Meteorologisk institutt
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MyWave – research towards a pan-European GMES service for ocean waves

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Objective

- **MyWave - A pan-European concerted and integrated approach to operational wave modelling and forecasting – a complement to GMES MyOcean services**
- **MyWave is a research project to enhance the quality of wave forecasts and lay the foundation for a future GMES service for ocean waves beyond 2014**

objectives

The main goal of MyWave is:

to lay the foundation for a future Marine Core Service that includes ocean waves.

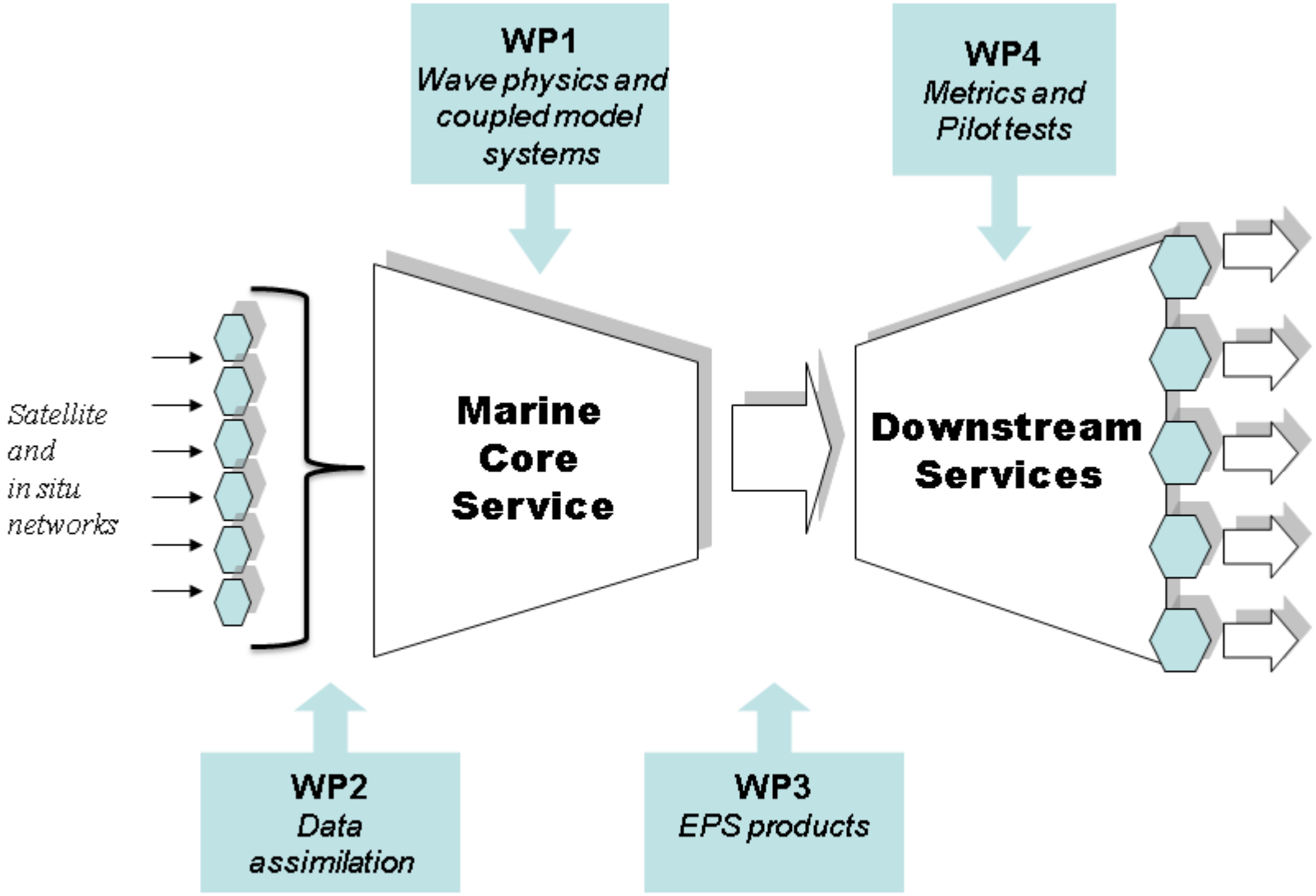
To reach this goal we will:

- increase the use of earth observations by improving data processing algorithms and data assimilation systems,

improve the physics in current wave models and provide a framework for coupled model systems (atmosphere/waves/ocean),

establish a new standard for probabilistic wave forecasts based on ensemble methods,

derive standard protocols for validation products.


WP1
Wave physics and coupled model systems
WP4
Metrics and Pilot tests
Satellite and in situ networks
Marine Core Service
Downstream Services
WP2
Data assimilation
WP3
EPS products

Work packages

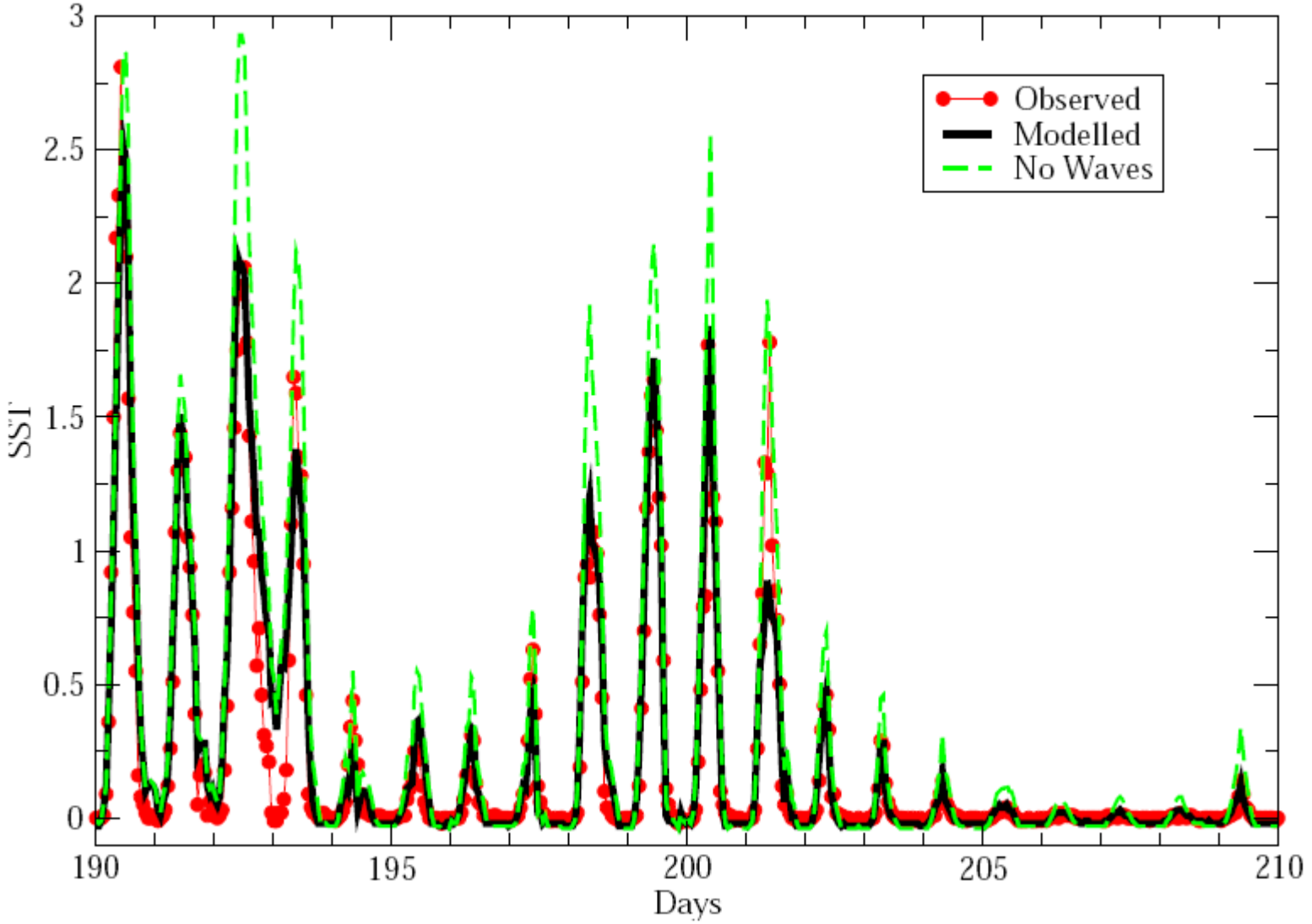
- **WP1 (ECMWF): Model developments**
- **WP2 (DELTARES): Data assimilation and improvement of both model and satellite near shore winds and waves**
- **WP3 (ISMAR): Ensemble approach to European wave modelling**
- **WP4 (UKMO): Metrics for Wave Model Core Products**
- **WP5 (MET.NO): Management**
- **WP6 (MET.NO): Dissemination**

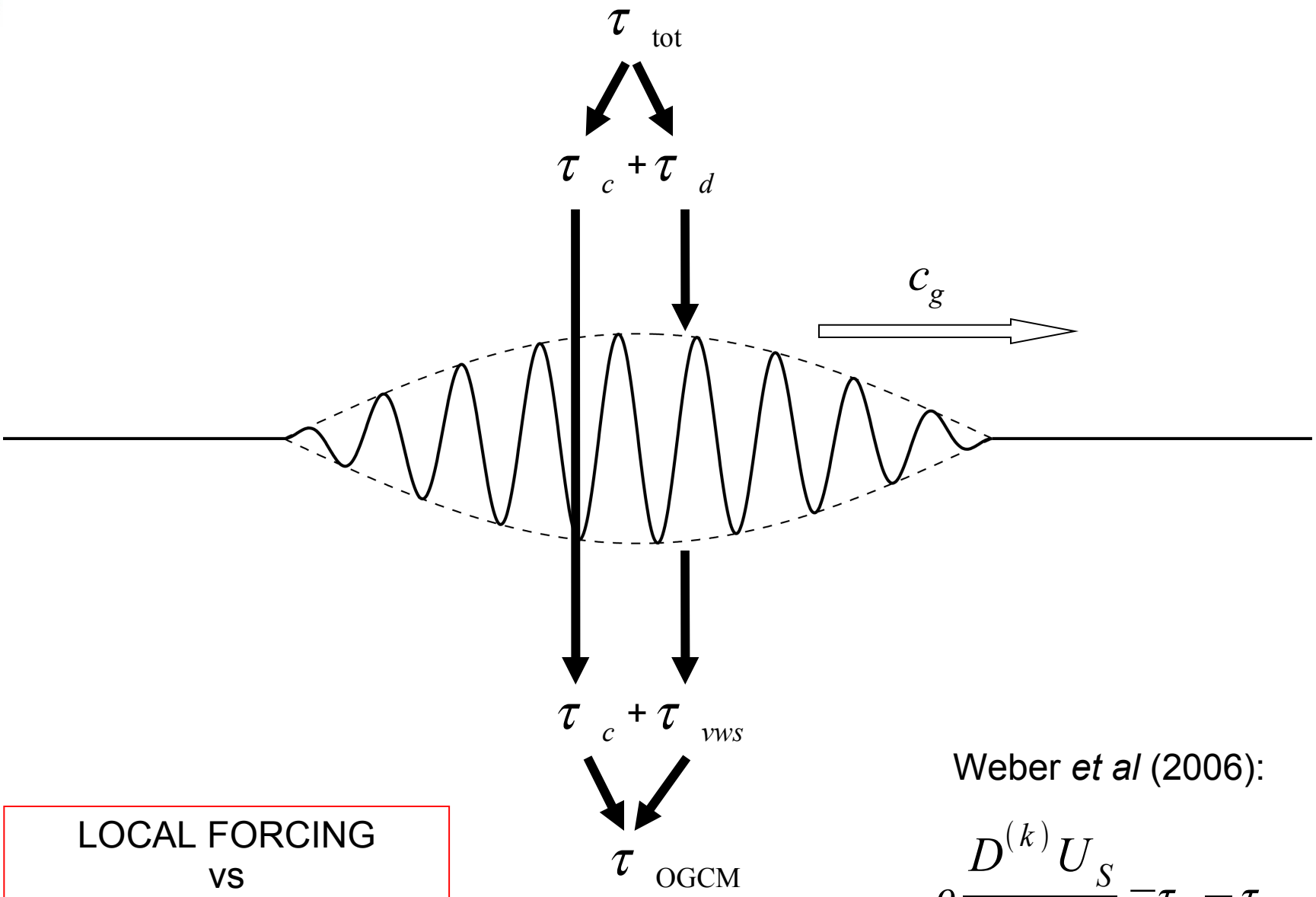
WP1

- **Model developments**
  - **Wind inpt in extreme conditions**
  - **Wind-wave interaction in swell conditions**
  - **Improved nonlinear transfer**
  - **Improved wave breaking term**
  - **Coupling with the ocean**
  - **Development of Italian (ISMAR) and Greek (HCMR) regional**
  - **Web based source code library**

Task 1.3 under WP1: Coupling with the mean ocean currents

- **Developments will be implemented in the ECNWF seasonal forecasting system (atmosphere-wave-current) and will include:**
  - **Mixed layer modeling (injection of TKE from breaking waves)**
  - **Current included in wave advection term (current refraction etc)**
  - **Momentum flux through waves**

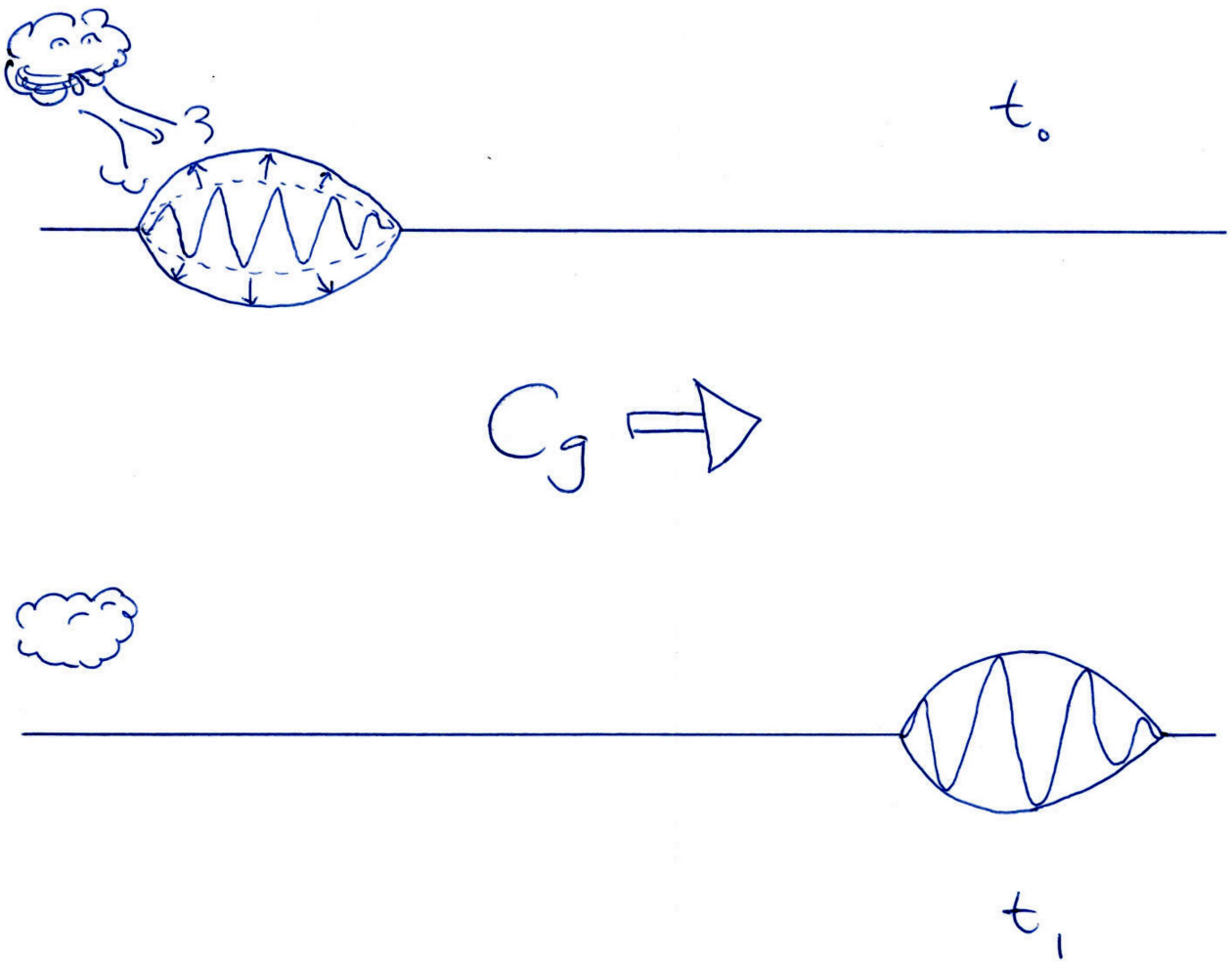

Observed
Modelled
No Waves
SST
Days
3
2.5
2
1.5
1
0.5
0
190
195
200
205
210

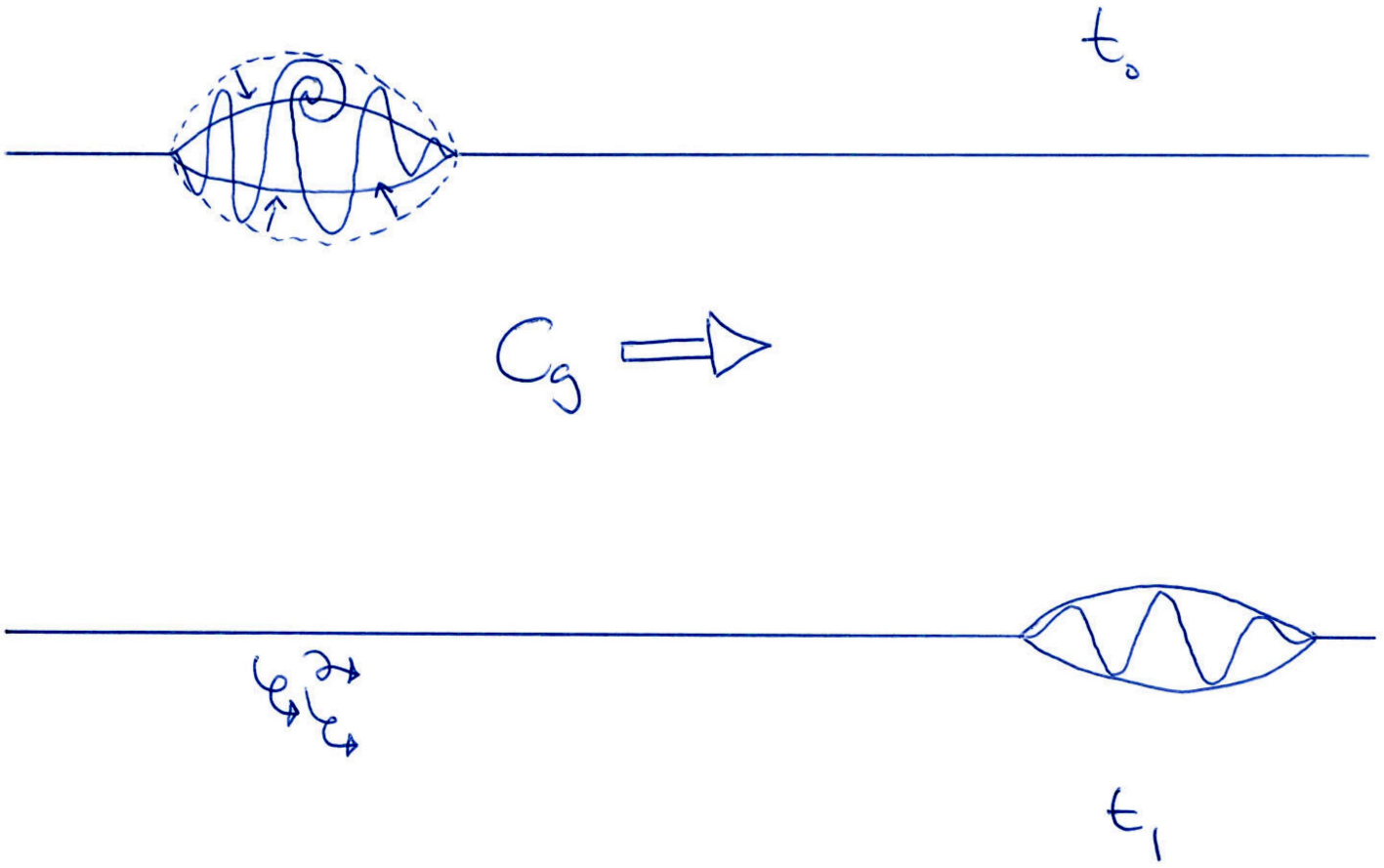


LOCAL FORCING
vs
ADVECTION BY GROUP

Weber *et al* (2006):

$$\rho \frac{D^{(k)} U_S}{dt} = \tau_d - \tau_{vws} .$$


t_0
C_g
t_1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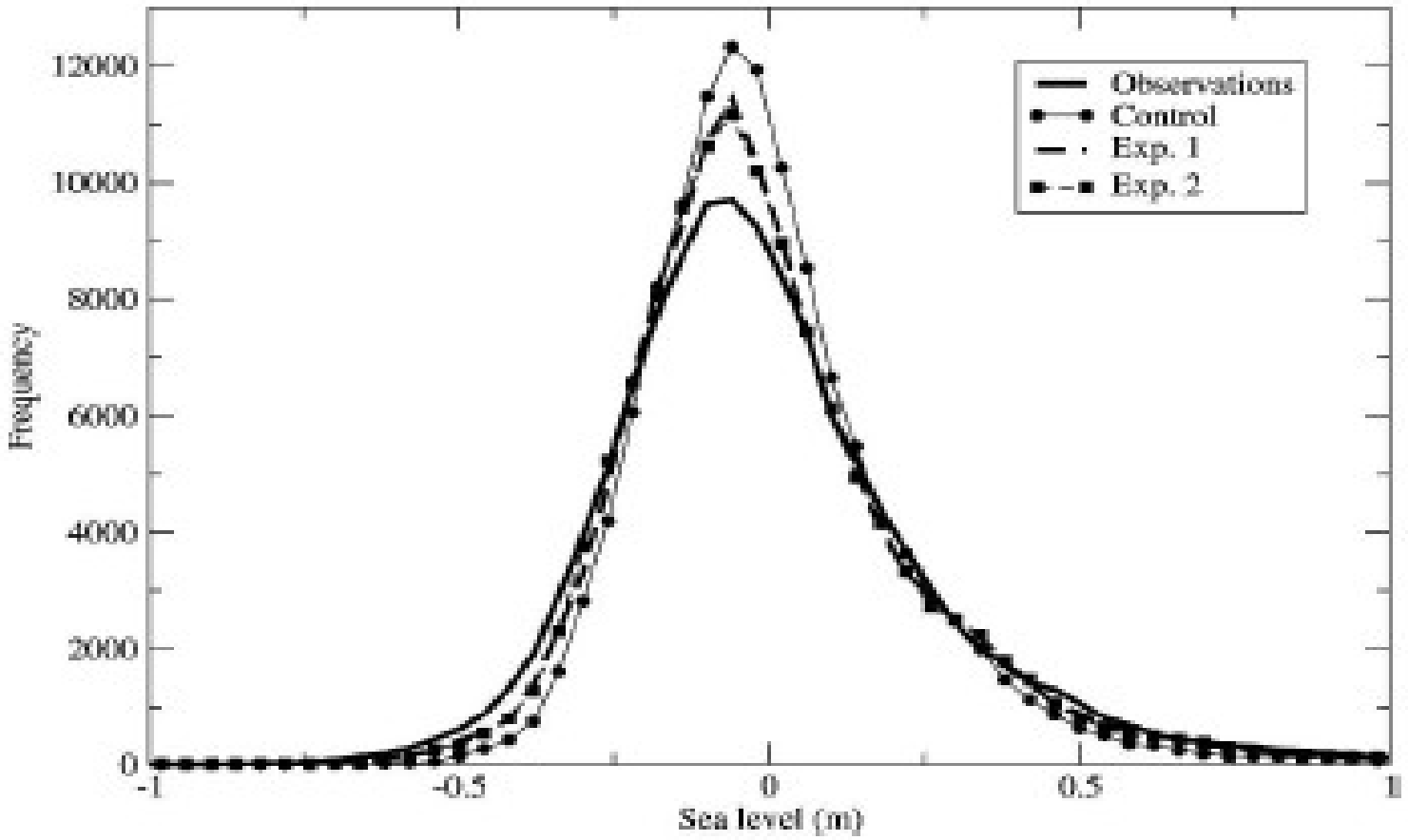
Observations
Control
Exp. 1
Exp. 2
Frequency
12000
10000
8000
6000
4000
2000
0
-1
-0.5
0
0.5
1
Sea level (m)

Deltares

Enabling Delta Life

Data-assimilation with SWAN and OpenDA

Martin Verlaan,

Sofia, Saskia, Julius, Arno, … (Deltares)

Nils van Velzen (TU-Delft)

13 Feb 2012

WP3

Ensemble approach to European wave modelling

To apply different Ensemble techniques in wave forecast, assessing, for two separate and different areas, performance and increased information with respect to a deterministic approach.
To apply the technique both at large and local scales, in the latter case for three specific harbours

Two approaches will be followed to ensemble forecast

WP3
Task 3.1 – Ensemble Transform Kalman Filter (followed by UKMO)

Task 3.2 – Local Ensemble Transform Kalman Filter (followed by USAM)

WP4

Task 4.1: Identify 'compatible metrics' using remote sensed and in-situ wave measurement baselines

Task 4.2: Identify user focused performance metrics

Task 4.3: Performance metrics for ensemble prediction systems

Summary

- **Official start was 1 January 2012**
- **Project will last for 3 years**
- **Total budget is 2.000.000,- EUR**

Summary

- **MyWave aims at:**
  - **Improve current state of the art wave modeling**
  - **Establish regional models coupled to atmosphere**
  - **Establish a global model coupled to ocean and atmosphere**
  - **Improved data assimilation techniques**
  - **Regional wave ensemble forecasts**
  - **Proposa a road map towards a future GMES service for ocean waves**