

# Progress Reporting from Set net Team

Landing & Marketing site of Set-net at Mae Rumpon Beach 12-19 Mar. 2013  
EMDEC staff on duty of catch monitoring for major species



# C6 Set-net Team Task & Goal

- Monitoring of set-net catch / sales record
  - Cost-Profit analysis for income simulation
  - Fish accumulation performance of chamber net
  - Unit price analysis with size frequency data
  - Long-term trend of catch composition with trophic level analysis, as stomach contents and stable-isotope analysis
  - Catch competition with other coastal and commercial fishing gear
- Distribution and marketing channel of set-net catch
- Monitoring of extension phase to other region
- Technical & Management Manual of set-net technology transfer

**“OPERATION SYSTEM ANALYSIS OF SET NET IN RAYONG, THAILAND,  
FROM THE VIEW POINT OF COST-PROFIT SIMULATION  
WITH FUEL CONSUMPTION ASSESMENT”**

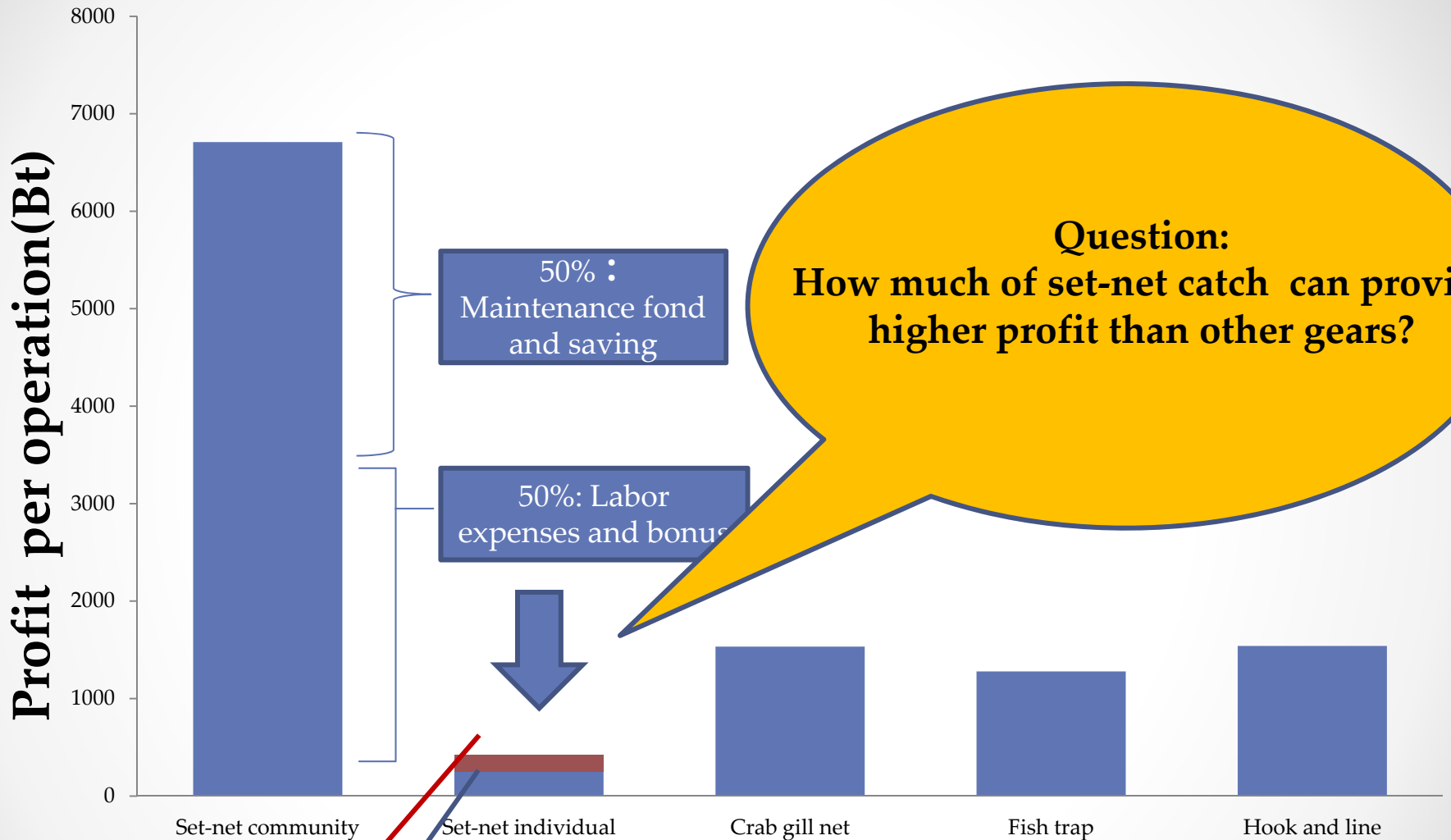
**Takatsugu KUDOH**

**supported by KU, SEAFDEC & TUMSAT**

**Takafumi ARIMOTO, Anukorn BOUTSON,**

**Aussanee MUNPRASIT, Nopporn MANAJIT**

# Part2: Profit comparison between set-net and other gear fishermen



## Profit per operation in fishing gear types

Bonus

Daily salary

# Simulation model of profit of 1 fisherman

$$\text{Profit}(\text{year}) = \text{Sale}(\text{year}) - \text{Cost}(\text{year})$$

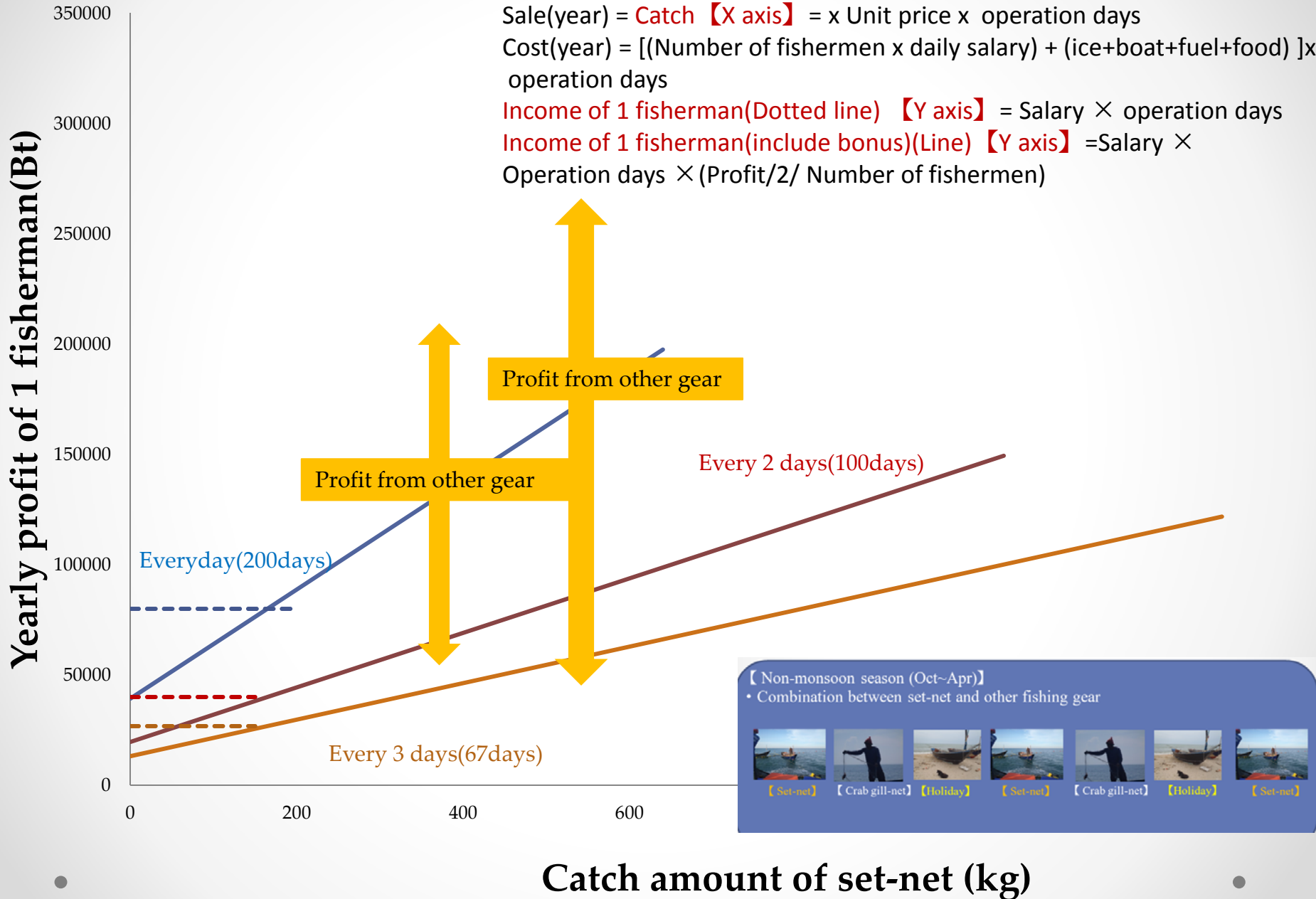
$$\text{Sale}(\text{year}) = \text{Catch} \text{ [X axis]} = x \text{ Unit price} \times \text{operation days}$$

$$\text{Cost}(\text{year}) = [(\text{Number of fishermen} \times \text{daily salary}) + (\text{ice} + \text{boat} + \text{fuel} + \text{food})] \times \text{operation days}$$

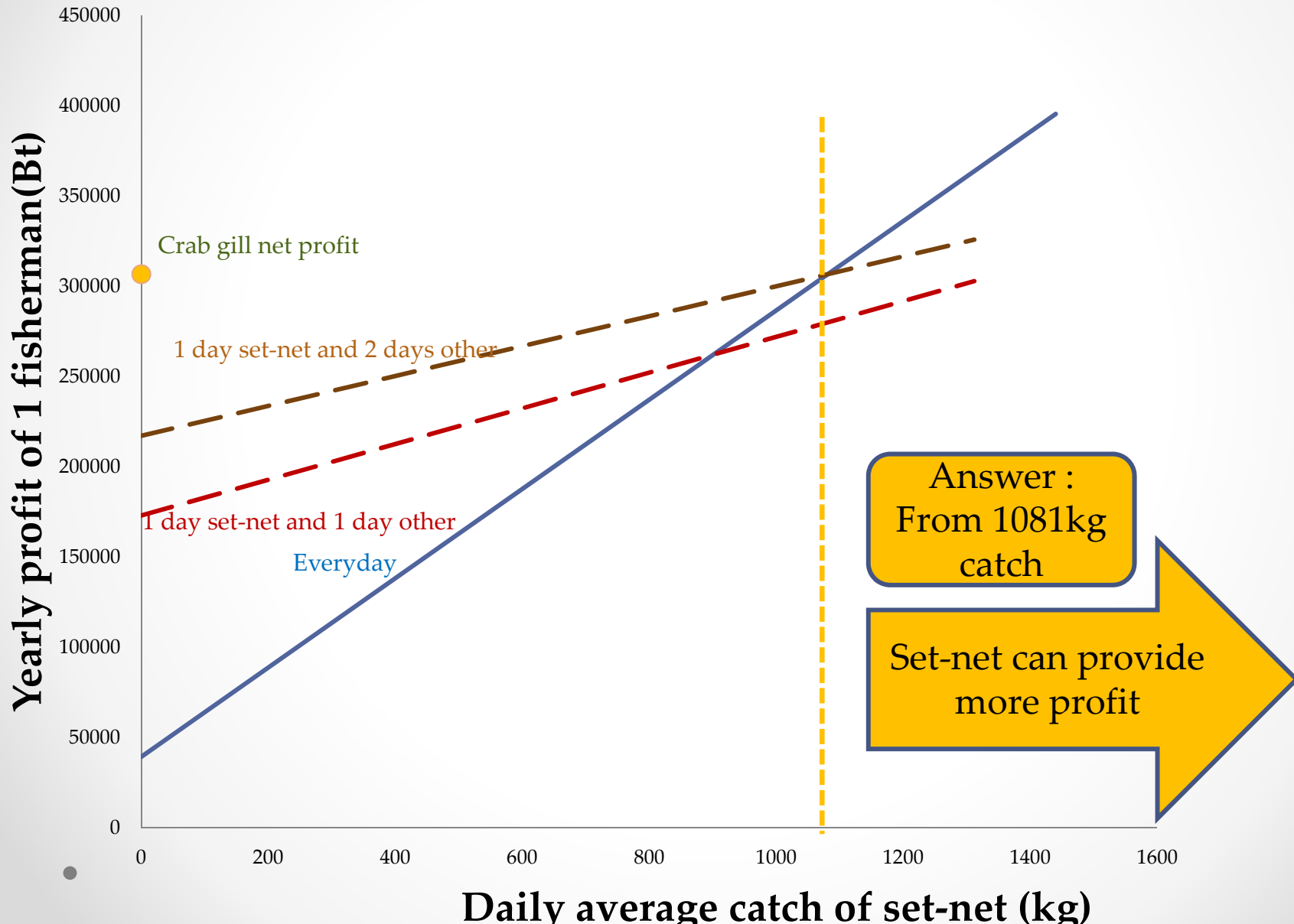
$$\text{Income of 1 fisherman (Dotted line) [Y axis]} = \text{Salary} \times \text{operation days}$$

$$\text{Income of 1 fisherman (include bonus) (Line) [Y axis]} = \text{Salary} \times$$

$$\text{Operation days} \times (\text{Profit} / 2 / \text{Number of fishermen})$$

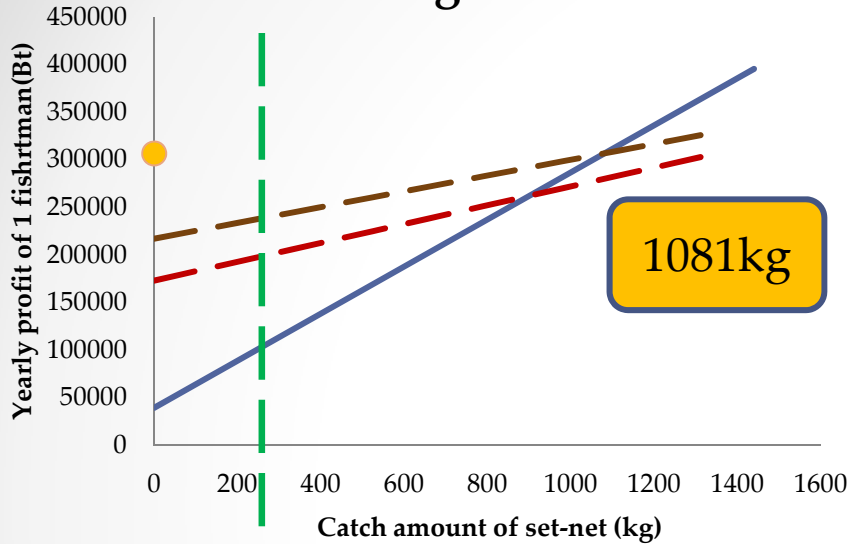


# Relationships between yearly total profit of 1 fisherman and catch amount of set net with the difference of operation days in case of crab gill net

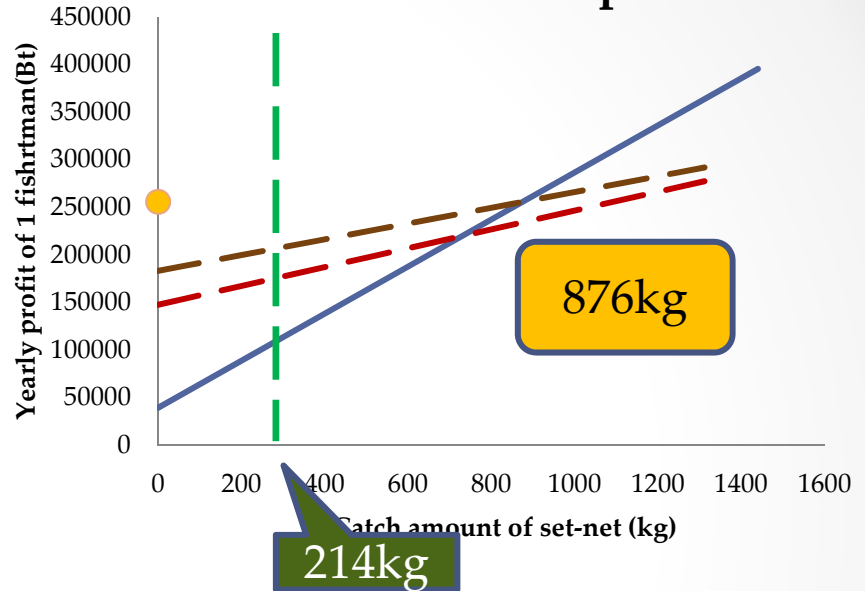


# Simulation model of profit of 1 fisherman

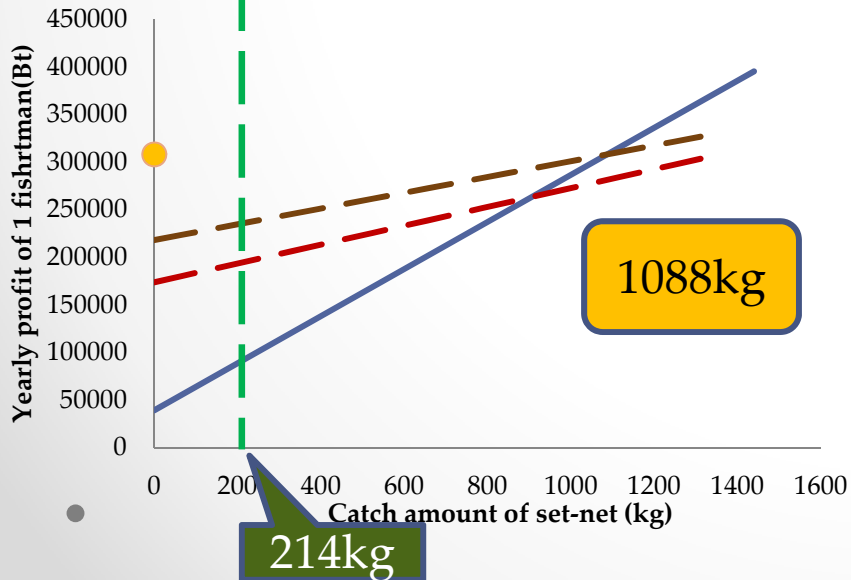
## Crab gill net



## Fish trap



## Hook and line



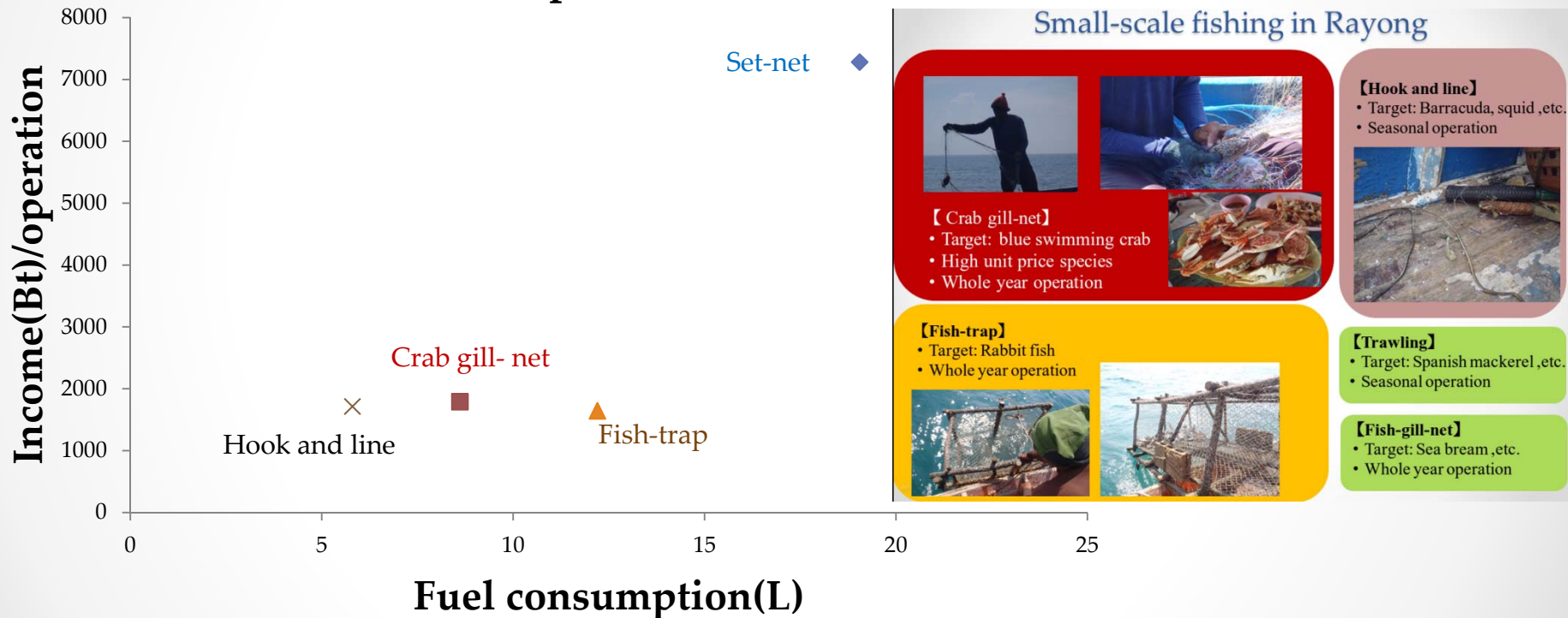
- Everyday set net
- - 1 day setnet and 1 day other
- - 1 day setnet and 2 days other
- Everyday other

**Conclusion:**  
Set-net is a kind of additional income for fishermen

# Part 3: Environmental impact assessment

## by fuel consumption

Relationship between income and fuel consumption



• CO2 emission(kg)/unit price(10000Bt)=

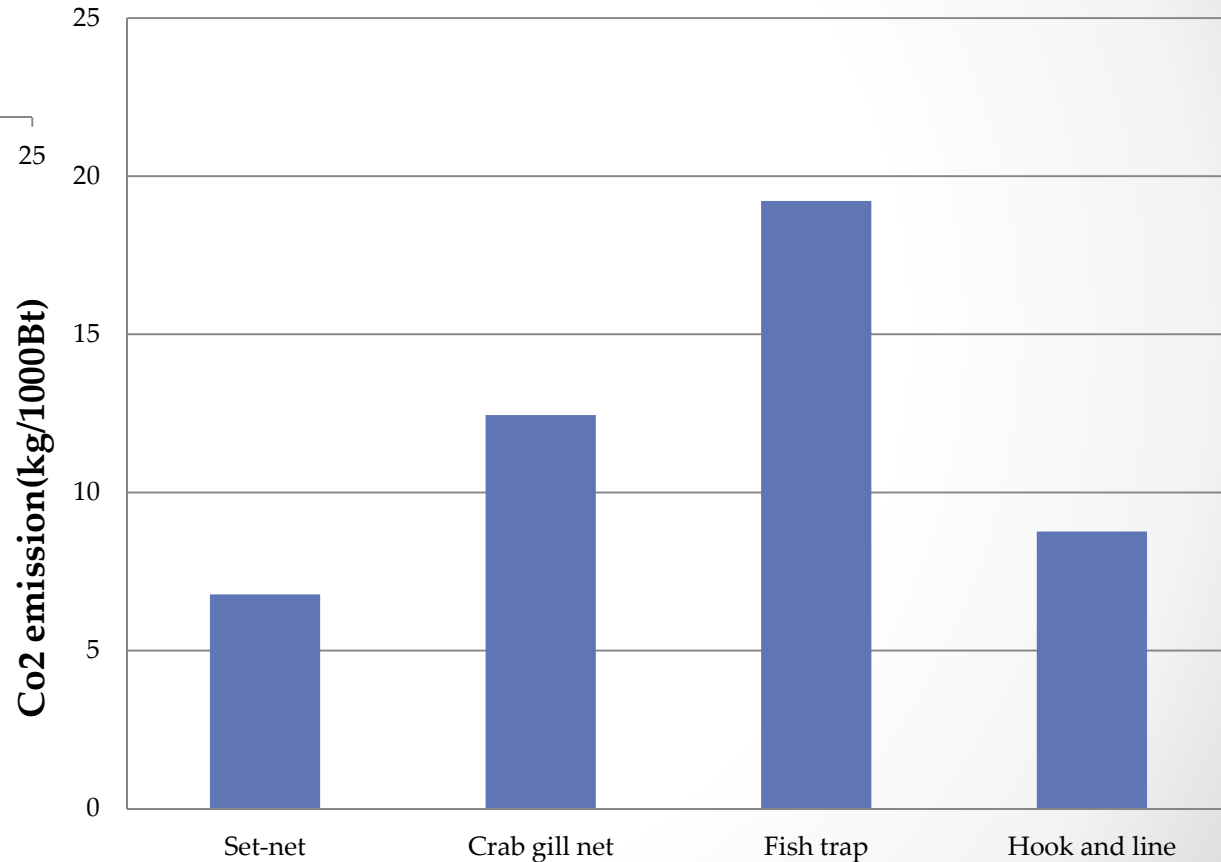
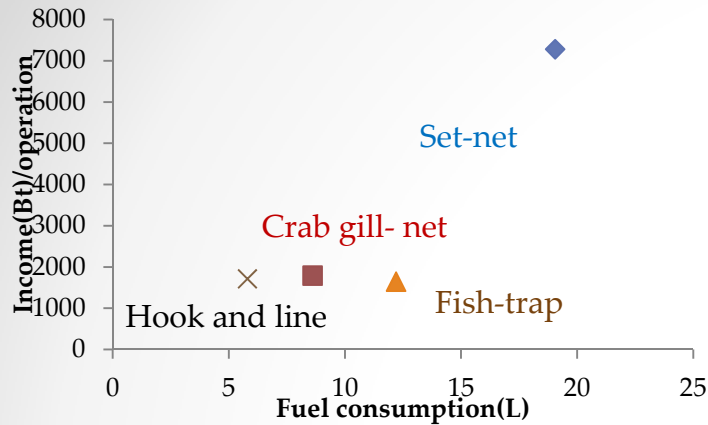
$$\text{Fuel consumption(L)/income(Bt)} \times 37.7(\text{GJ/kL}) \times 0.0687(\text{t-CO}_2/\text{GJ}) \times 10000$$



# Part 3: Environmental impact assessment

by fuel consumption

CO2 emission(kg)/unit price(10000Bt)



**Small-scale fishing in Rayong**



**【Crab gill-net】**

- Target: blue swimming crab
- High unit price species
- Whole year operation



**【Hook and line】**

- Target: Barracuda, squid, etc.
- Seasonal operation



**【Fish-trap】**

- Target: Rabbit fish
- Whole year operation



**【Trawling】**

- Target: Spanish mackerel, etc.
- Seasonal operation



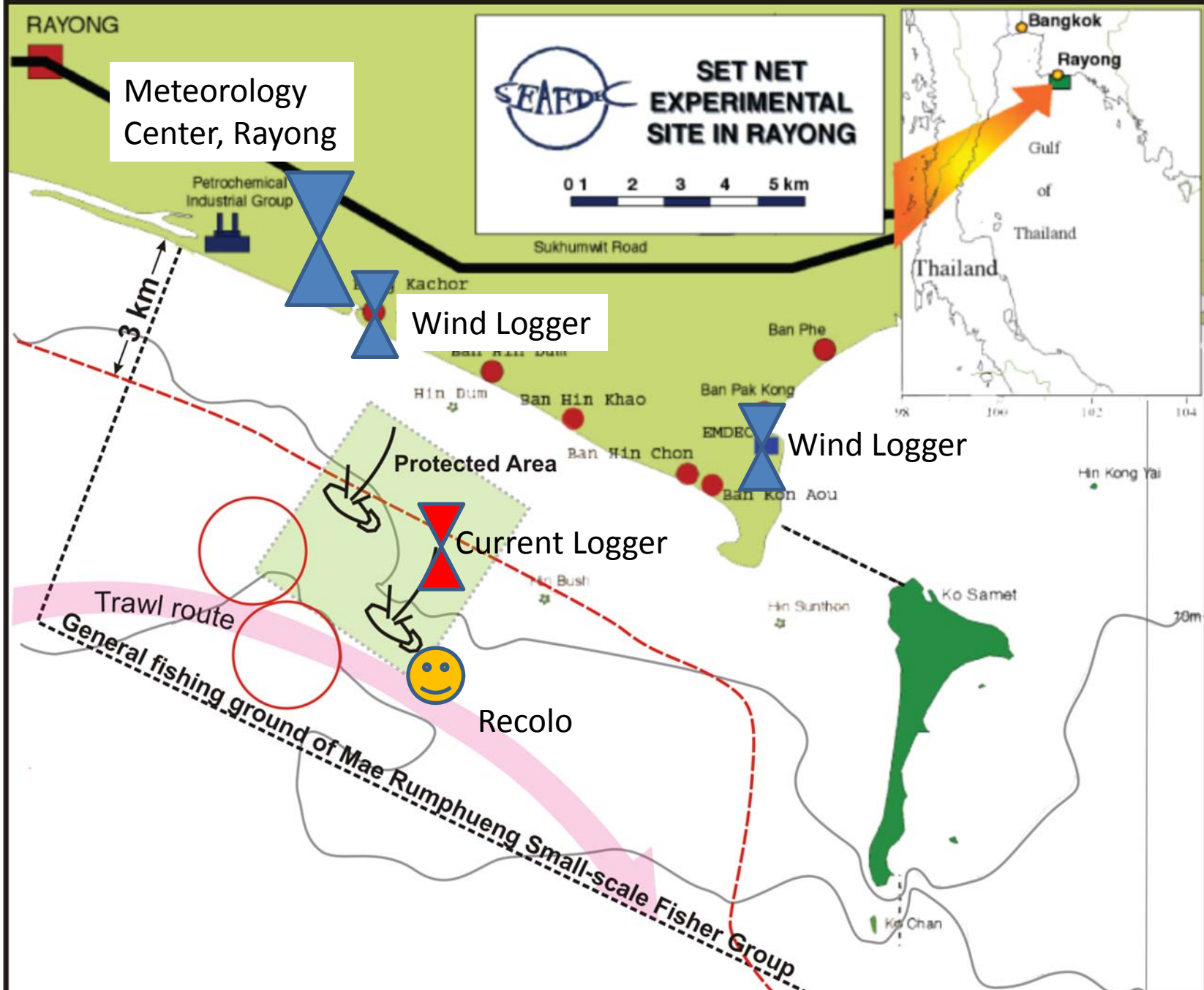
**【Fish-gill-net】**

- Target: Sea bream, etc.
- Whole year operation

Less CO2 emission/unit in set-net than other gears

# Continuous Monitoring for understanding the catch patterns

- Daily Catch / Sales Record
- Size frequency of main catch species
- **Current logger** : direction / speed
- **Depth logger** for gear shape evaluation
- **Wind logger** : direction / speed
- Wind / Sea State data from Meteorology Center
- **Interval Video Recorder** (Recolo) : fishing activities around set-net



Setting locations for current logger and wind loggers, with Recolo recording.

# Wind Logger

Data retrieval, March 13



Re-setting with longer LAN cable for easier data retrieval



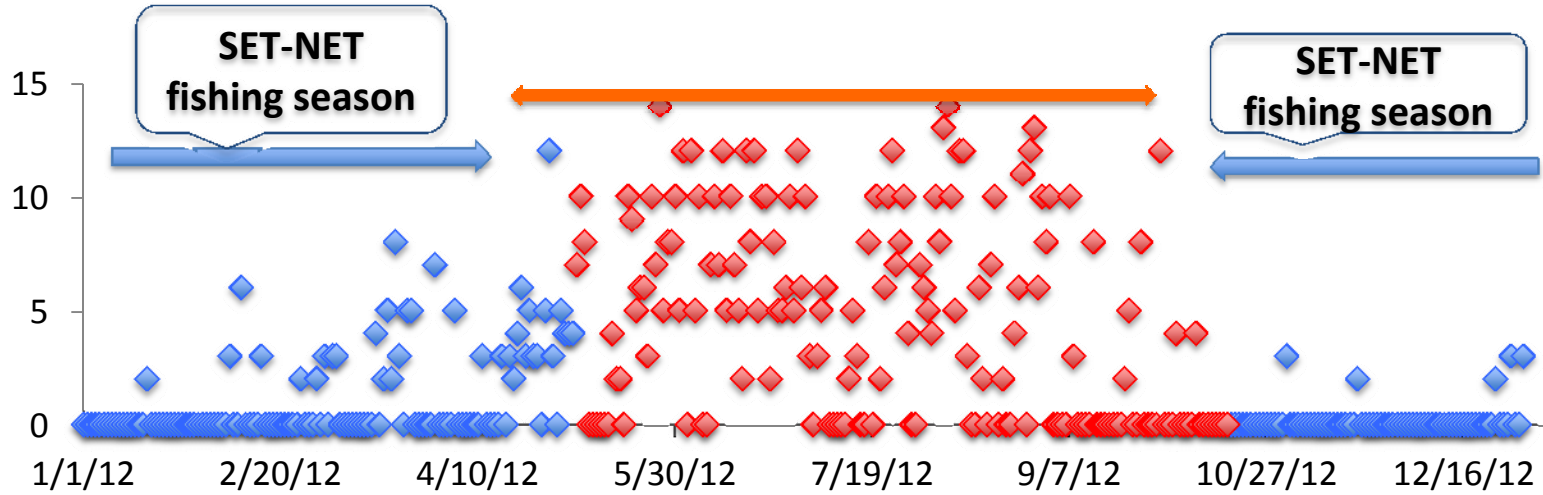
# Rayong Meteorology Center



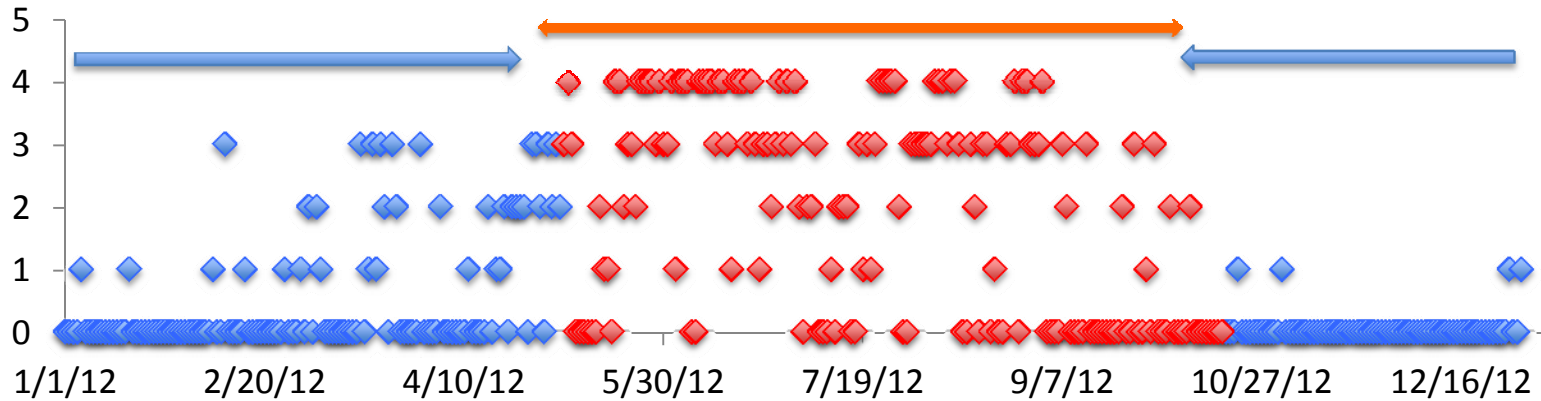
สถานีอุตุนิยมวิทยาระยอง  
กรมอุตุนิยมวิทยา

# Daily Wind speed + Sea state at AM 4:00 in 2012

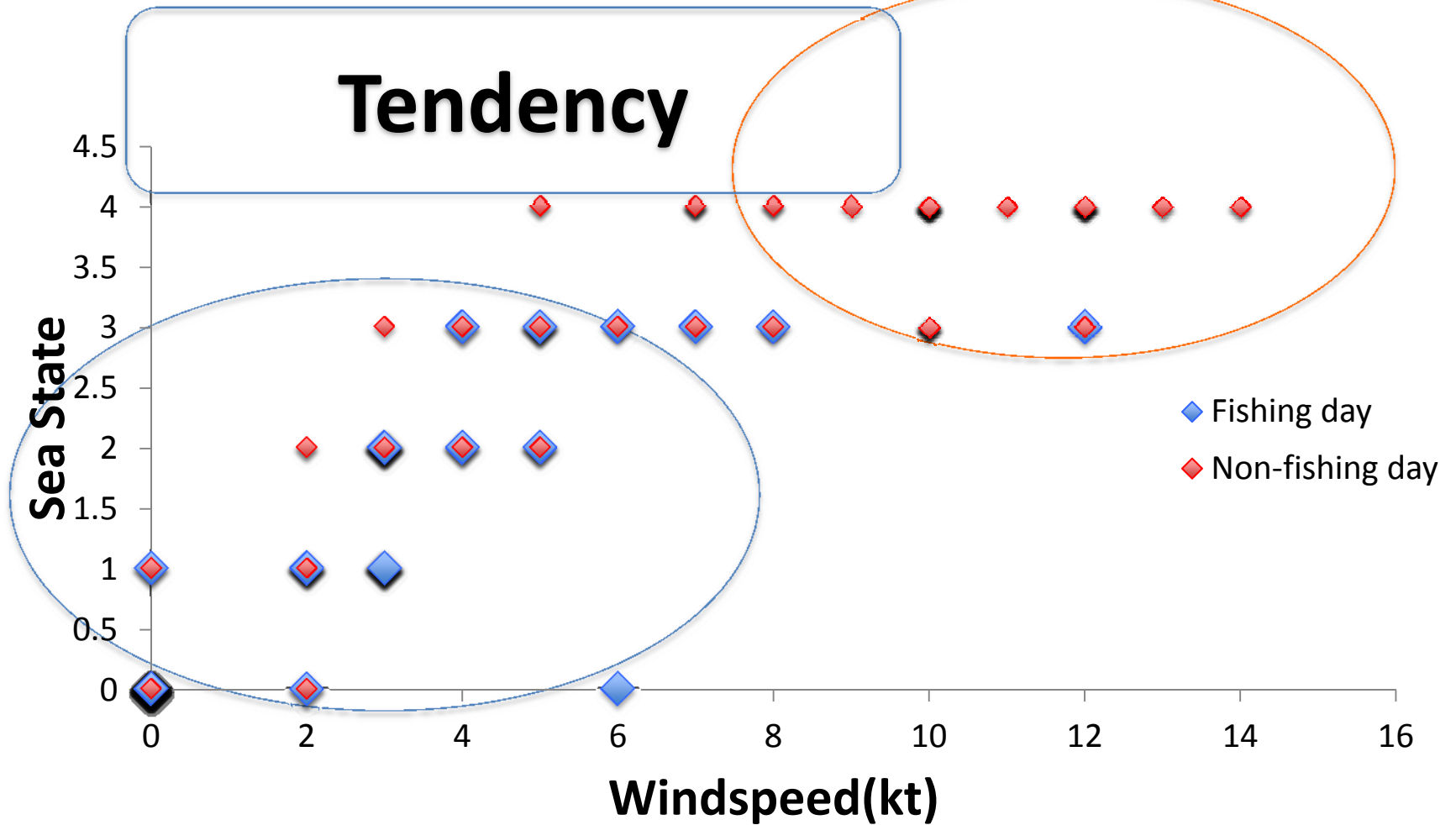
Wind speed(knot)



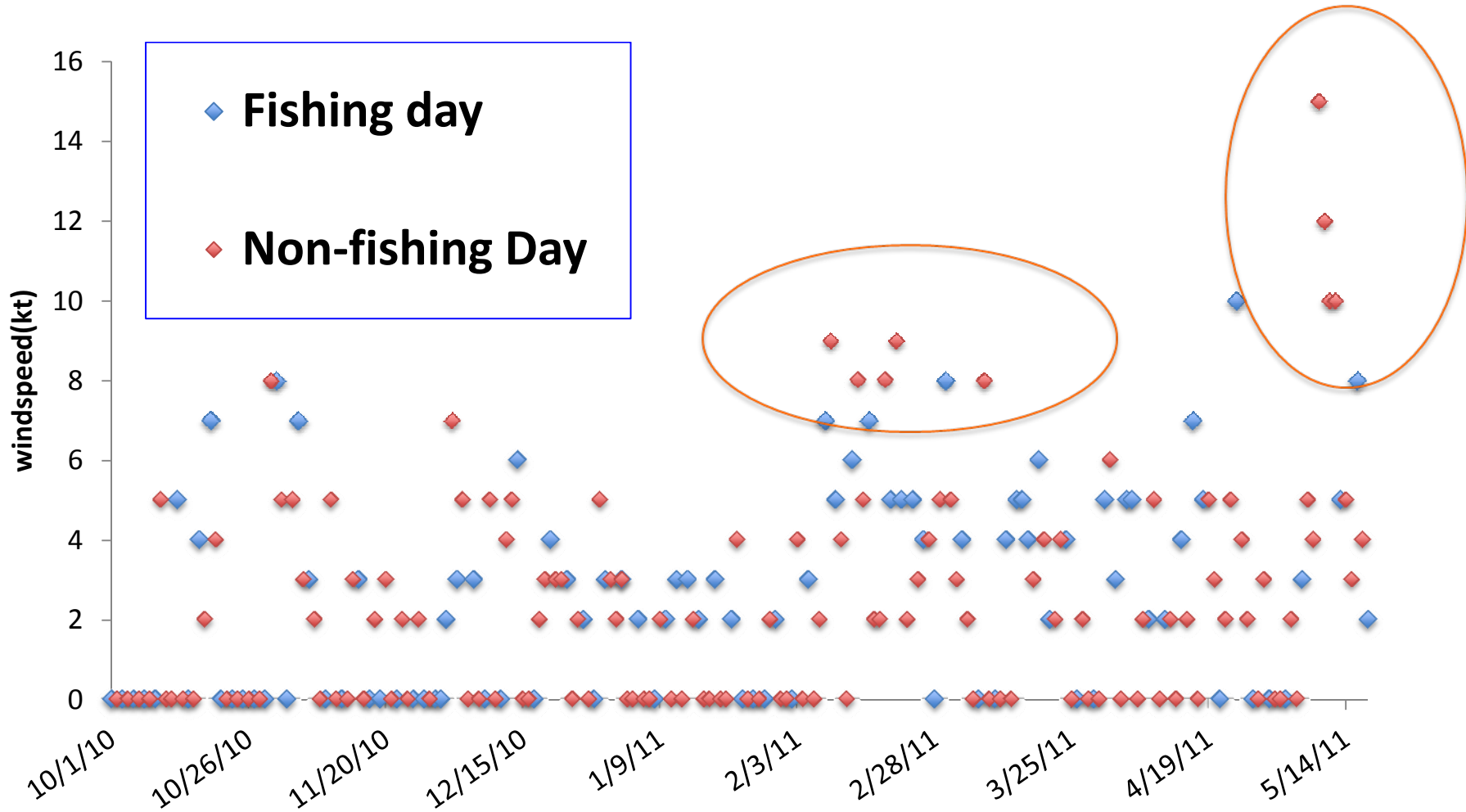
Sea state



# Relation of wind speed & Sea state at AM 4:00 for 2012 Oct-Dec

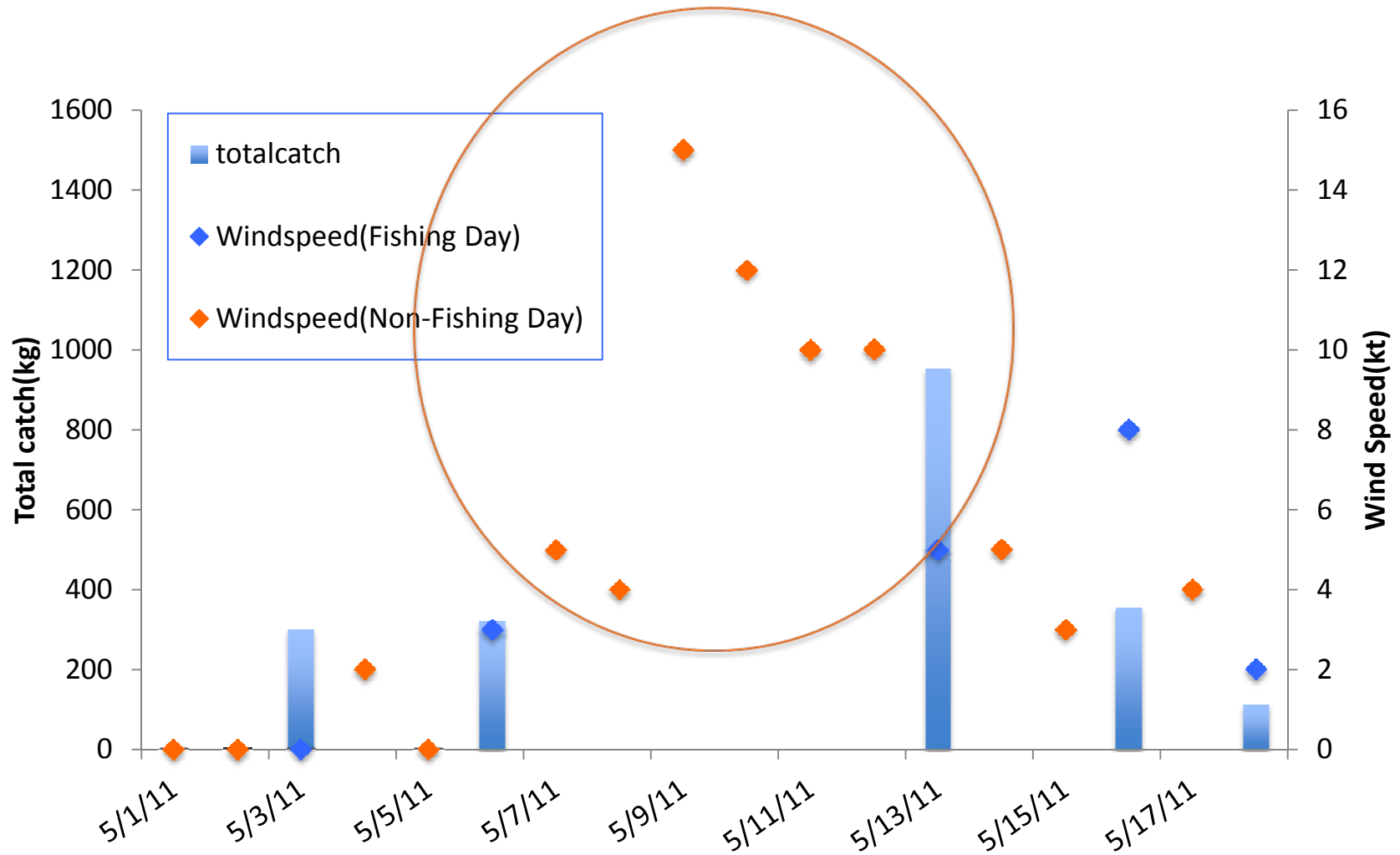


# Daily Wind speed at AM4:00 in Fishing season (2010.10.1-2011.5.18)





# Windspeed & Totalcatch in Windy days



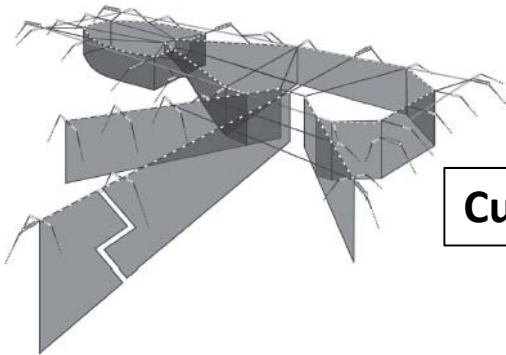
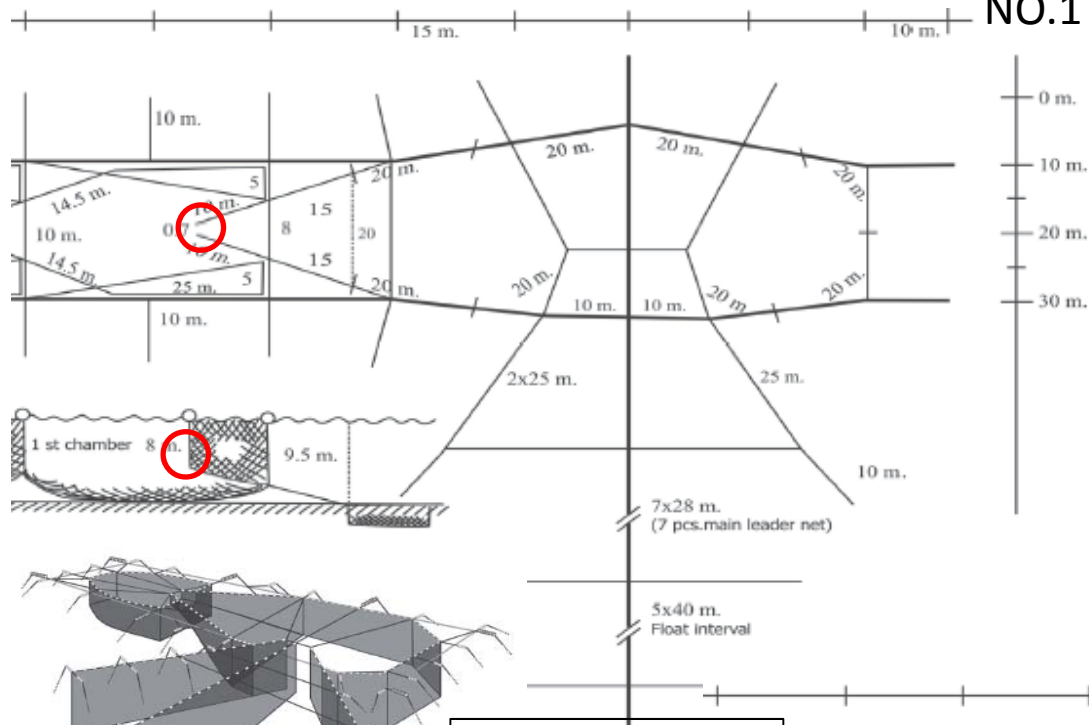
# Decision making to go SET-NET fishing in rough sea conditions

- **Wind speed level**
- **Sea state level**
- **Scheduled operation interval**
- **Catch trend; good or poor**
- **..... And any more ??**
- **In other small scale fishing....?**

# Current & Depth Logger Retrieval on March 14

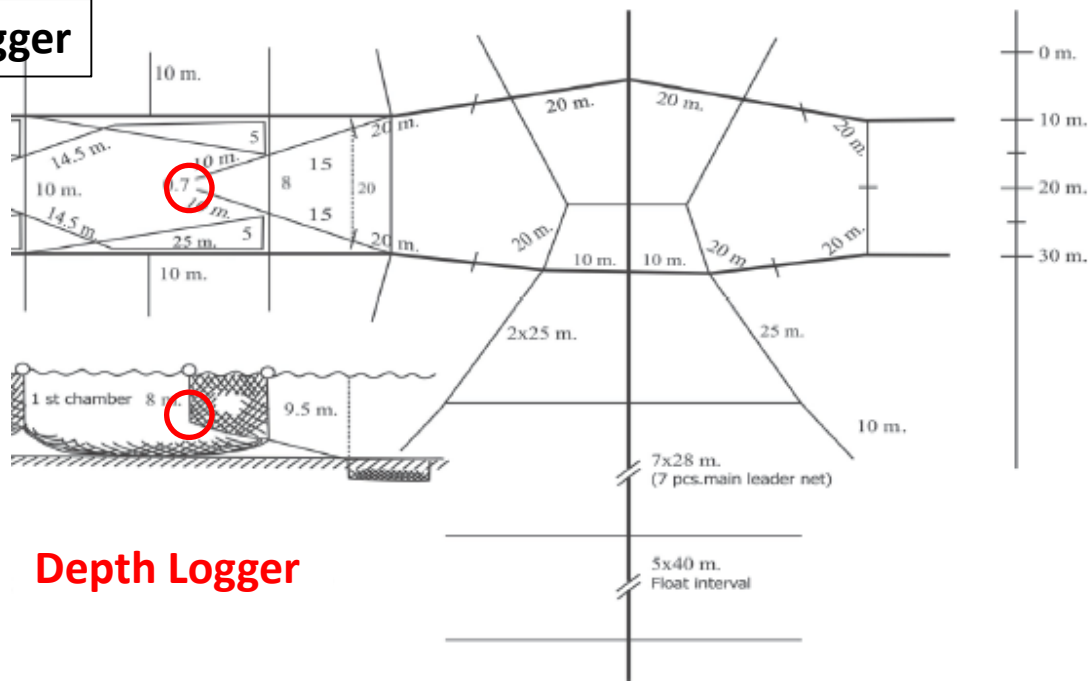


# NO.1 Offshore-side



**Current Logger**

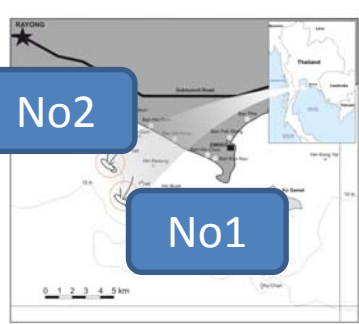
# NO.2 Shore-side



**Depth Logger**

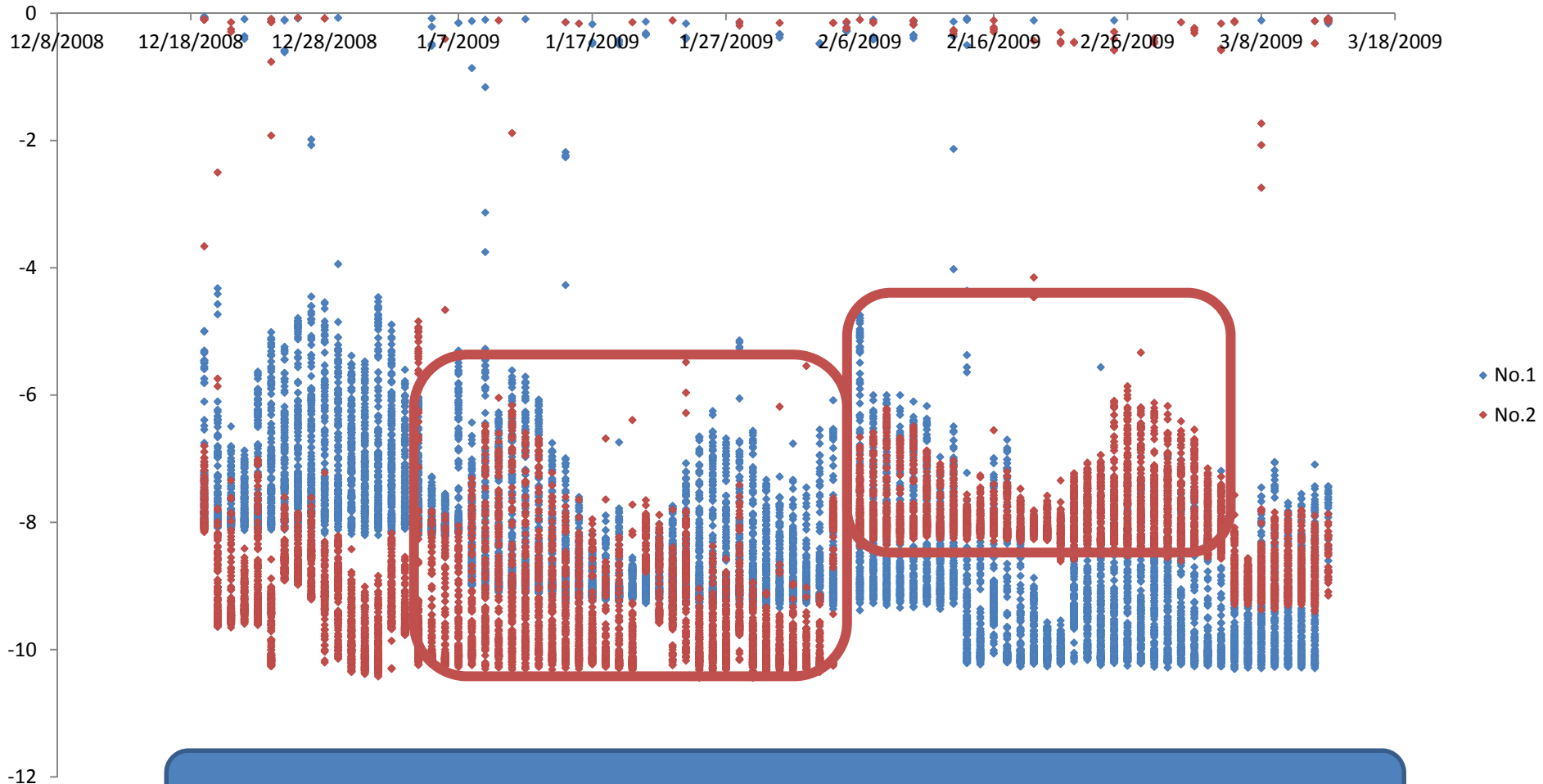
# Logger Data Retrieval





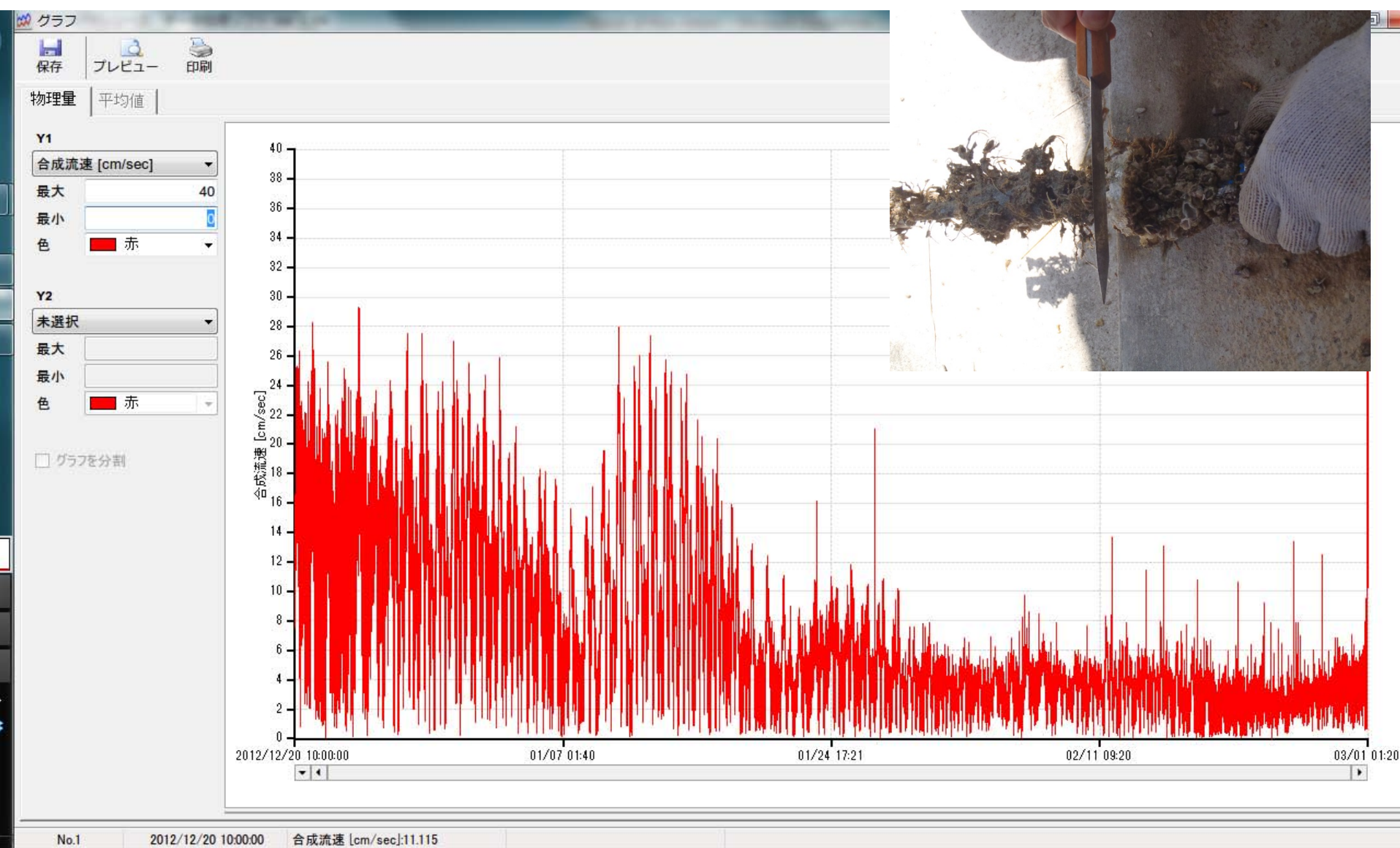
# Result of depth logger (Dec to Mar)

Depth[m] by Depth mater No.1,No.2

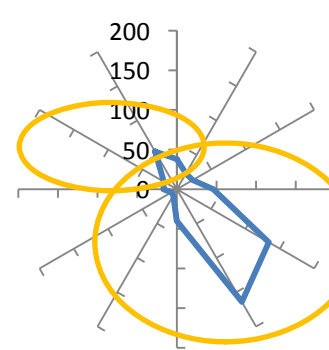
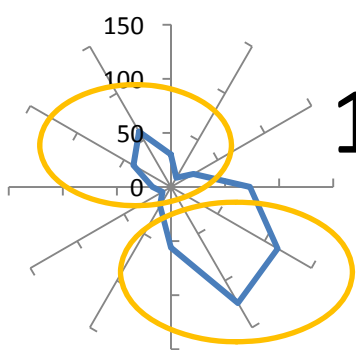


Different depth of slope net tip in each spare net, by net change

# Result of flow speed (Dec 2012 – Mar 2013)

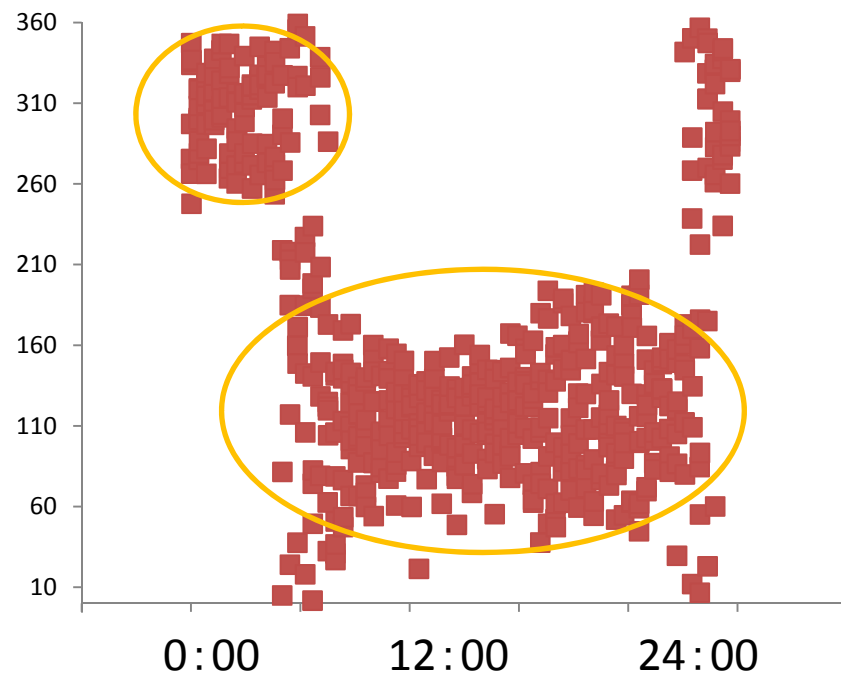
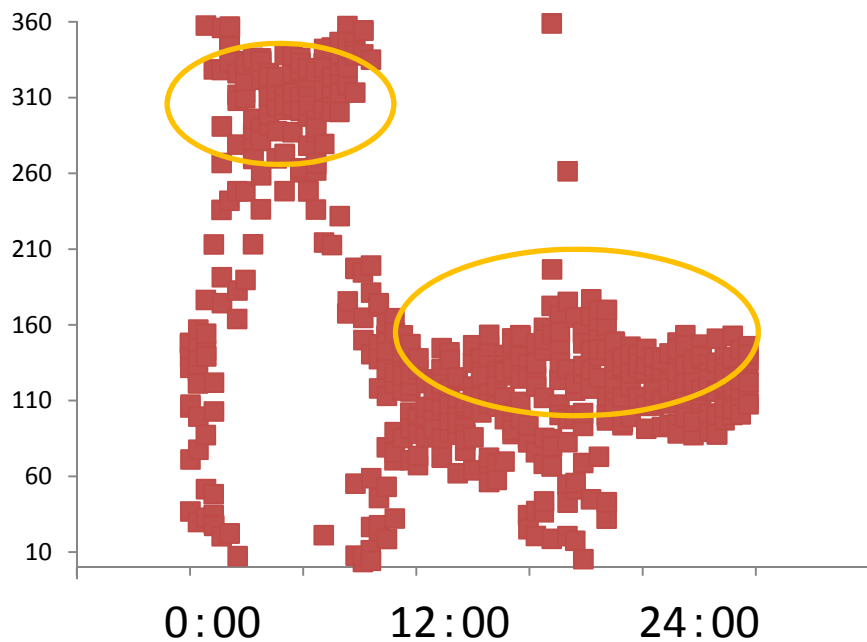


# 1 day flow direction with hours



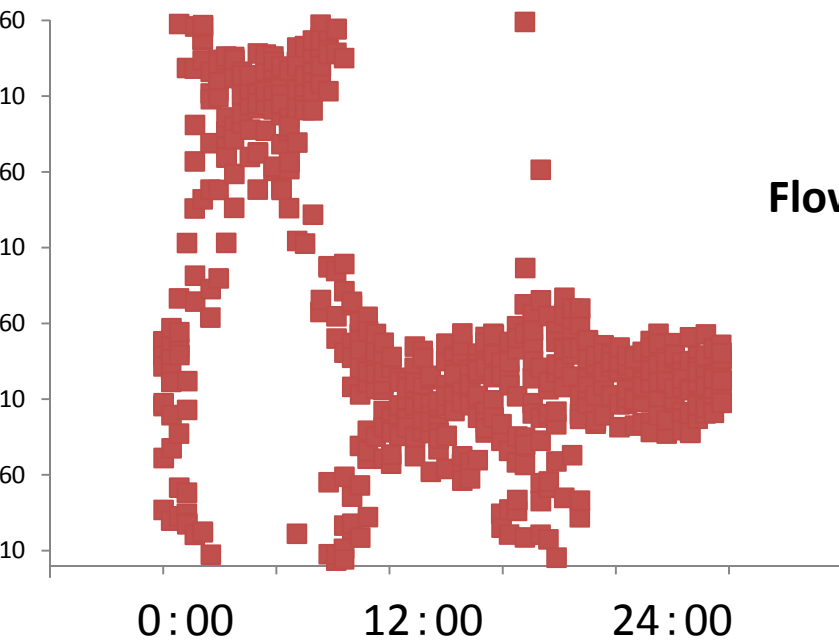
Calm day Dec 28

Strong current day Jan 2

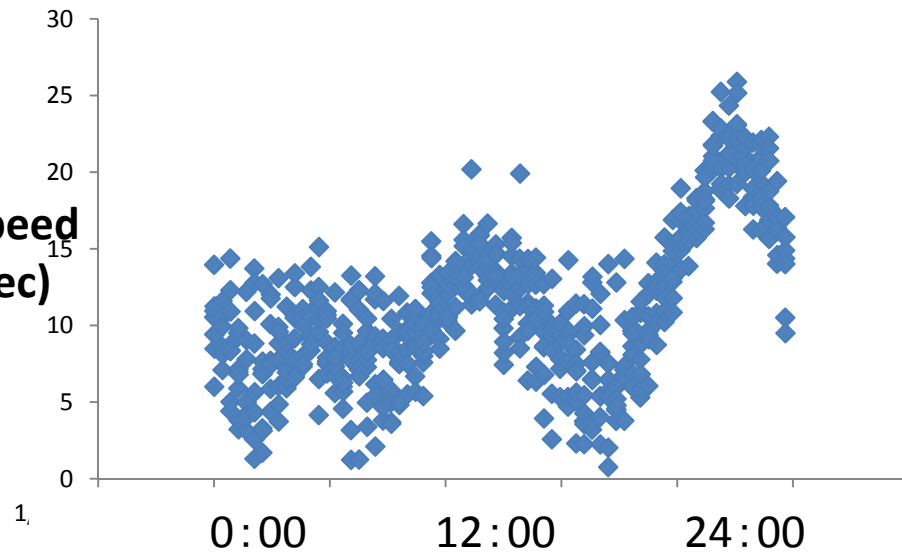
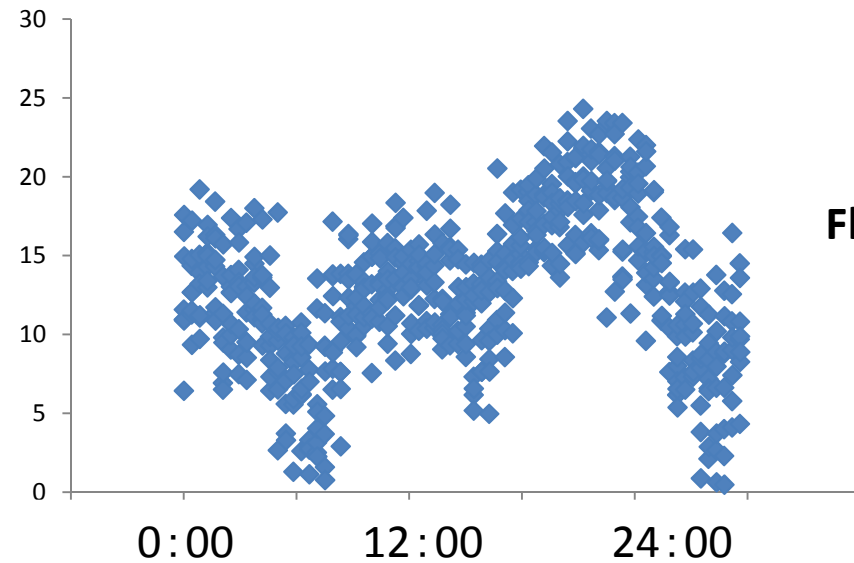
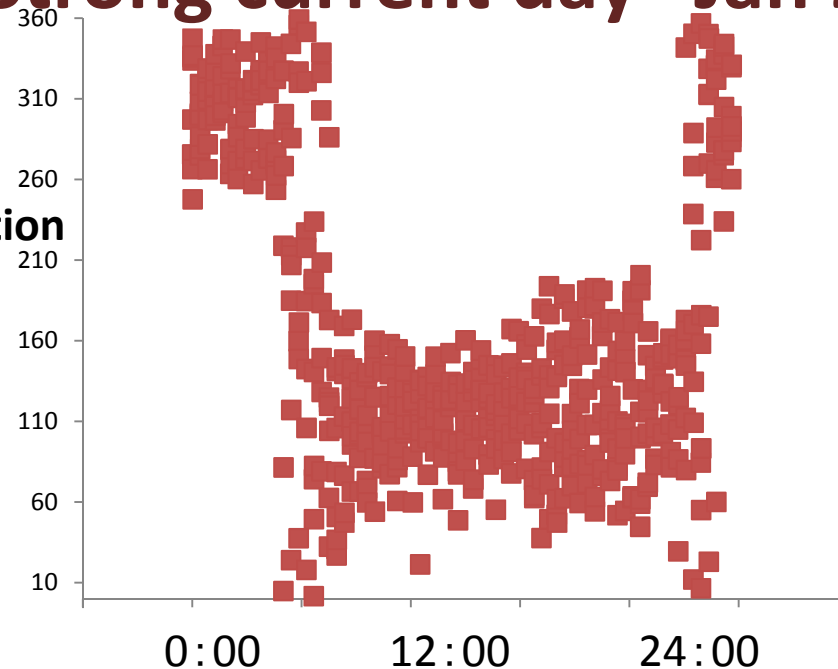




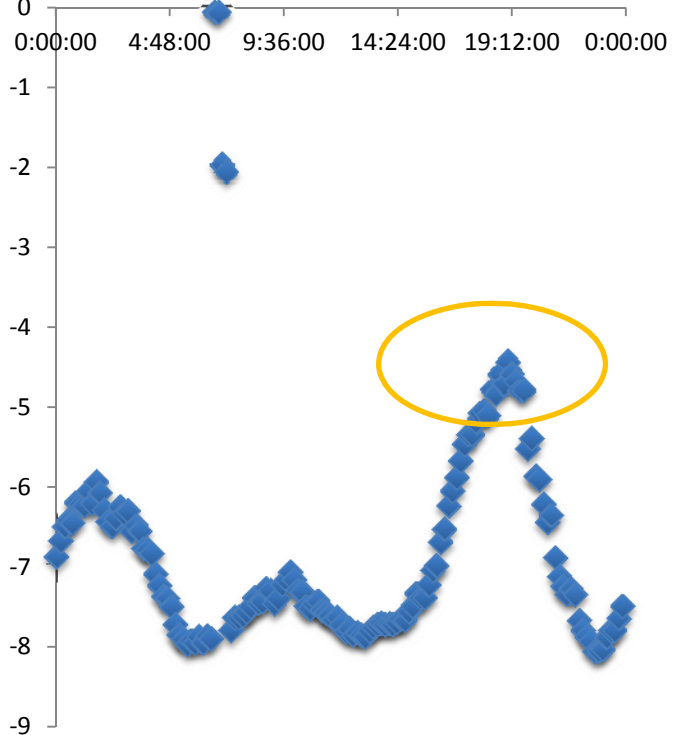
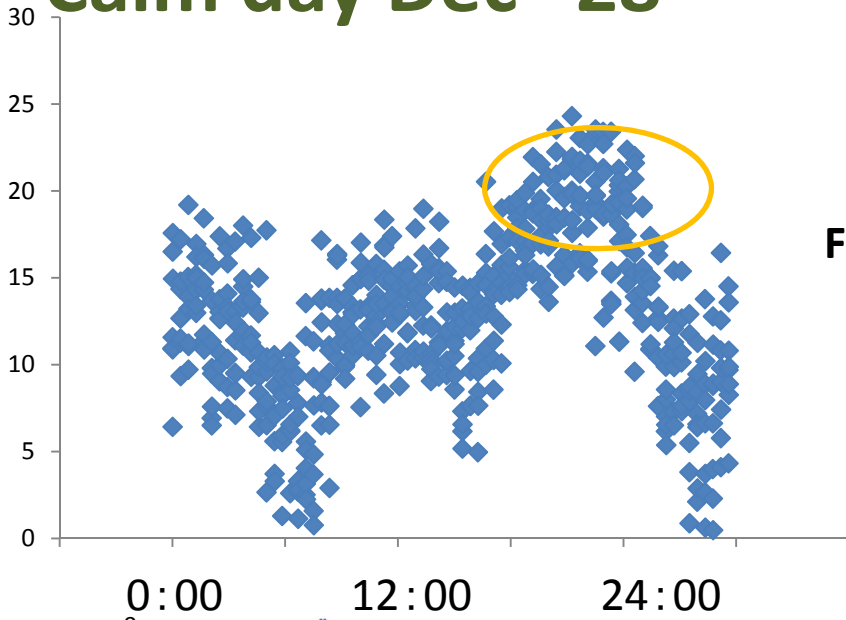
# Calm day Dec 28



# Strong current day Jan 2

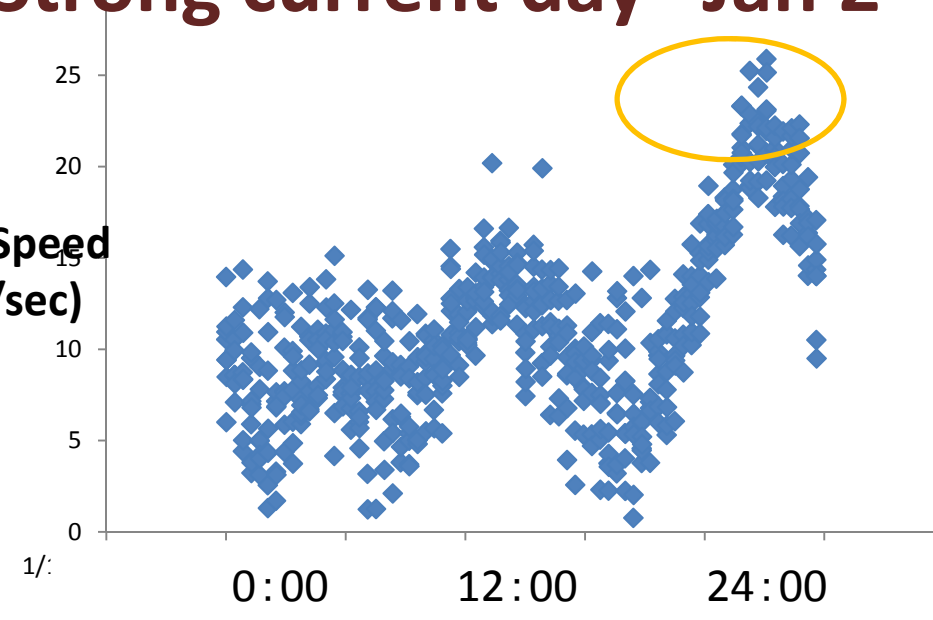


# Calm day Dec 28

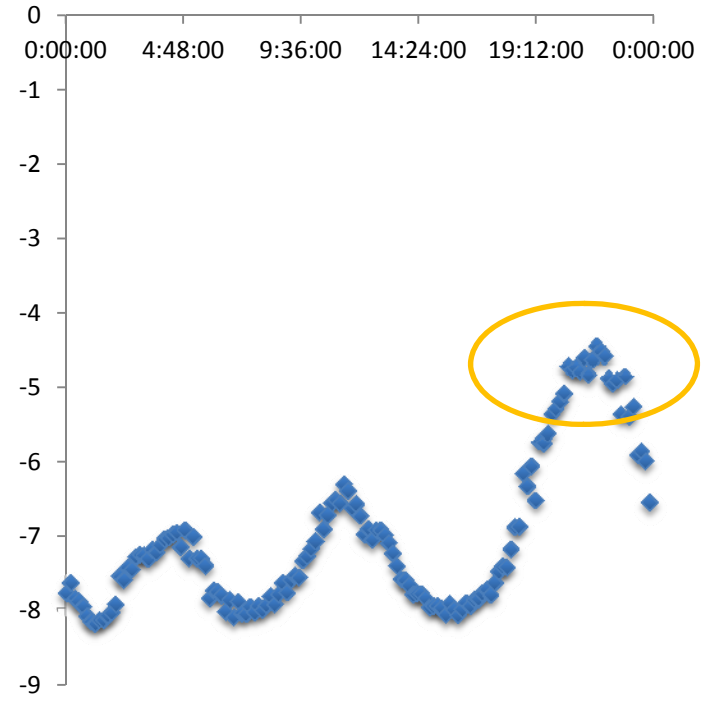


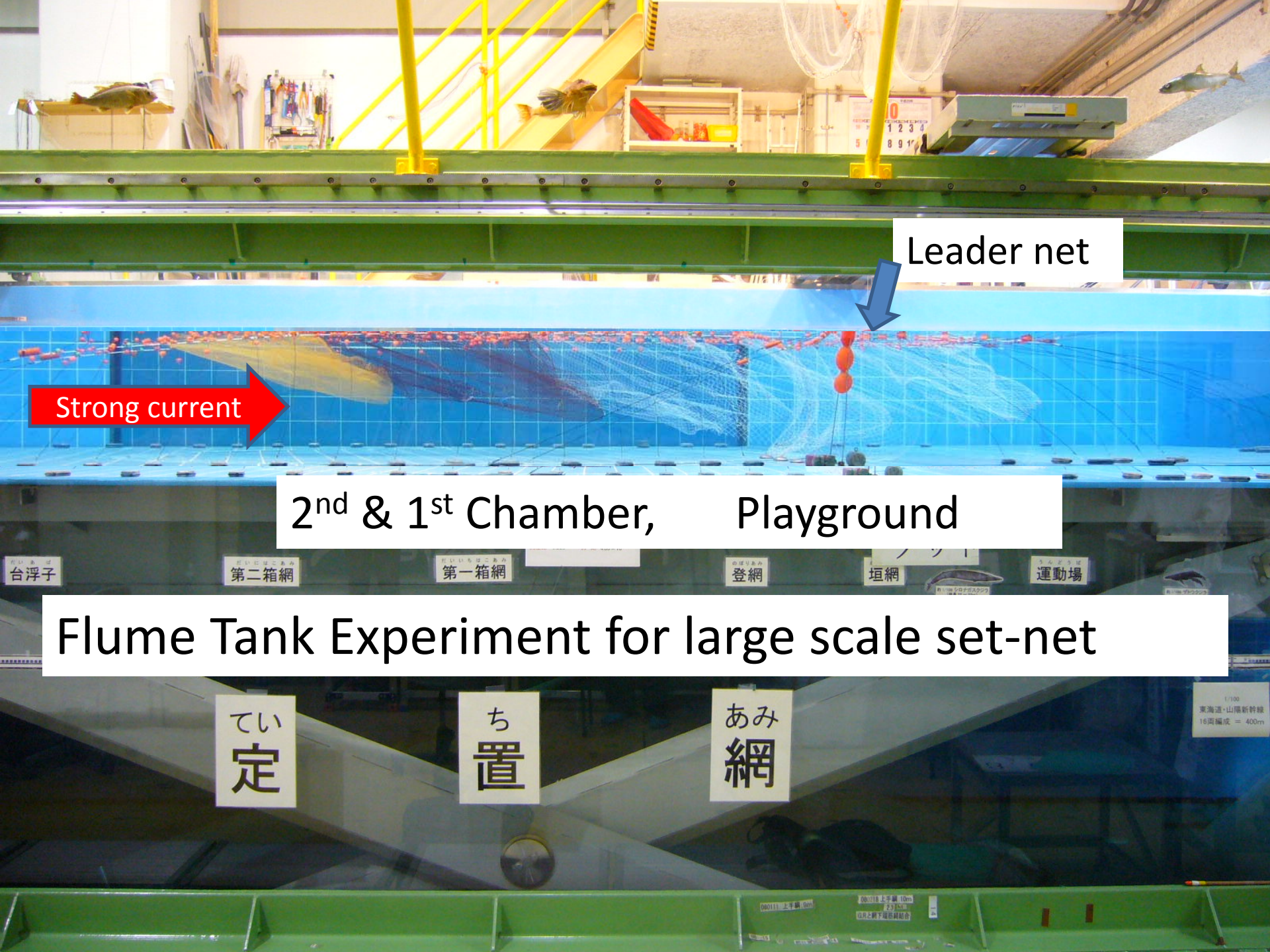
# Strong current day Jan 2

Flow Speed (cm/sec)



Depth (m)





Leader net

Strong current

2<sup>nd</sup> & 1<sup>st</sup> Chamber, Playground

Flume Tank Experiment for large scale set-net

てい定

ち置

あみ網

1/100  
東海道・山陽新幹線  
16両編成 = 400m

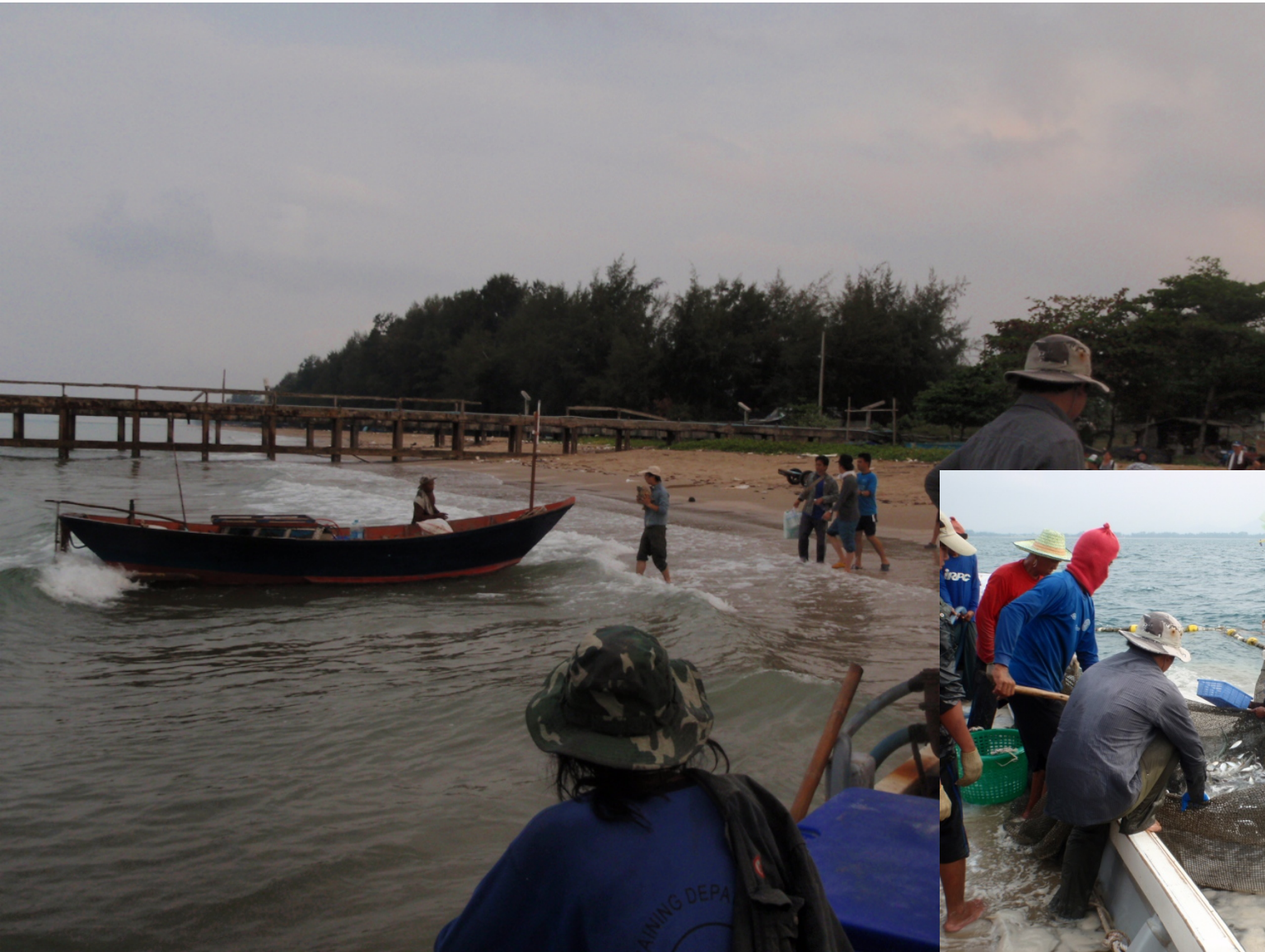
# Interval Video Recorder for monitoring fishing activities around set-net for 14 – 16 March



# Progress Reporting at EMDEC on March 15



# Logger Setting on March 16





Sand bag 40 Kg

3m from seabed

4m, small float

8m from seabed

10m, main float

# Current Logger Setting

at the end of 1<sup>st</sup> Unit leader net of 12.4m deep at lowest tide



# Depth Logger Setting

No.2 on 08:10 AM

No.1 on 09:10 AM





# Next activity

- 6-10 May, 2013 ICES-FAO Fishing Technology and Fish Behavior meeting at SEAFDEC
- 11-18 May, 2013
- together with Fishing Gear team
  
- Retrieving of Logger data
- Catch/Sales Data
- Discussion meeting for research task sharing