AquaPark – Norad funded project

Planning and management of aquaculture parks for sustainable development of cage farms in the Philippines
Wave modelling for exposed cage areas

by

Øyvind Leikvin & Lars Øvergaard

Output from AquaPark

Aquapark Project Partners
– Bureau of Fisheries and Aquatic Resources
– Akvaplan-niva AS
– Map and Marine Ltd
STWAVE simulates

- Depth-induced wave refraction and shoaling
- Current-induced wave refraction and shoaling
- Depth-steepness-induced wave breaking
- Diffraction
- Wind-wave growth
- Wave-wave interaction
- Whitecapping
- Reflection
STWAVE assumptions

• Mild bottom slope
• Spatially homogeneous offshore wave conditions
• Steady-state waves, currents, and winds
• Linear refraction and shoaling
• Depth-uniform current
• Linear radiation stress
STWAVE modelling, Panabo - Main input data

- **Bathymetry**
  (provided from oceanographic charts and own measurements)

- **Wind speed in model domain**
  (1 year of wind-data (2009) extracted from measurements from Panabo area given by Namria)

- **Wave height at ocean boundary**
  (10 years of offshore wave data retrieved from [www.buoyweather.com](http://www.buoyweather.com), and is extracted from hindcast data from a global WAM wave model.)

- **Wave energy spectrum**
  (default by the model/ defined by user)
STWAVE modelling, Panabo - Model setup

- Resolution: 100 * 100 m (nesting also possible)

- Whole bay of Davao covered, an area of about 6000 km².

- Incoming wind and waves from the opening of Davao Bay in the south
Can you find reference on this, Patrick?
Oyvind Leikvin, 9/1/2010
Results

- A georeferenced picture/map may be placed as a background for the model plot.
- A wave train is set up, entering the model domain from offshore.
- Typically the whole bay system and the boundary towards the open ocean will be covered.
Overview of the area
Significant wave height (Hs)

- Red areas: 0-1 m
- Blue areas: 2 m
(input wave at offshore: 2.1 m)

- Should look at winds and waves from all directions, as well as taking peak periods into account.

- Reveals possible places for aquaculture
Significant wave height (Hs), from different angles
The STWAVE model also simulates the directional spreading of the waves into the bay:
MARAMING SALAMAT!