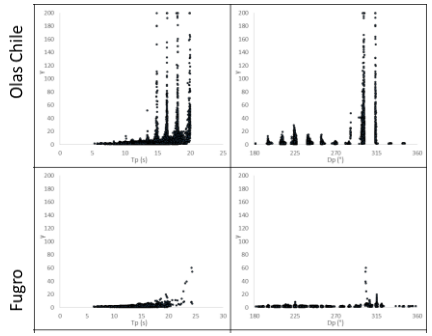
1979 - 2015

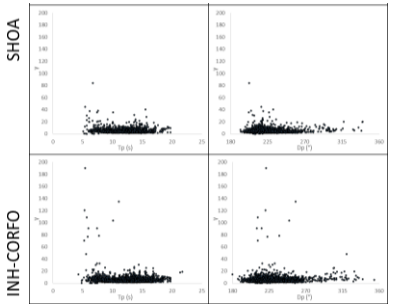
Oleaje

Forma espectral del oleaje



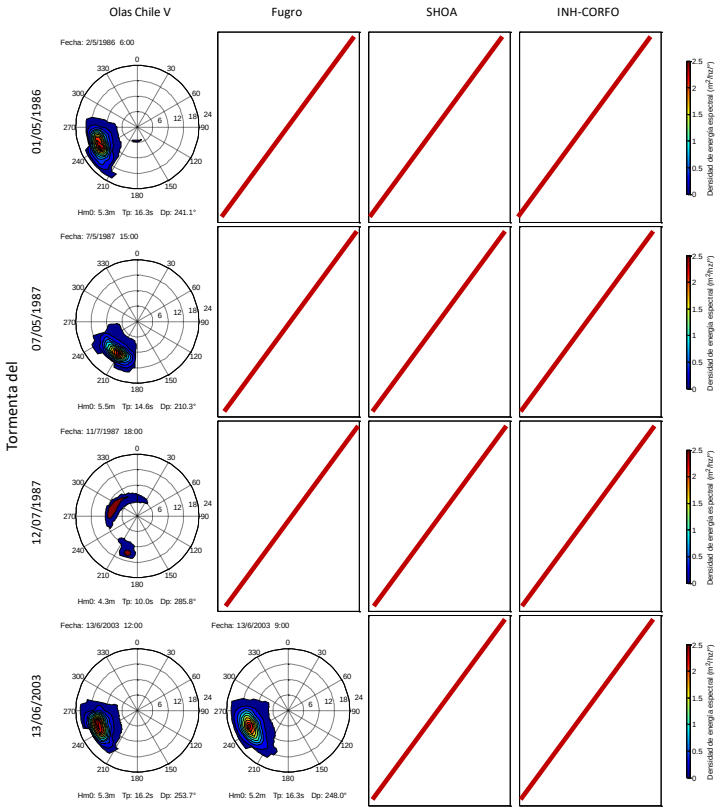


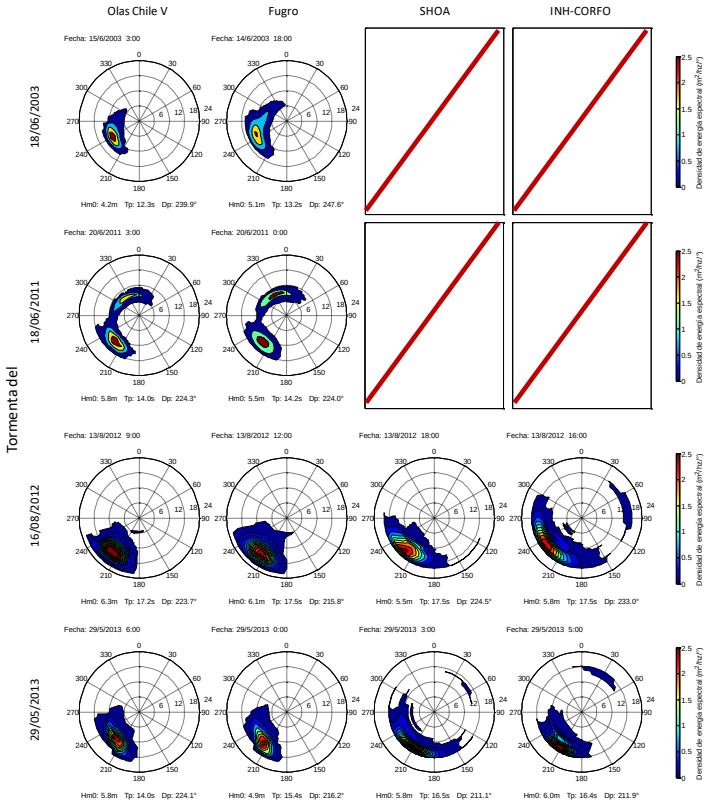


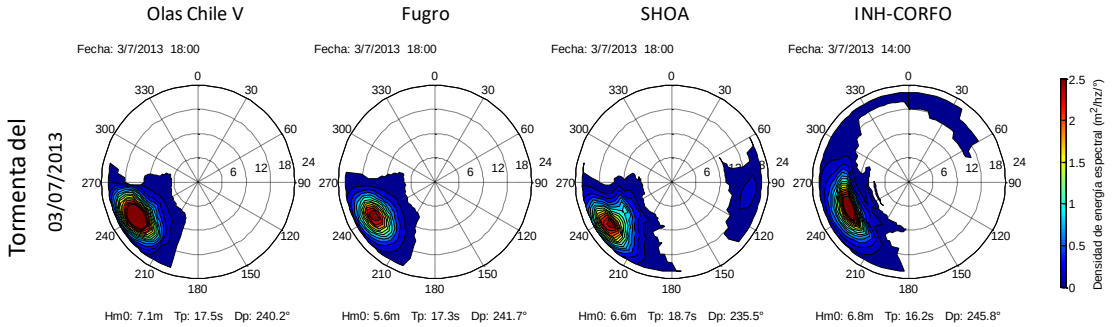


Oleaje

Forma espectral del oleaje durante marejadas



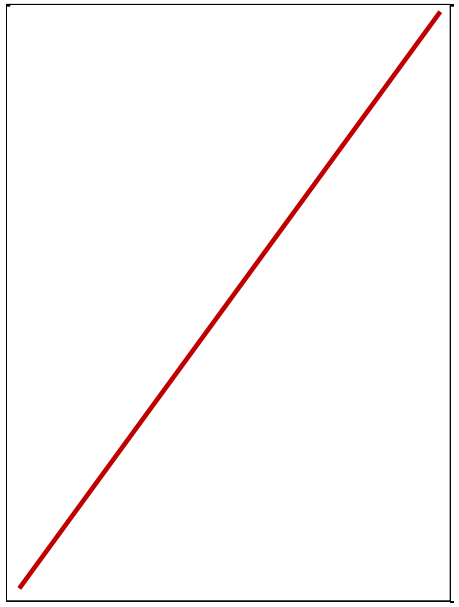




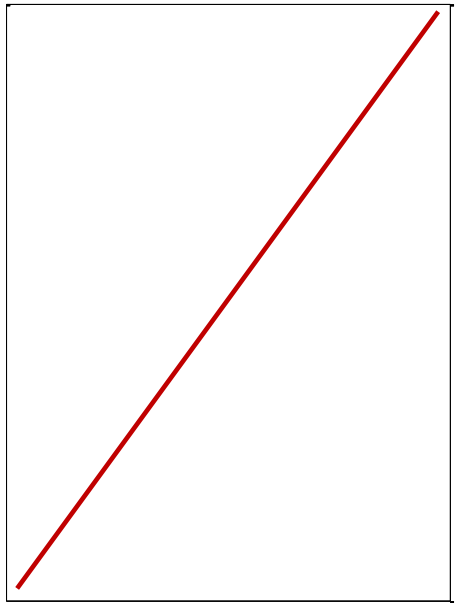
Oleaje

Forma espectral del oleaje durante marejadas – Evento del 08.08.2015

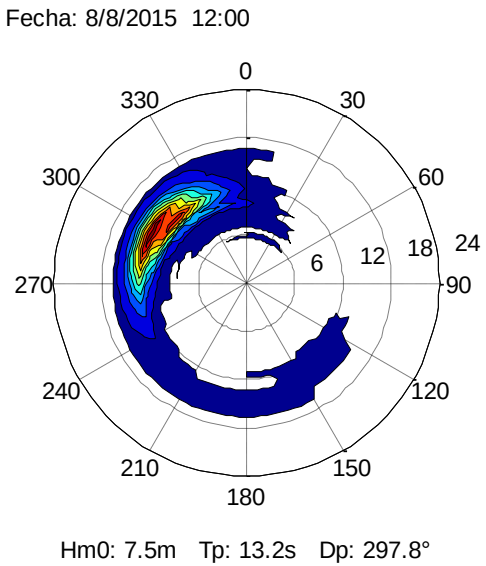
Olas Chile V



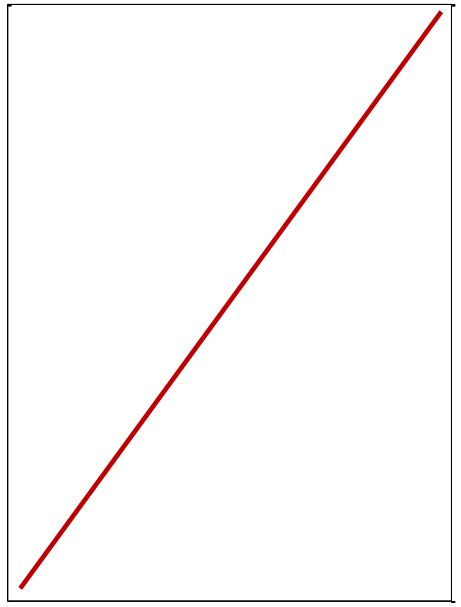
Fugro

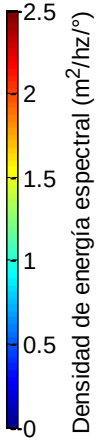


SHOA



INH-CORFO

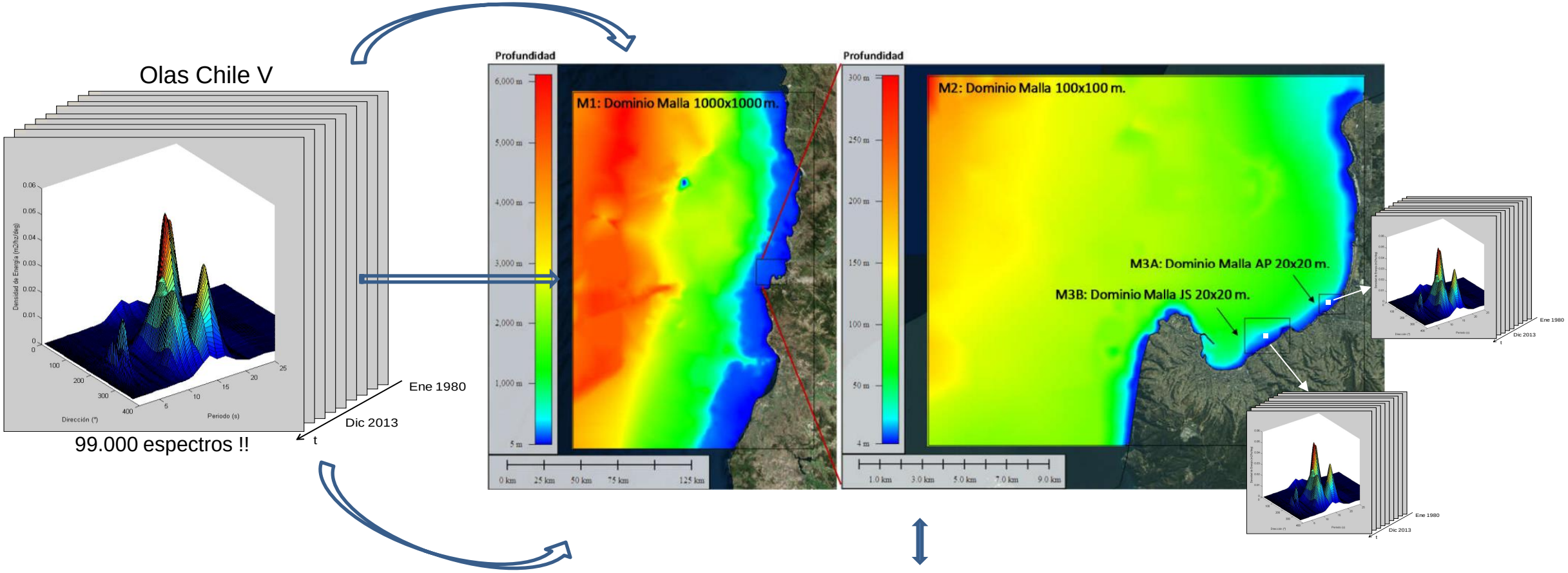




NOAA: Hm0: 9.2m Tp: 13.0s Dp: 320°

Oleaje

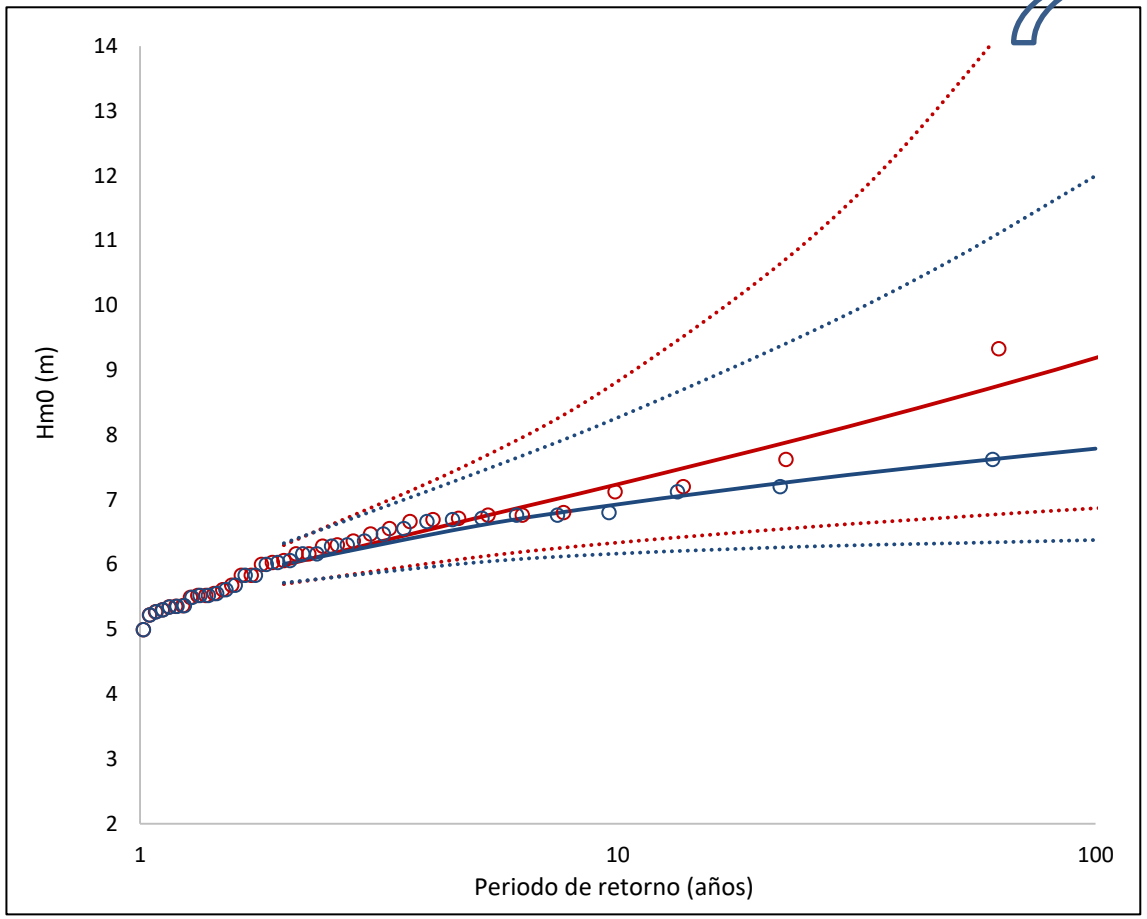
Propagación a aguas someras



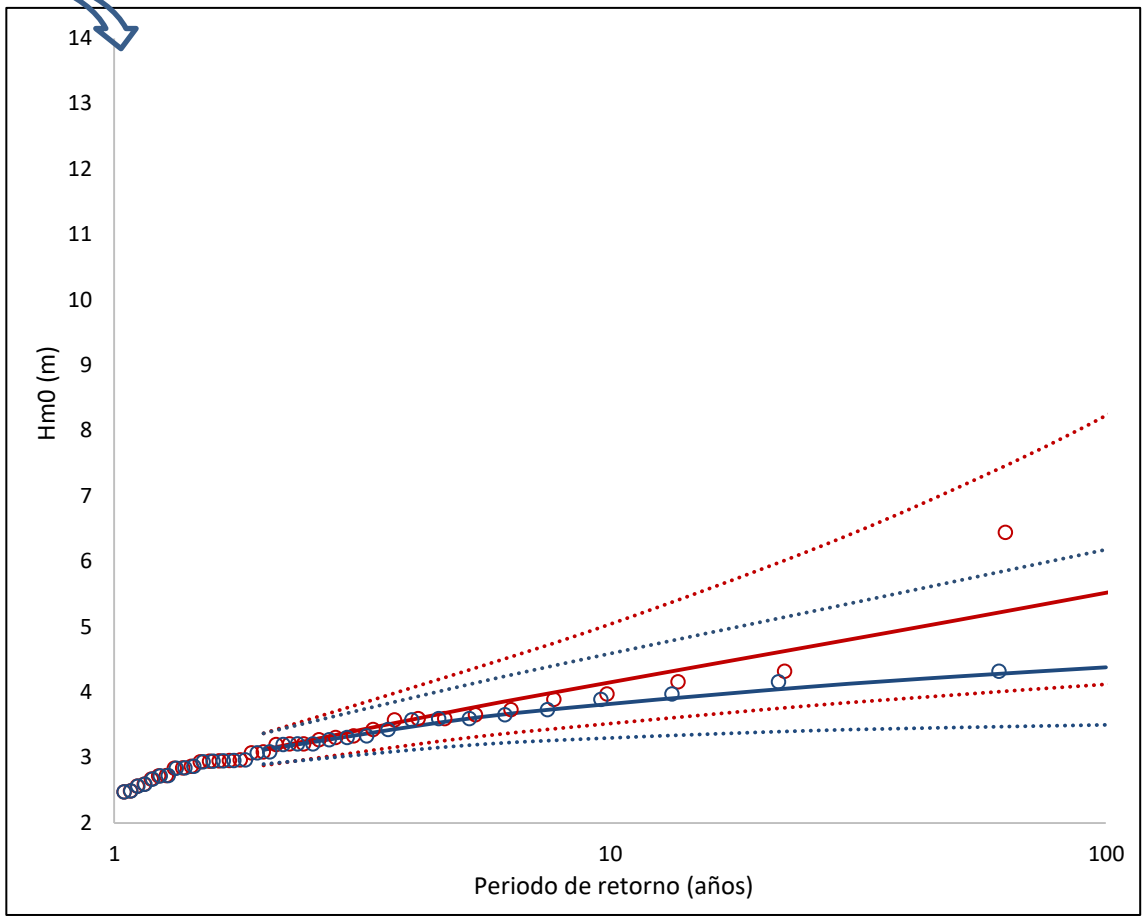
Oleaje

Análisis de extremos (Hm0) frente a Av. Perú – Resultados de modelación

Aguas profundas (Olas Chile V + NOAA08.08.2015)



Frente a Av. Perú (Propagación numérica – SWAN)



Pr ~ 120 Años

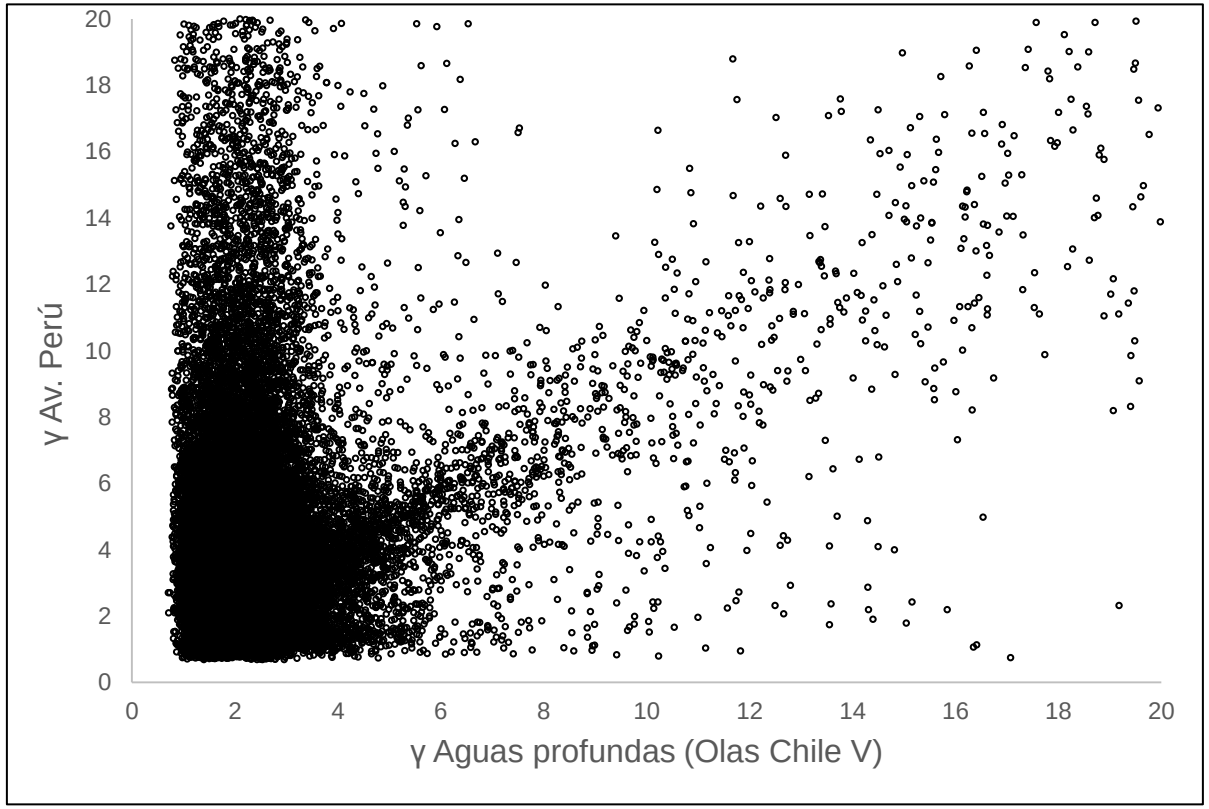
Pr ~ 450 Años

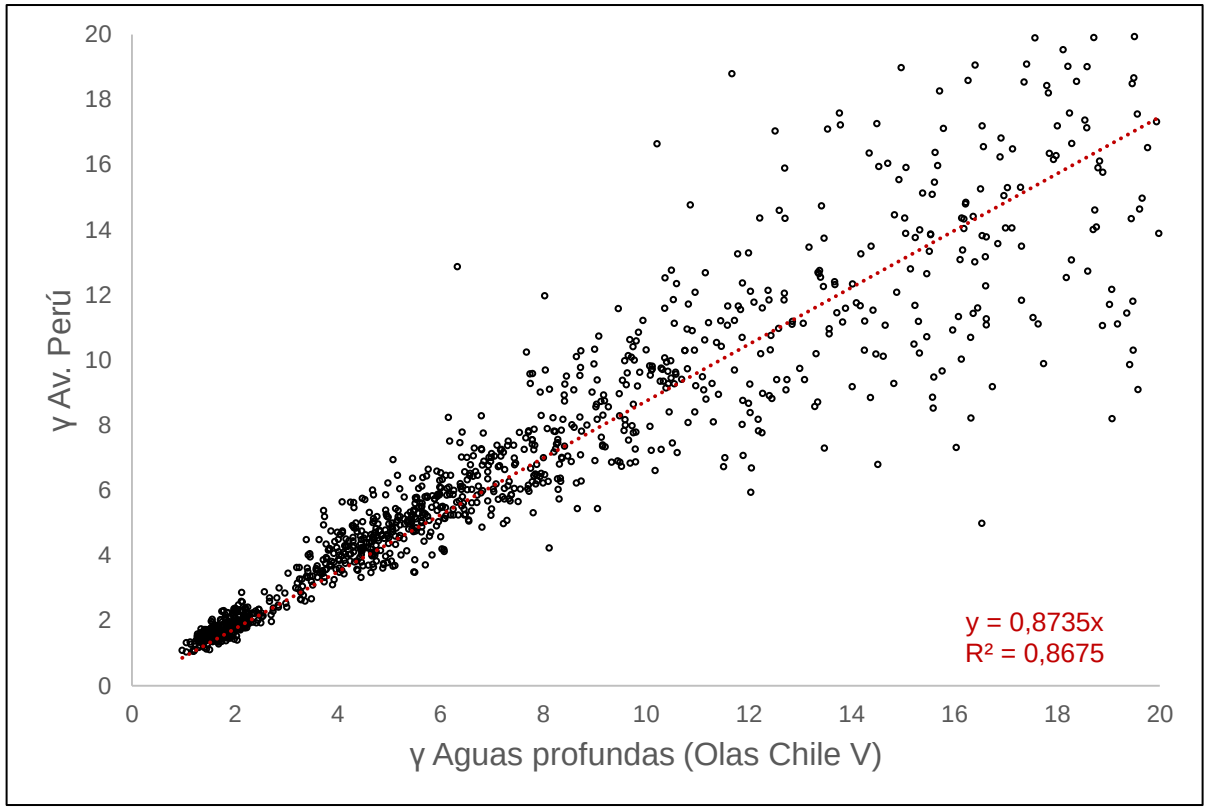
Con	08.08.2015:	AMV	AMV +95%	Empirico
Sin	08.08.2015:	AMV	AMV +95%	Empirico

(AMV: Ajuste de máxima verosimilitud)

Oleaje

Forma espectral del oleaje





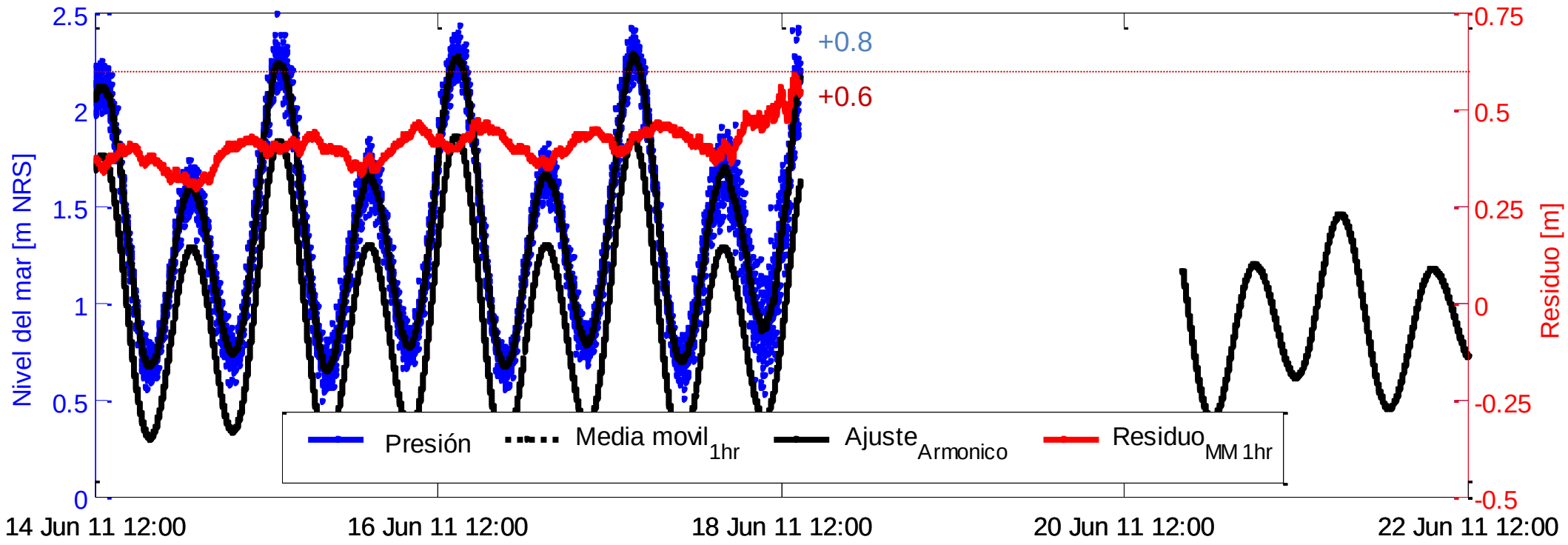
Nivel del mar

Fuente de datos

Intergovernmental Oceanographic Commission (IOC)

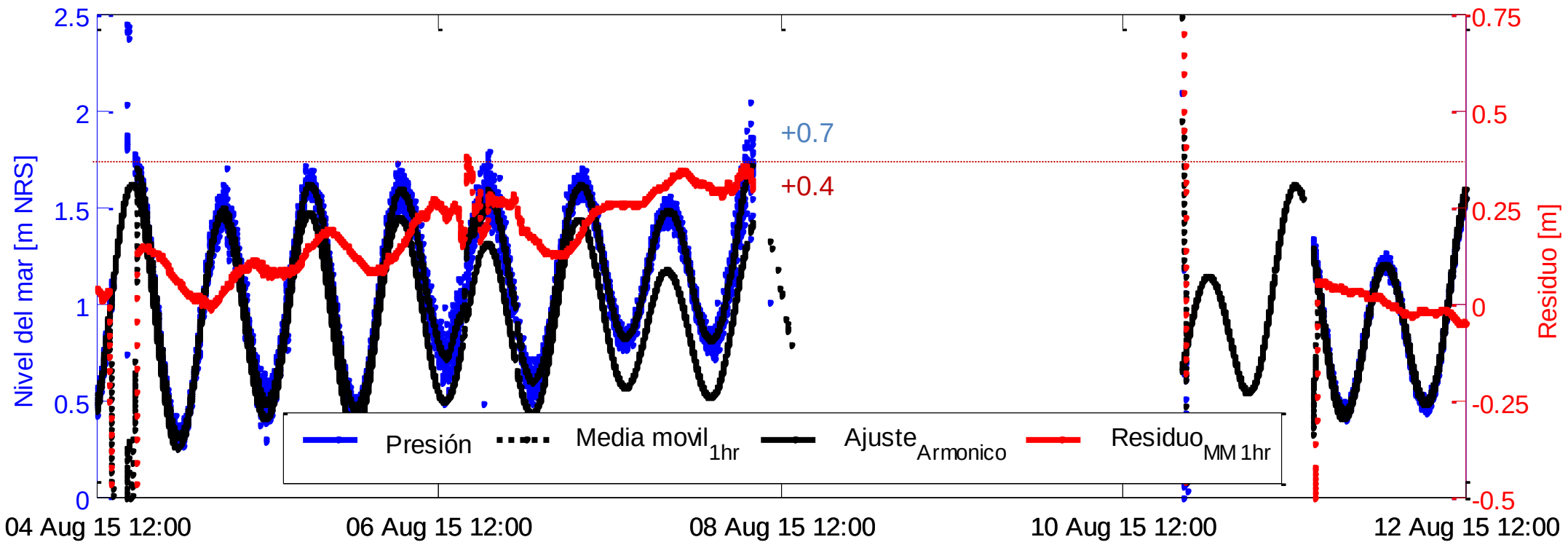
Nivel del mar

Marea astronómica – marea meteorológica: Evento de Jun 2011



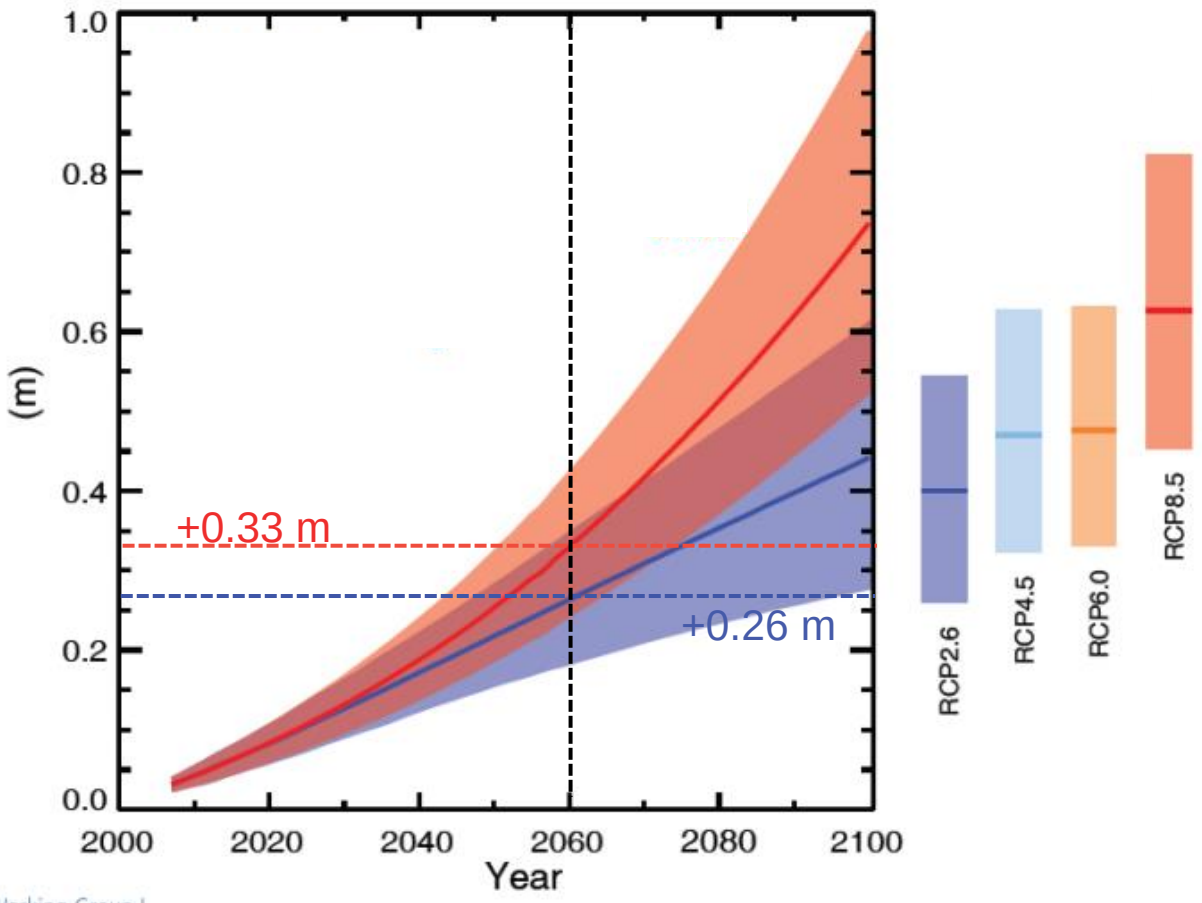
Nivel del mar

Marea astronómica – marea meteorológica: Evento de Ago 2015



Nivel del mar

Projecciones del aumento del nivel medio del mar



IPCC AR5 Working Group I
Climate Change 2013: The Physical Science Basis

ipcc
INTERGOVERNMENTAL PANEL ON climate change

Escenarios de modelación

Nivel del mar

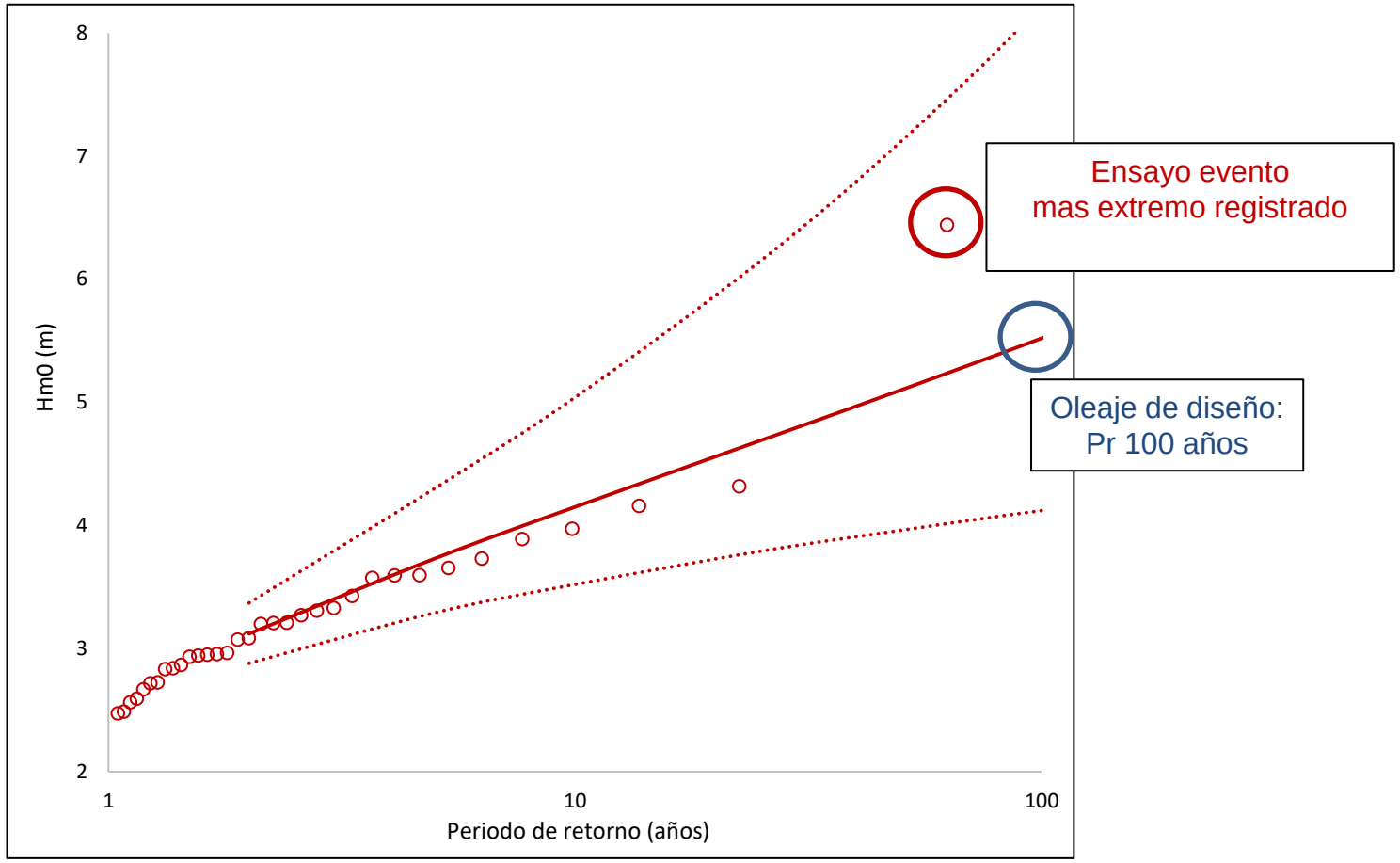
se reproduce
en modelo físico

Nivel de Marea = M_astronómica + M_meteorológica + WaveSetup + Cambio Climático

Escenario desfavorable para el sobrepaso	2.68 m	= 1.85 m	+0.5 m	+0.0 m	+0.33 m
Escenario desfavorable para la estabilidad del pie	0.93 m				

Escenarios de modelación

Oleaje



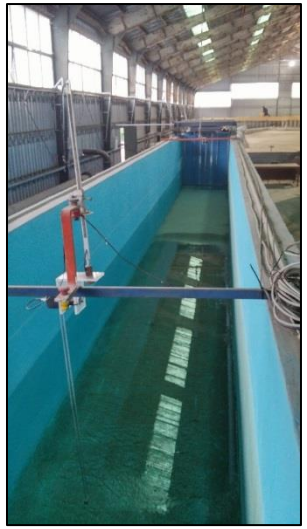
Periodos: 12s y 17.5s

Reflexiones finales

- Escases de datos de oleaje (temporal y espacialmente).
- Gran variabilidad de las características del oleaje según distintas fuentes de datos.
- Los parámetros de la forma espectral son muy importantes. Es recomendable tratar de estimarlos a partir de datos de campo.
- Incertidumbre en la estimación de los parámetros de diseño asociados a periodos de retorno.
- No siempre la altura de oleaje es el parámetro mas critico de diseño, en especial en aguas mas someras. En el caso de nuestro estudio, el periodo y el nivel de marea pueden ser tan o mas relevantes que el Hm0.

Que sigue?

Modelación física



Apoyo en modelación numérica (alternativas)

Gracias

Gobierno de Chile

Instituto Nacional de Hidráulica