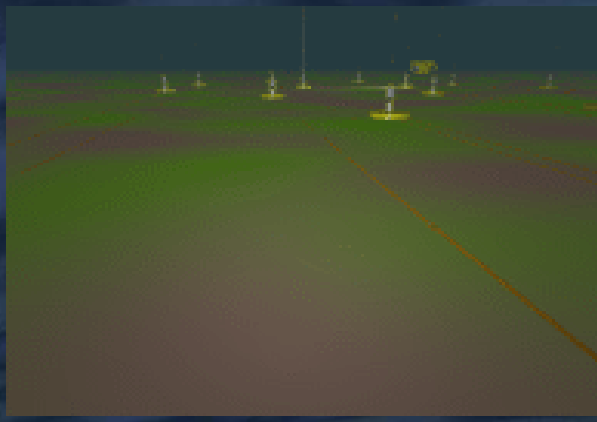
http://antares.in2p3.fr



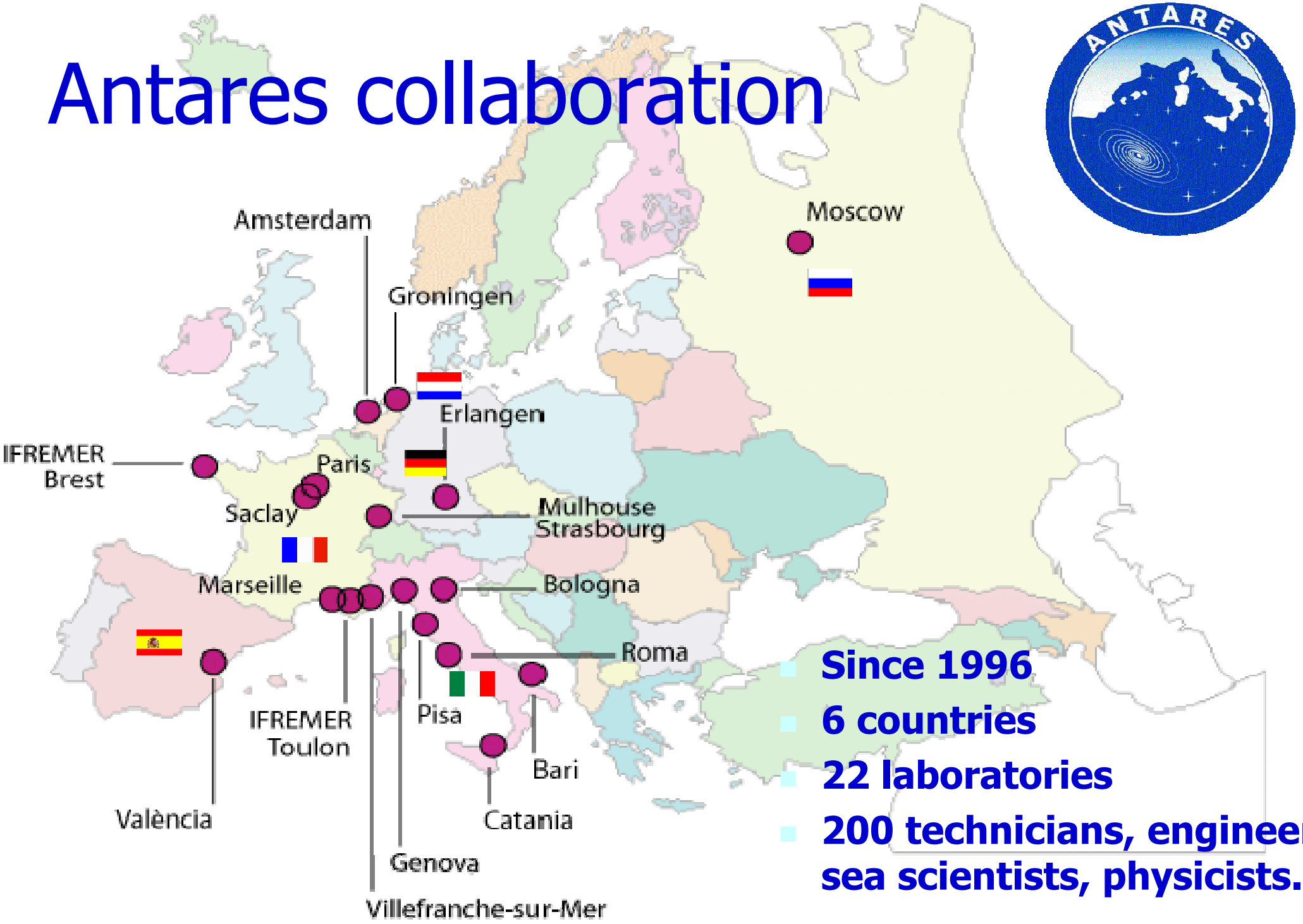
# Antares Status report


Th. Stolarczyk

CEA Saclay, Dapnia

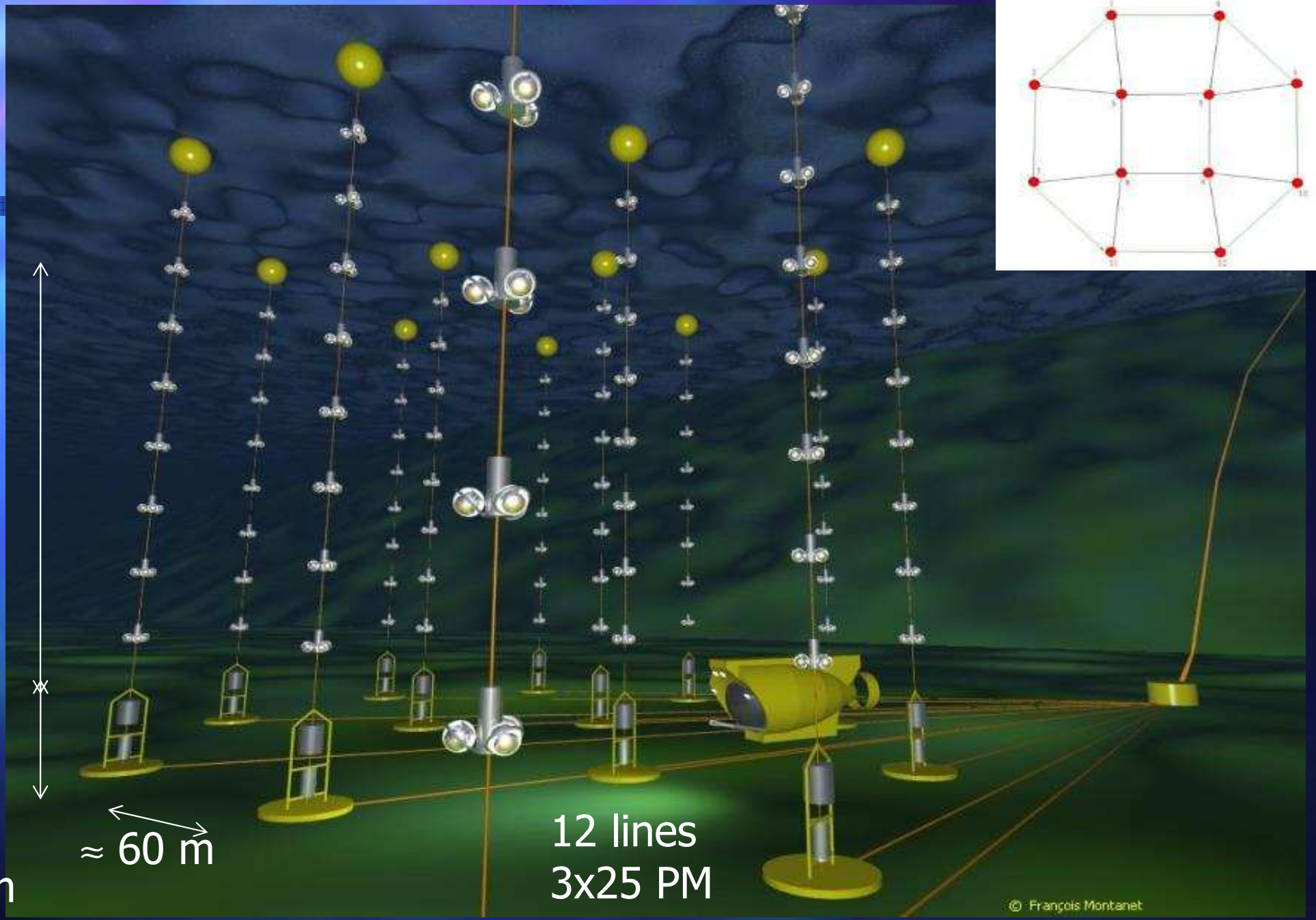
On behalf of the Antares collaboration

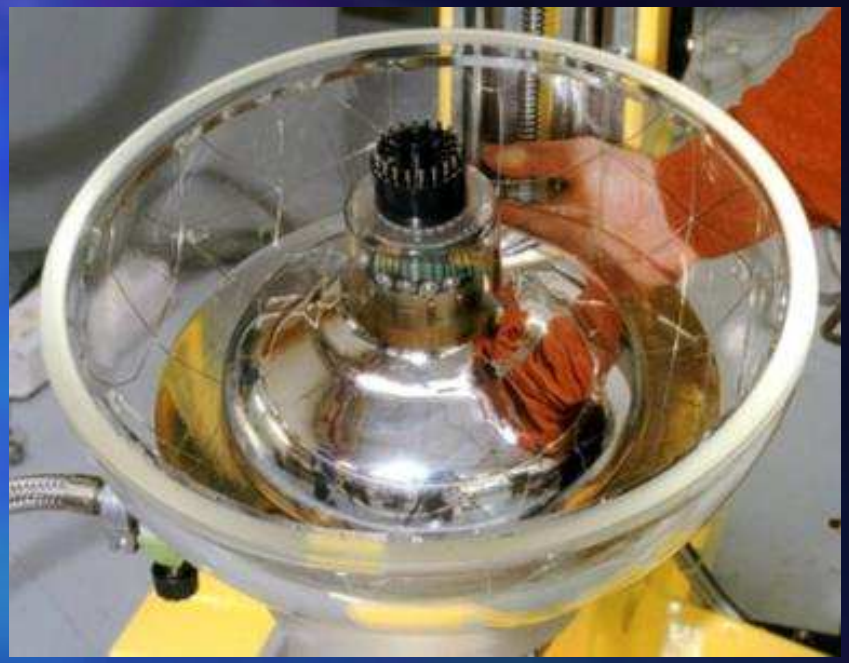
# Antares collaboration




- **Since 1996**
- **6 countries**
- **22 laboratories**
- **200 technicians, engineers, sea scientists, physicists.**

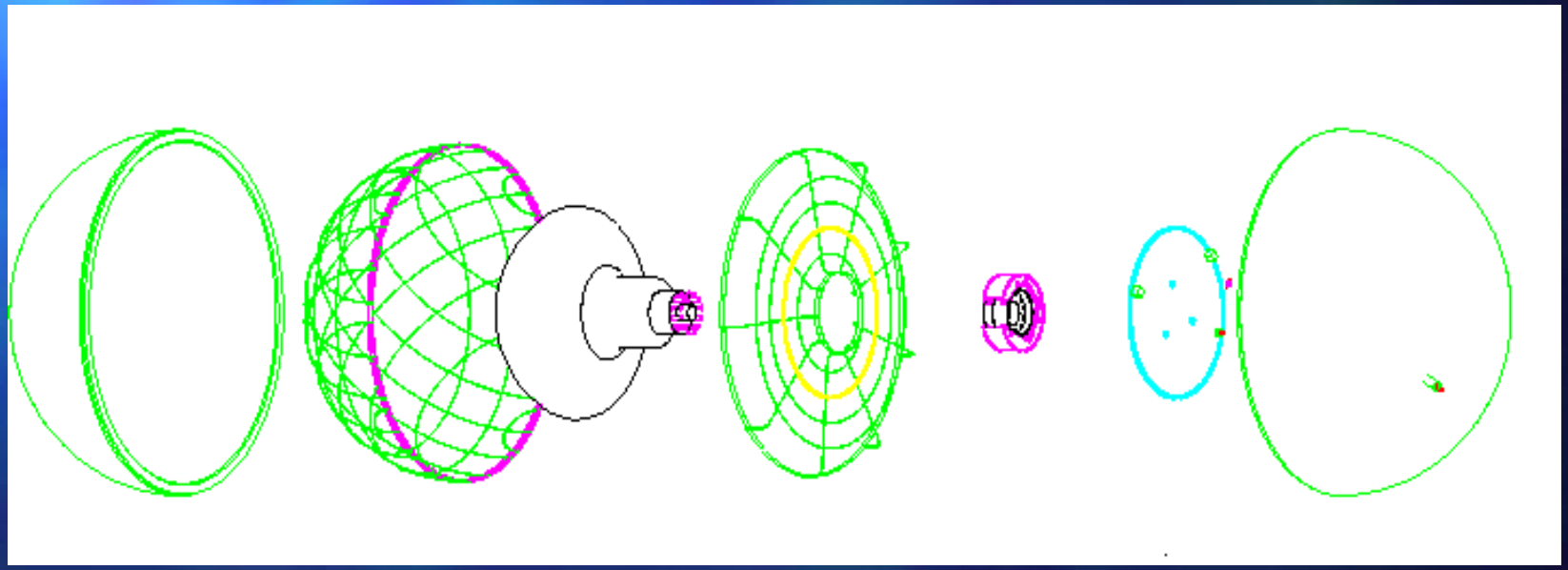

TOULON
HYÈRES
TOULON A50
VERS TOULON
MARSEILLE A50
SEYNE
VERS
ST MANDRIER

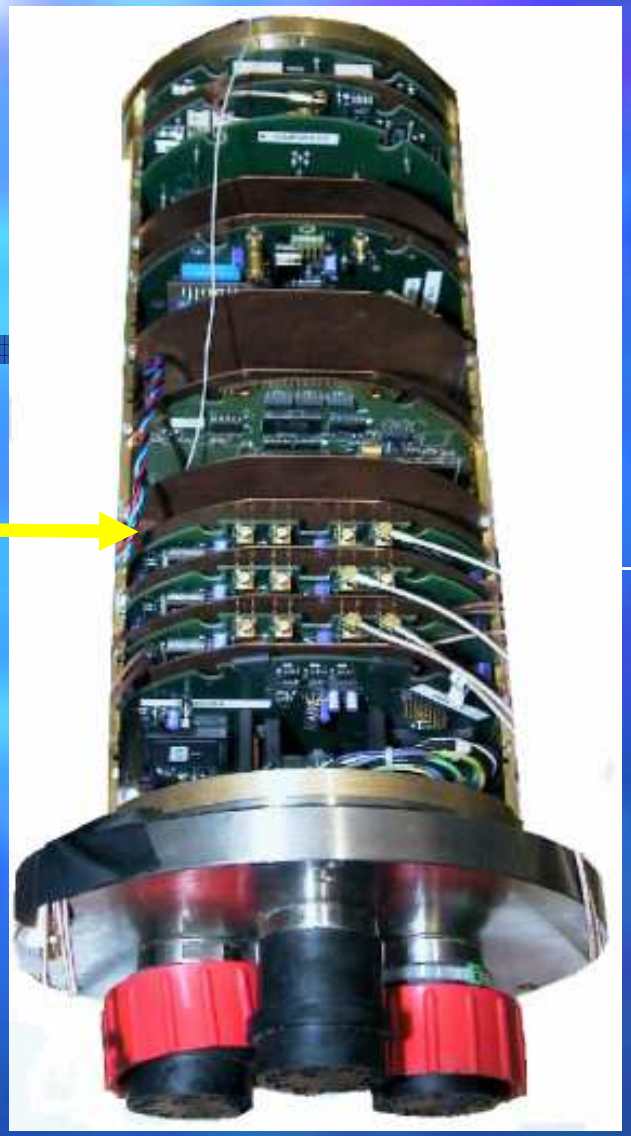

350 m
100 m
-2500 m
≈ 60 m
12 lines
3x25 PM
© François Montanet



900 optical modules

$\sigma_{TTS} \approx 1.3$ ns





**ARS card x 3**

**Acquisition**
- **FPGA**
- **VxWorks**
- **100 Mbit/s**

**Clock 20 Mhz (50 ns)**

**Compass, tiltmetres**

**Power**

Ethernet 100 Mbit/s → 1 Gbit/s

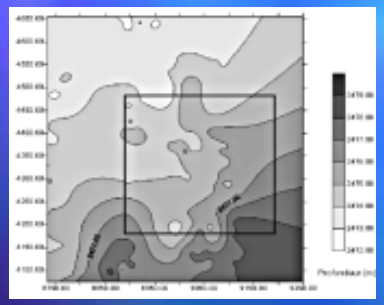
Optical beacon, hydrophone…

# Overview of a local control module (LCM)

# Back to History

## 1996 - 2000

Enviro
studies



Dec. 1
Site ex
(300 x

Nov. 19
7 PM d

## 2001- 2003

## 2005 operations

Oct. 2
40 km

March, 17th
Mechanical test

Dec. 9th 2002
Juncti

March, 18th
MILOM
(optical modules)

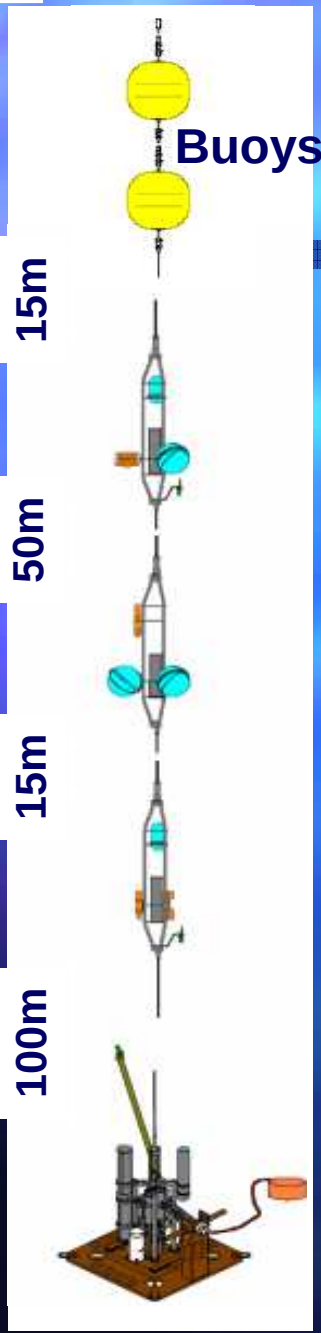
Dec. 23rd 2002
Sector line + MIL


April 12th
Connection with VICTOR

Marc
Connections with Nautile

# MILOM

(Since march 2005)

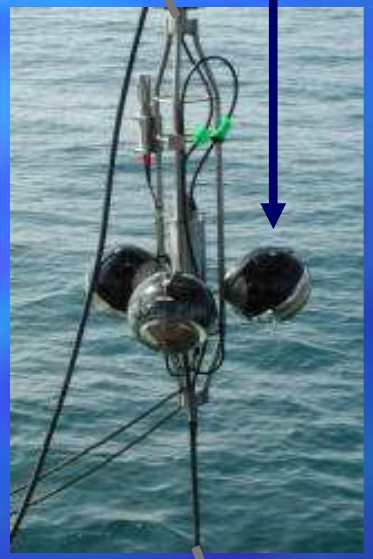


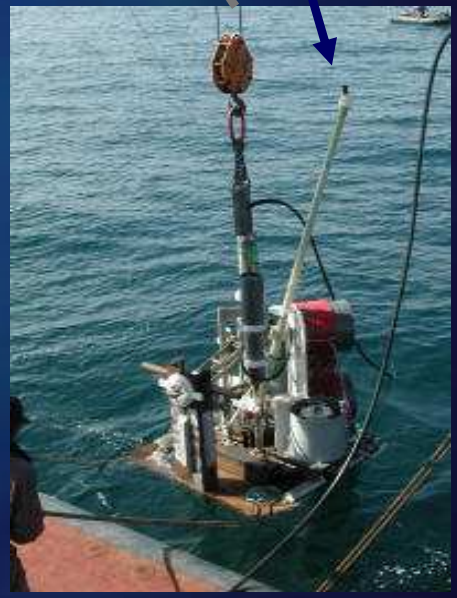

Acoustic Doppler Current Profiler (ADCP)

3 Optical Modules

LED beacon

Acoustic Positioning Transducer





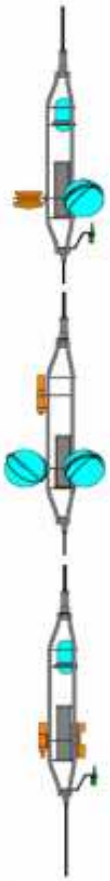
Storey 3

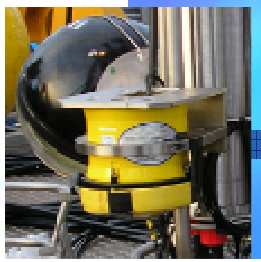
Storey 2

Storey 1

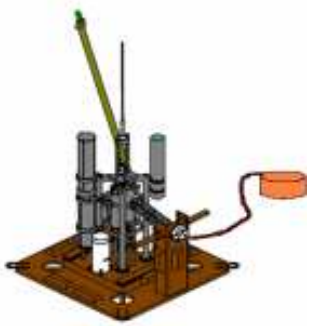
Bottom String Socket

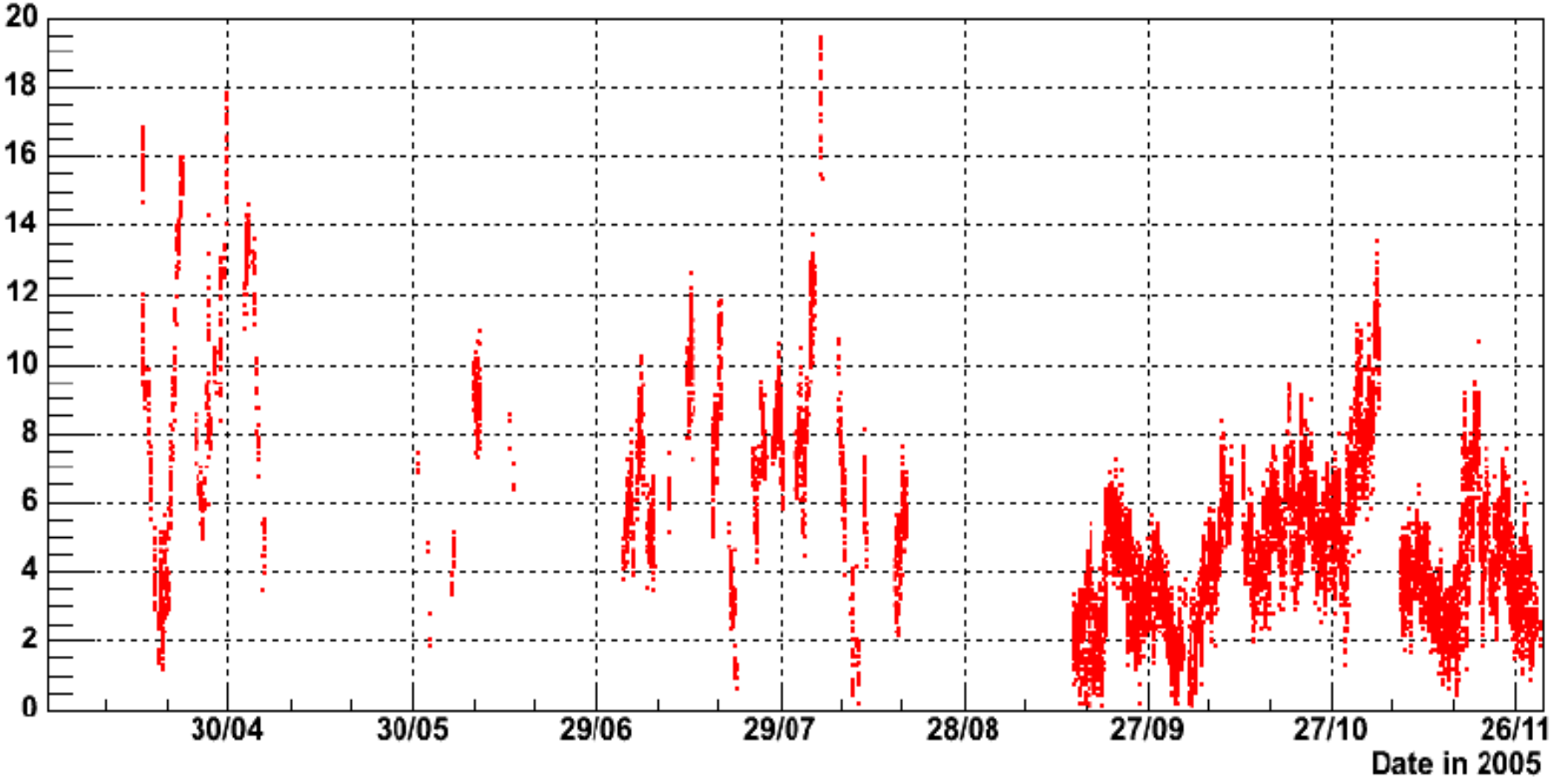
# MILOM – Sea currents



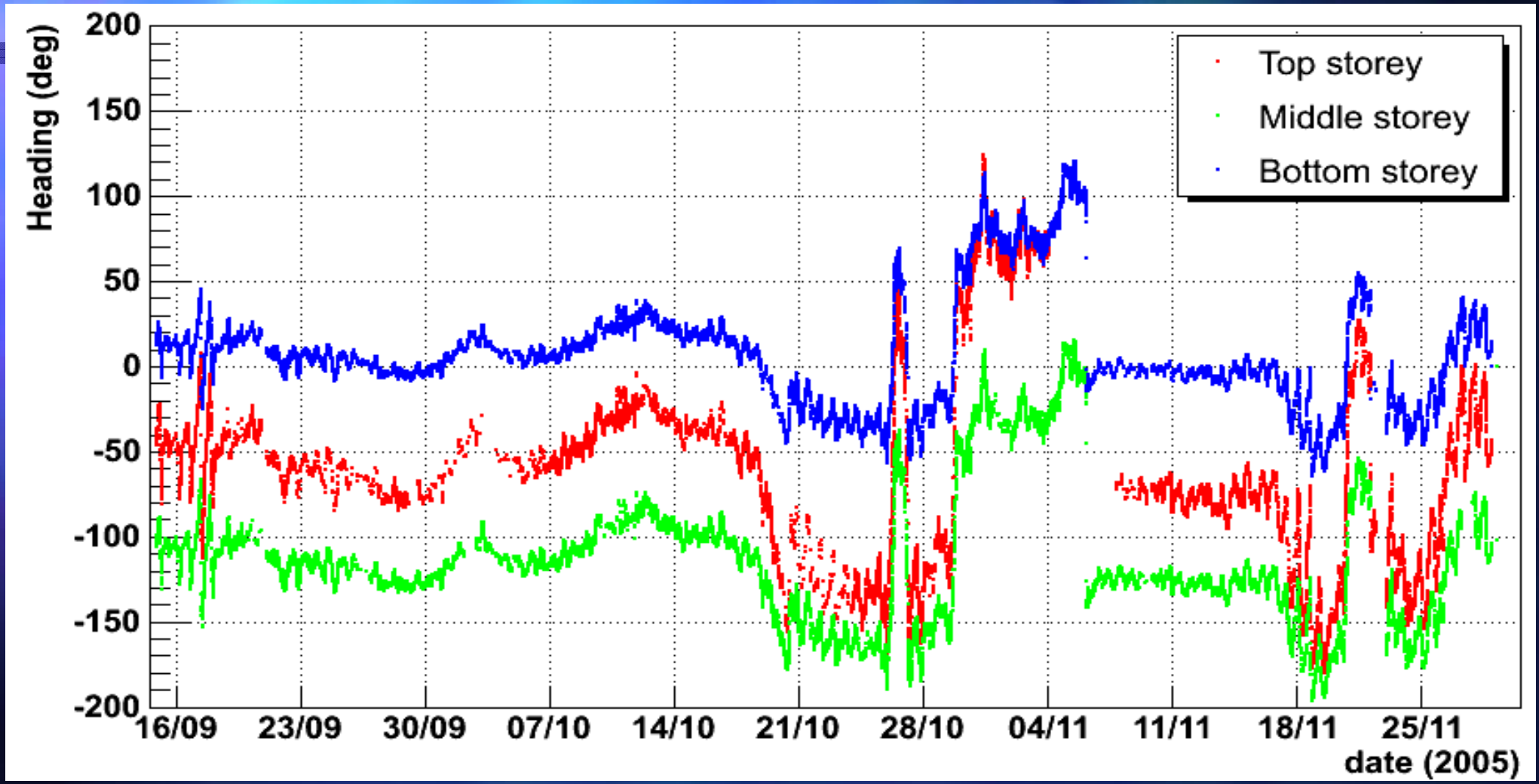


ADCP: Acoustic Doppler Current Profiler

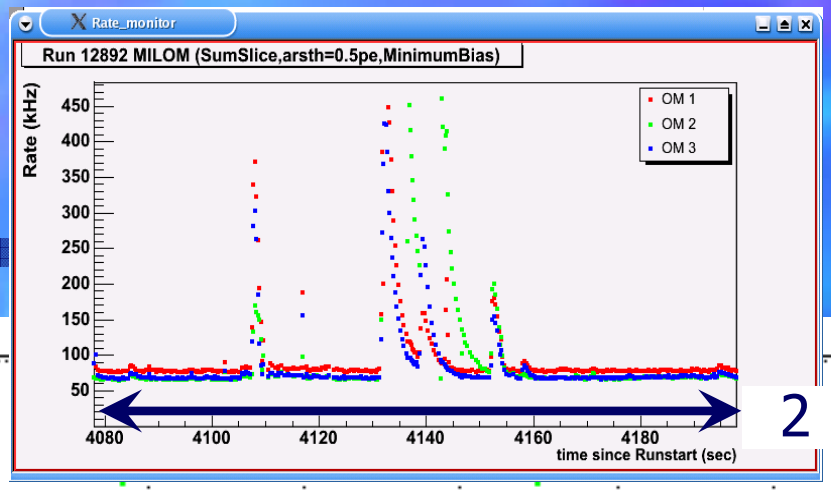




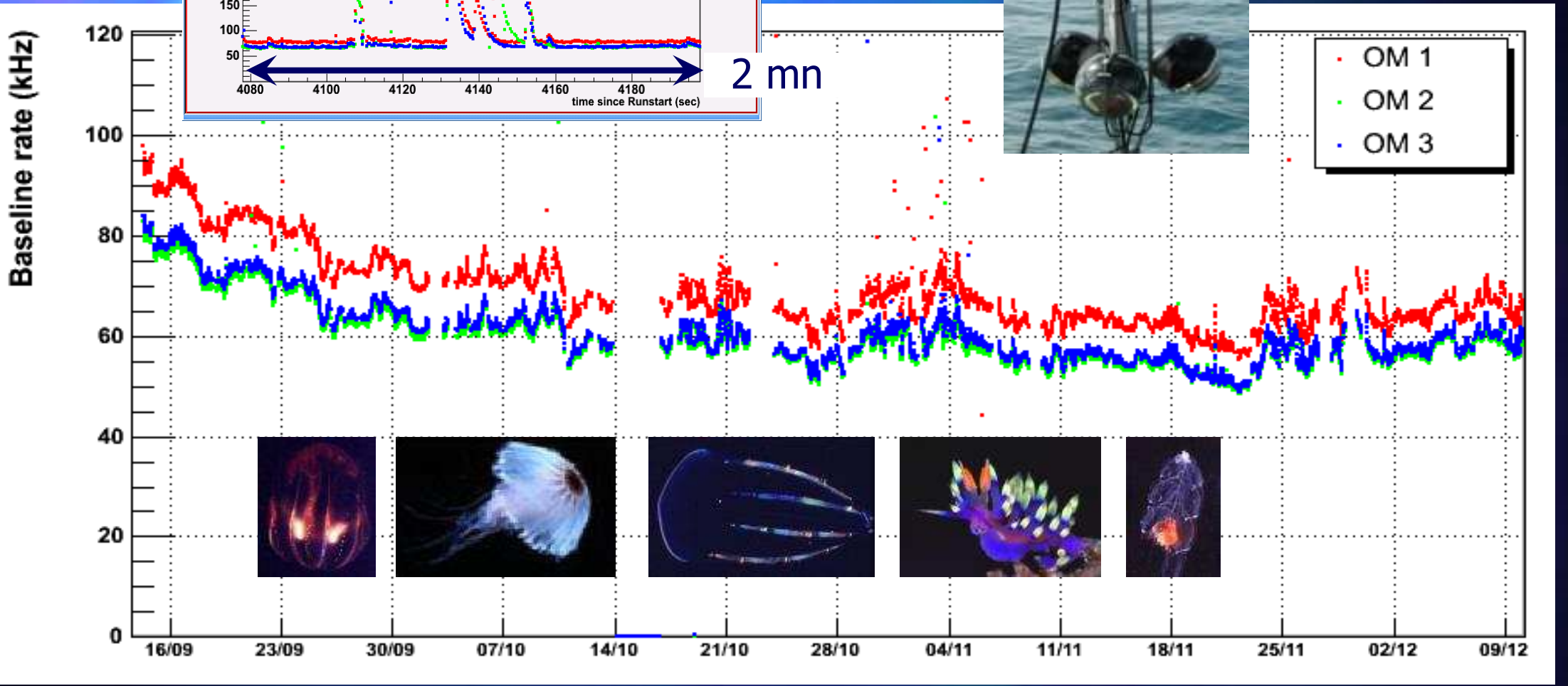
# MILOM – Line movements



# MILOM
# Optical background

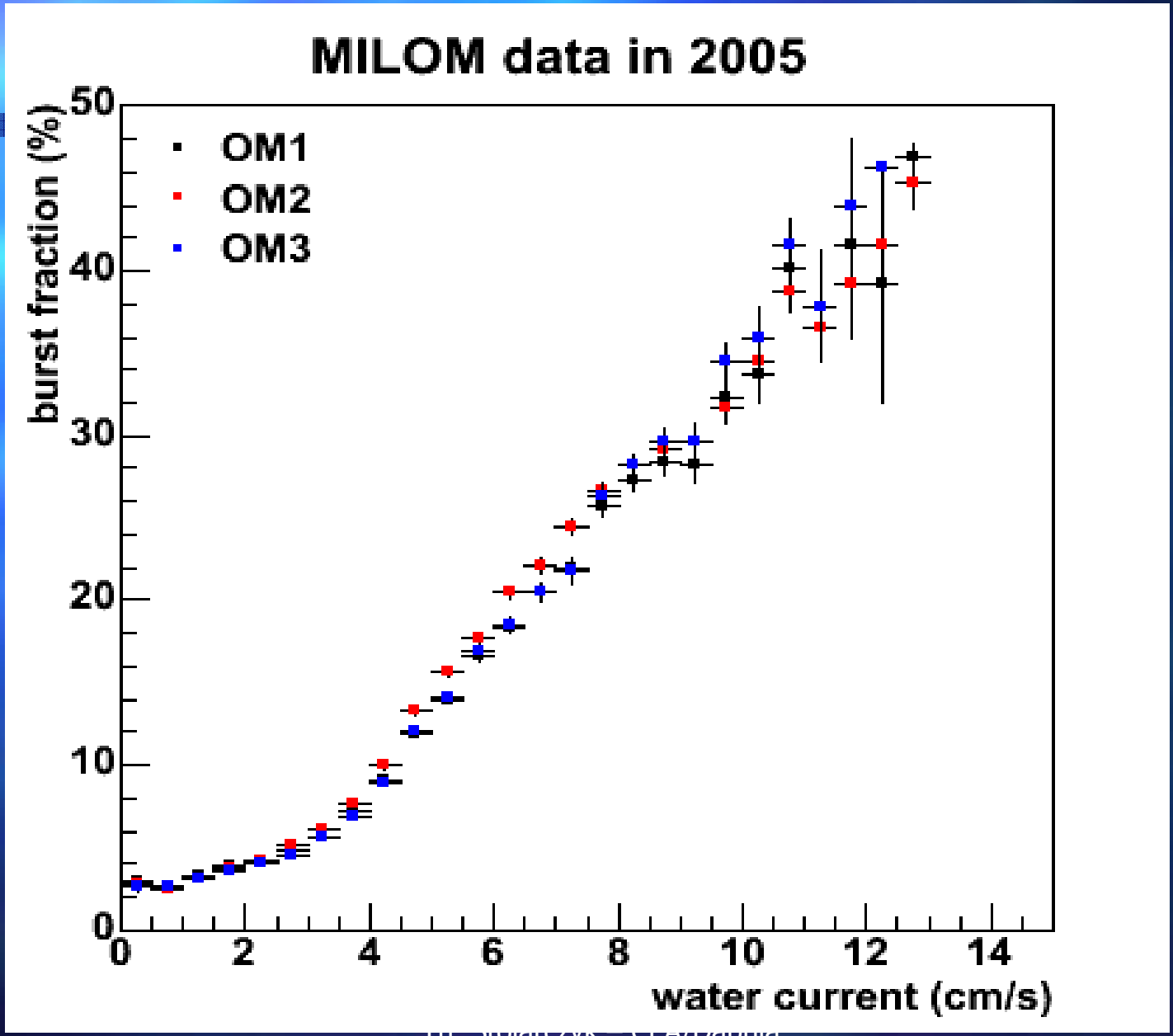



2 mn



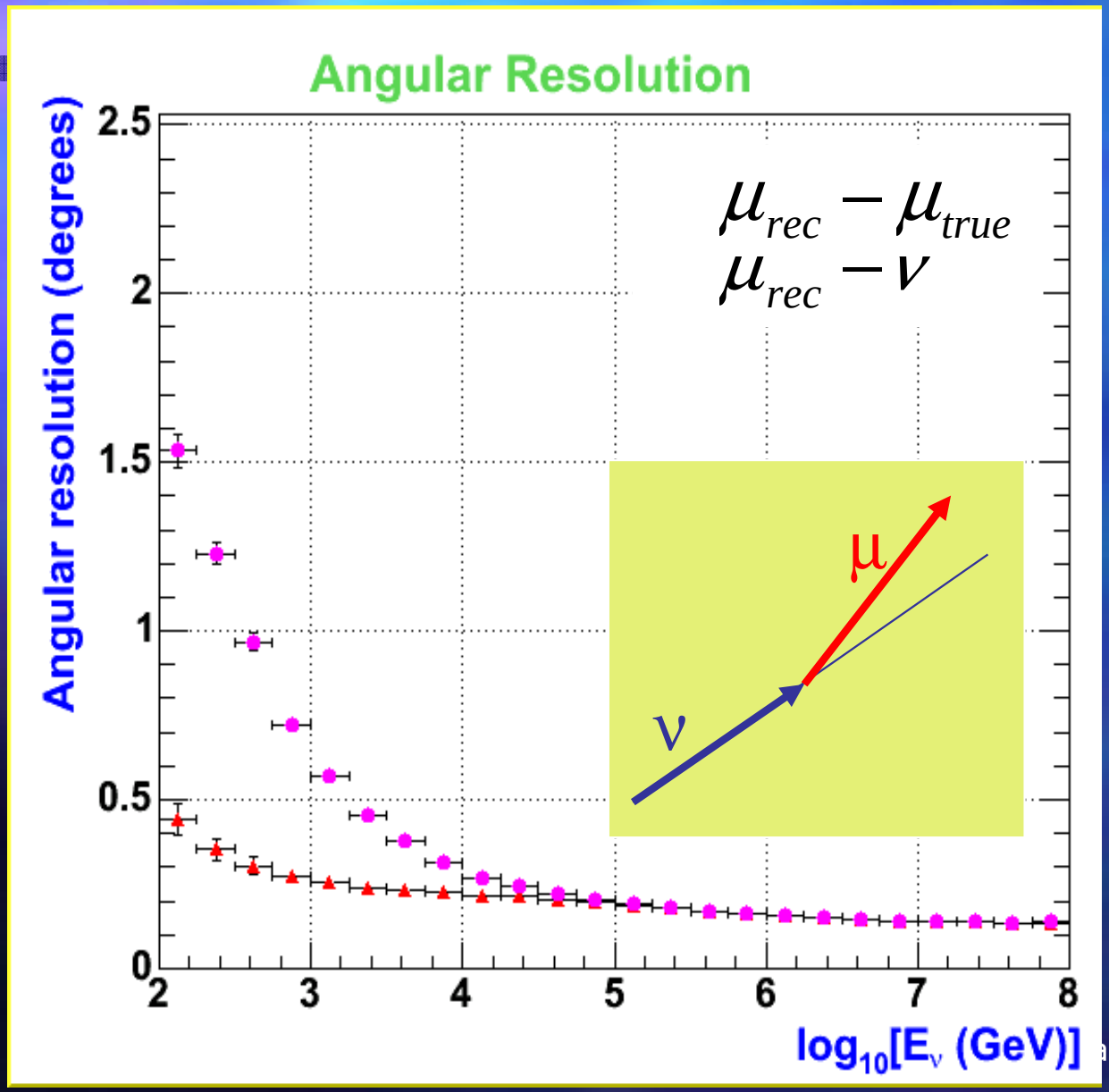

3 months

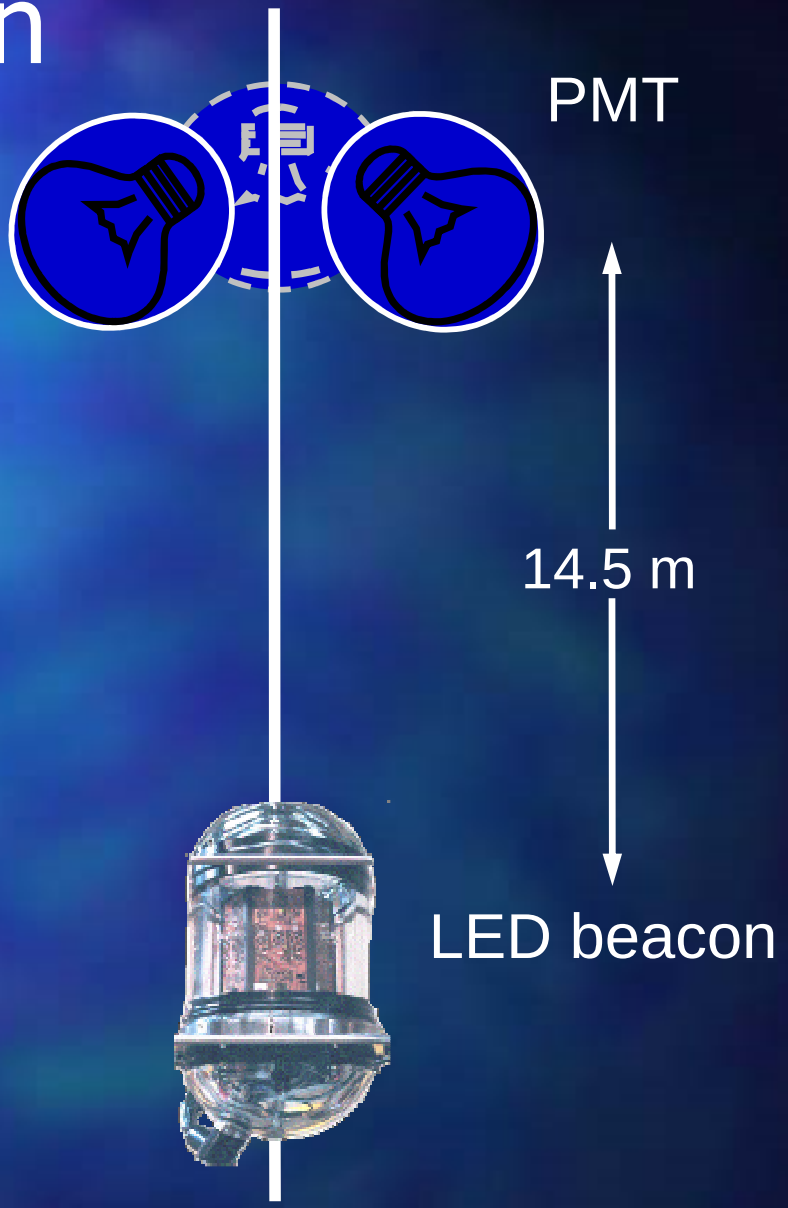
# Correlation of water current and burst fraction



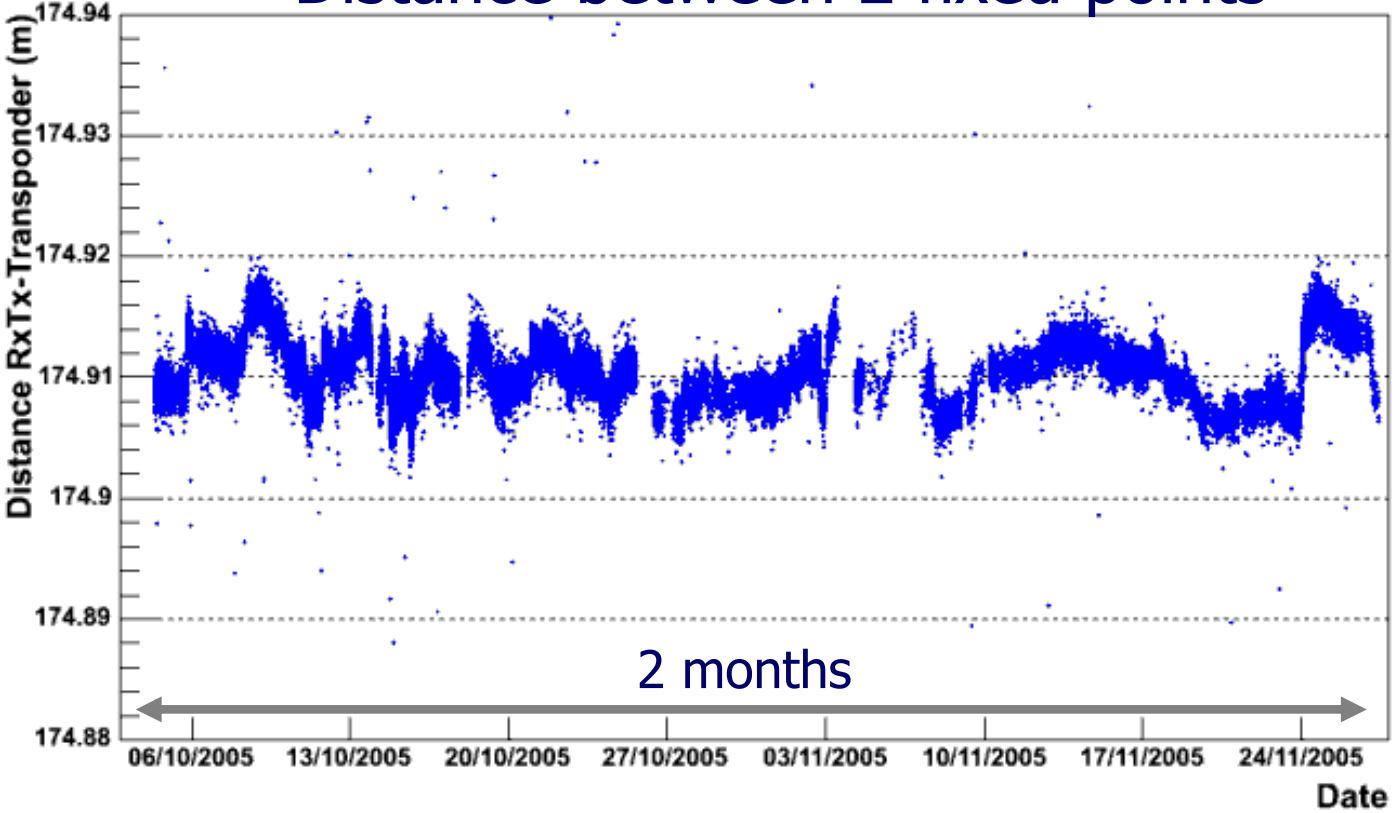
# MILOM : Time resolution

(Electronics contribution)



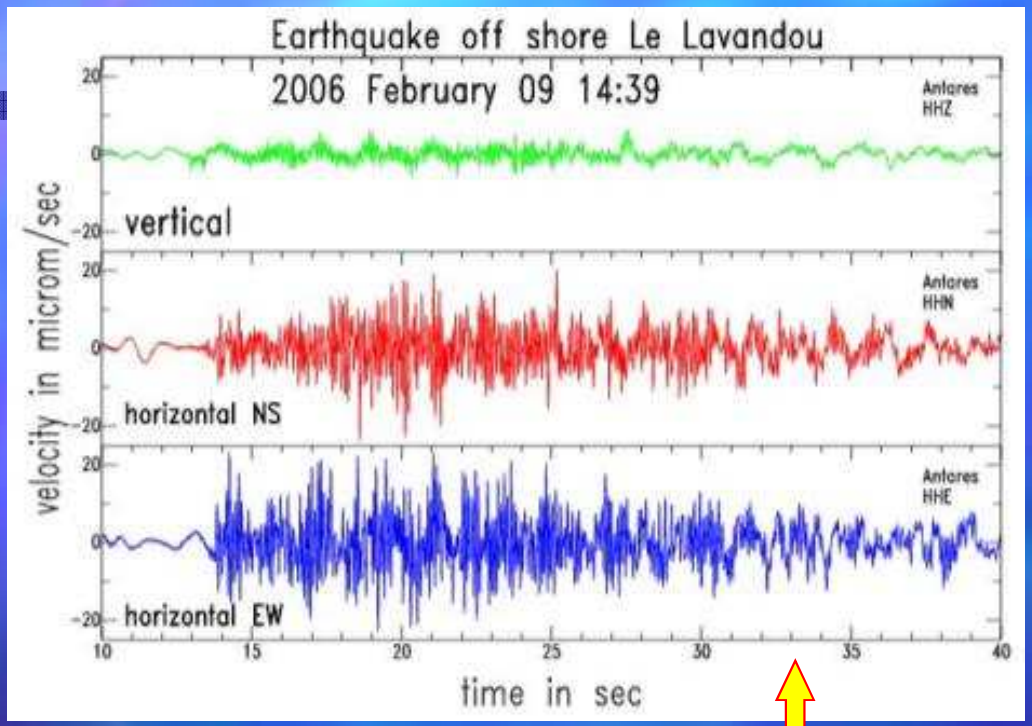



# MILOM : acoustic resolution




# MILOM : Data from seismometer

~ 150 m away from the MILOM.

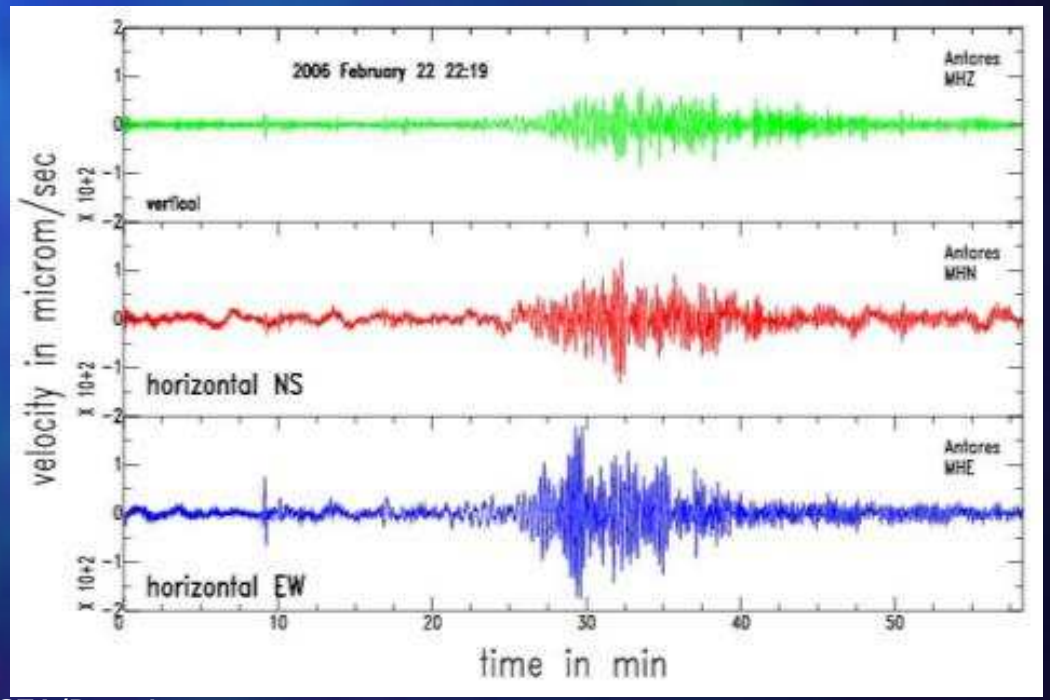



Lavandou (France)

Feb. 9, 2006

Mozambique

Feb. 22, 2006



# Line 1

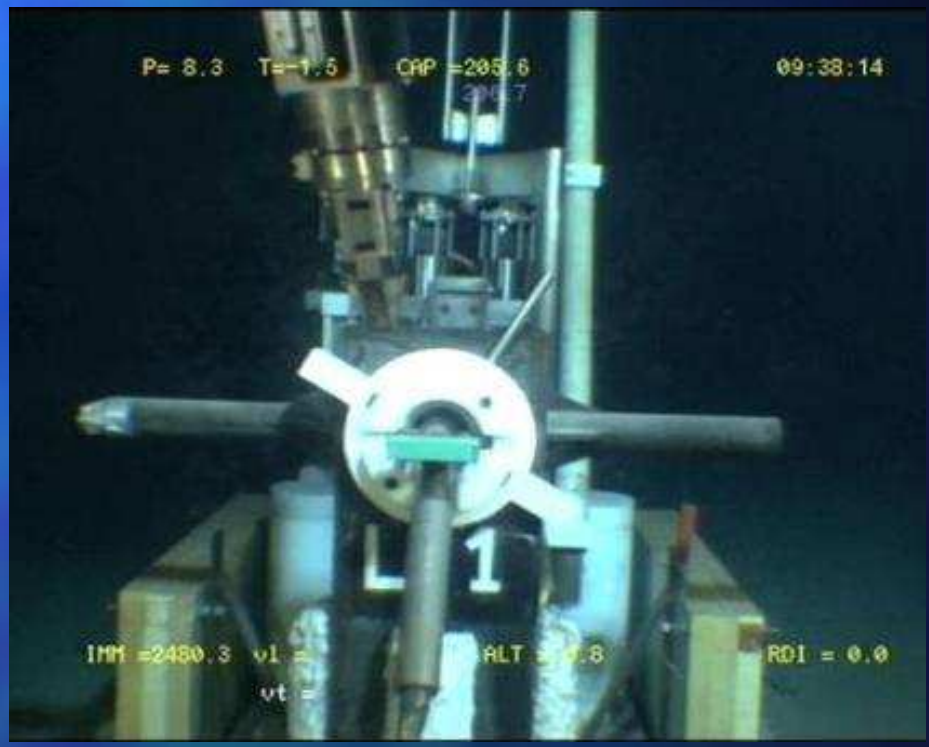
- In order to reduce the size of this file, high definition line 1 pictures have been removed. You can get them on the web : http://antares.in2p3.fr







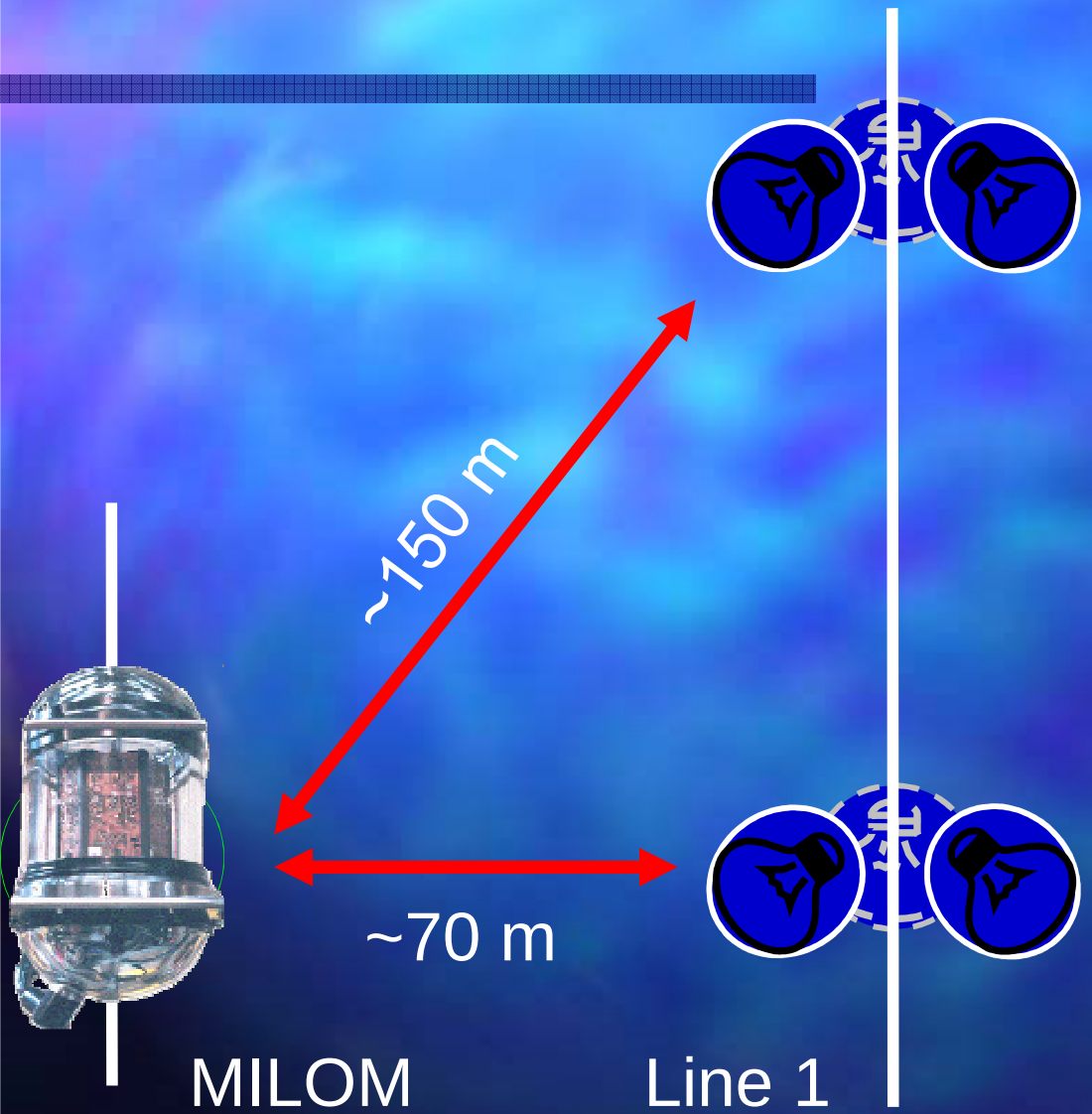

# Connected : March 2nd, 2006, 12h11

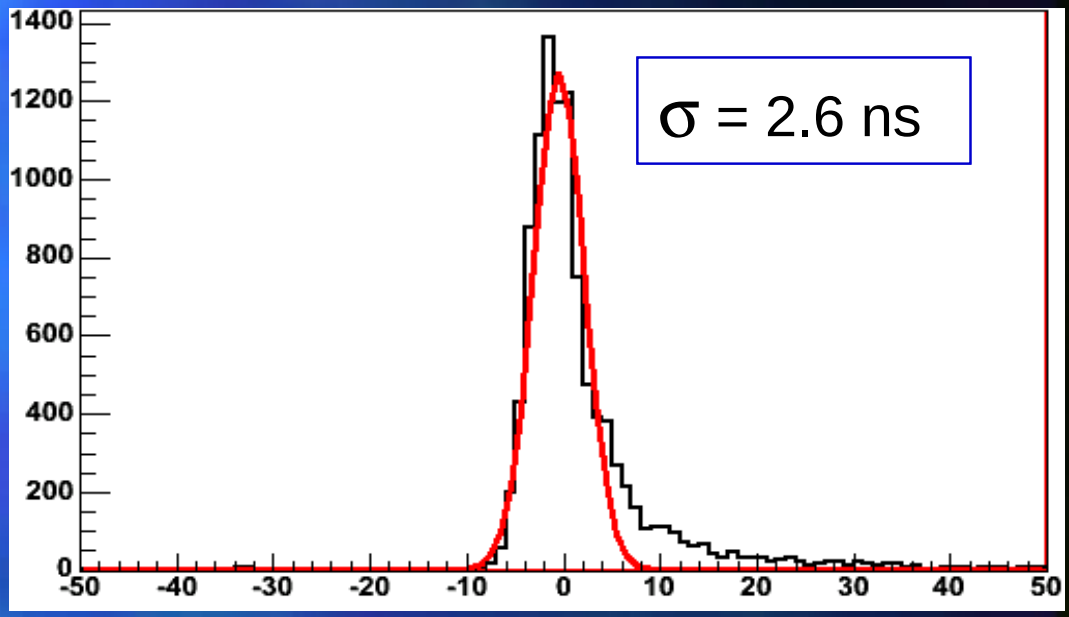


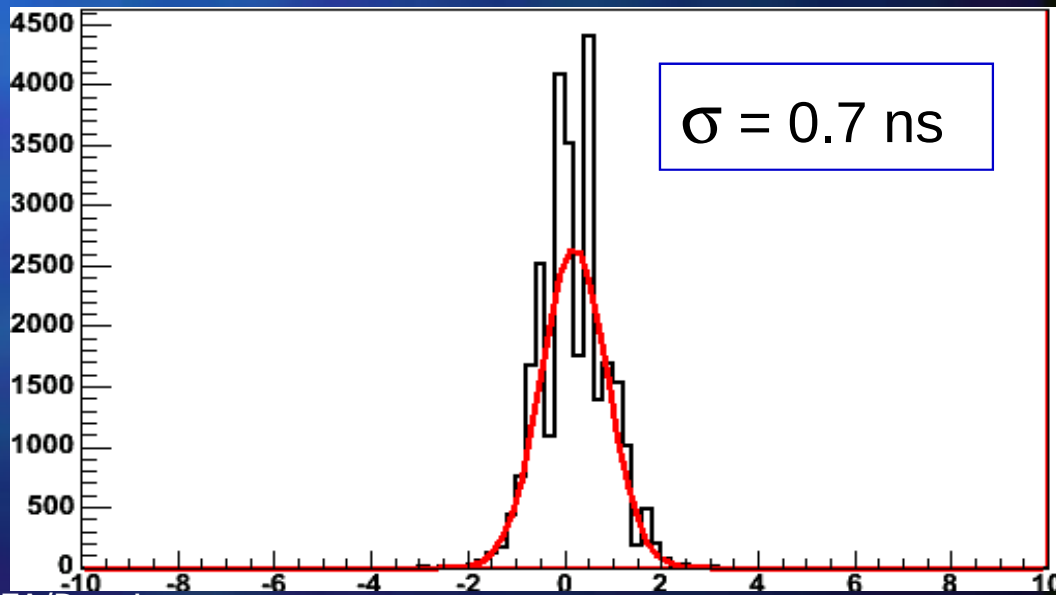

(picture taken in march 2005 – MILOM connection)

# LED beacon Time Calibration

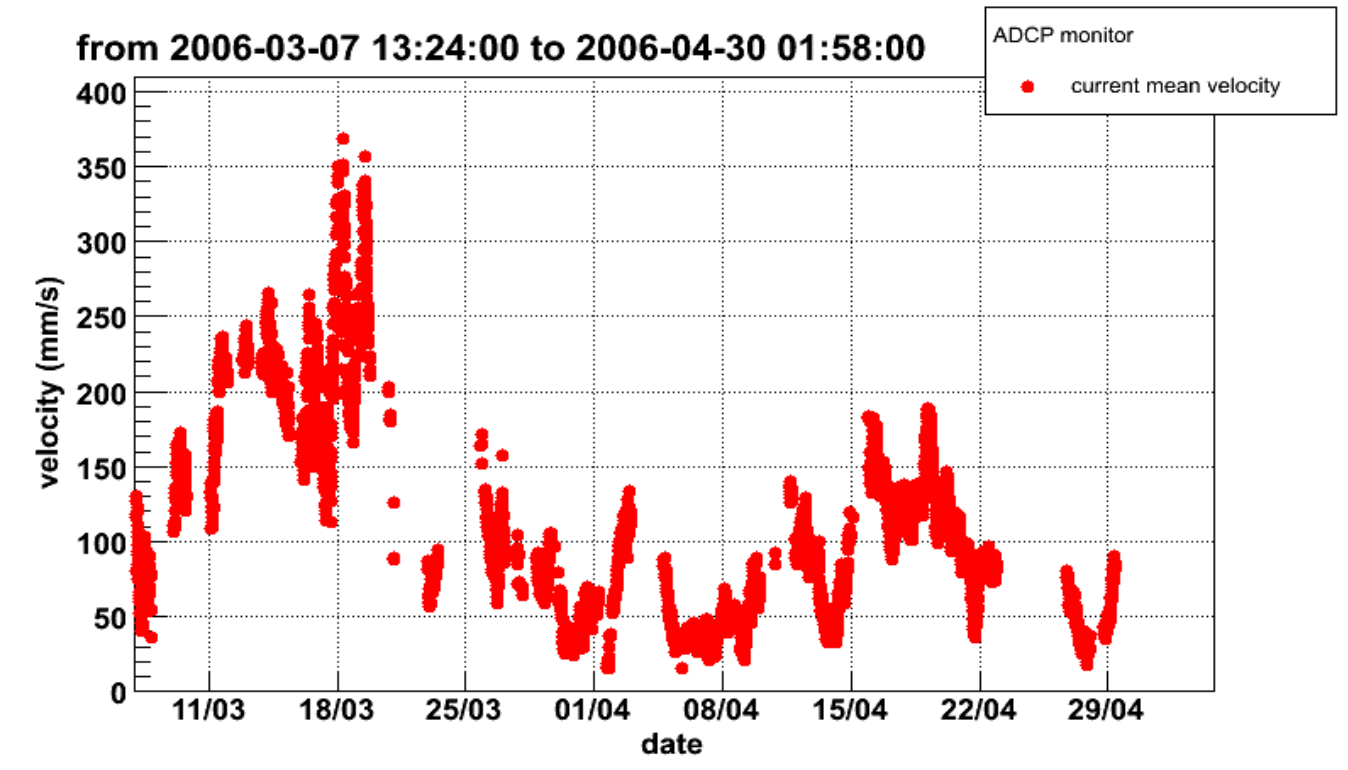
(Electronics + diffusion contributions)



# Line 1 – sea currents

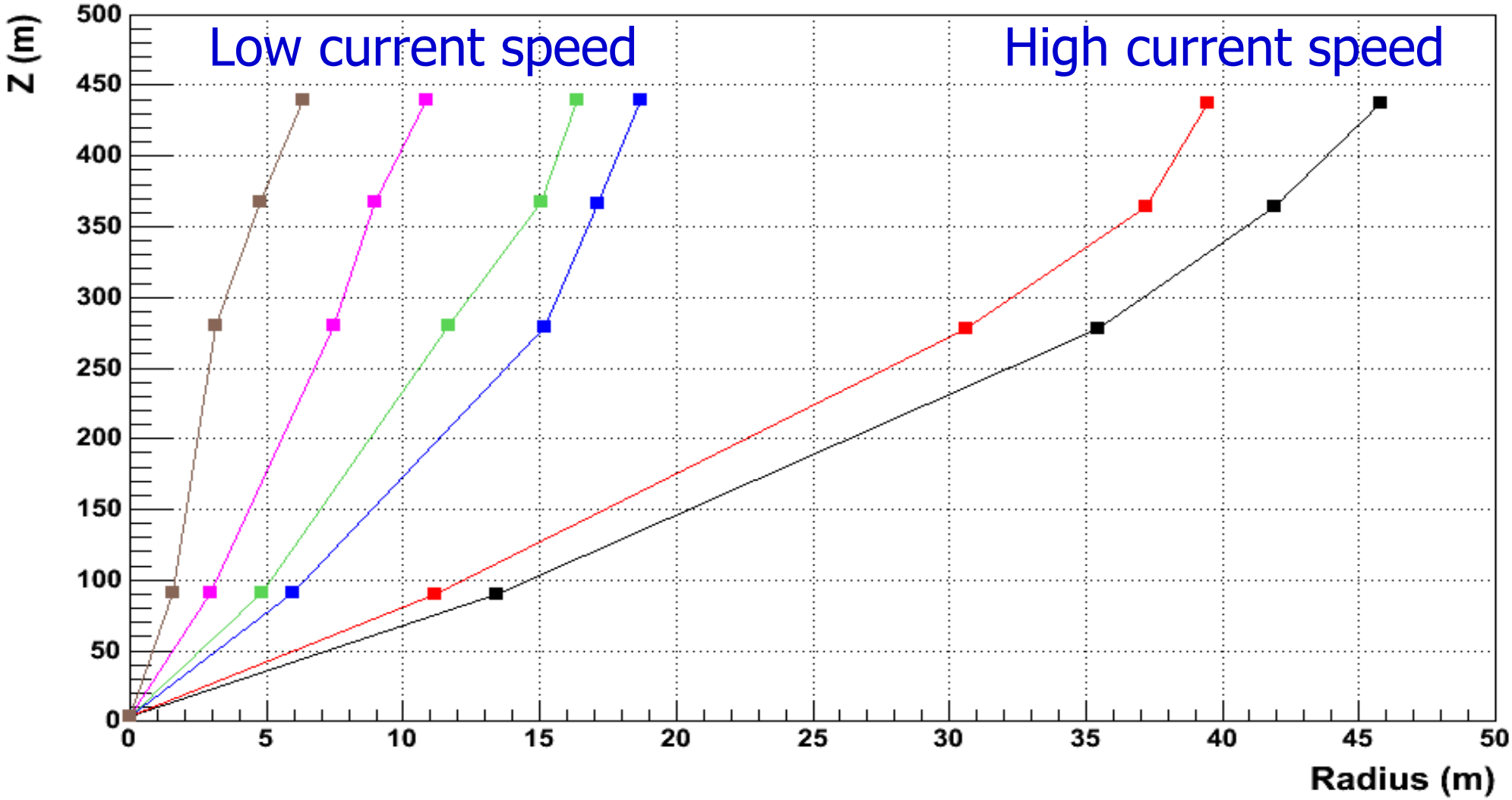



High value of sea currents
→
High bioluminescence activity

Seasonal effect ?
- seen on sector line (2003)
- seen on MILOM (2005)

# Line 1 shapes (acoustic data)

Current speeds : 4 12 15 26 32 33 cm.s$^{-1}$



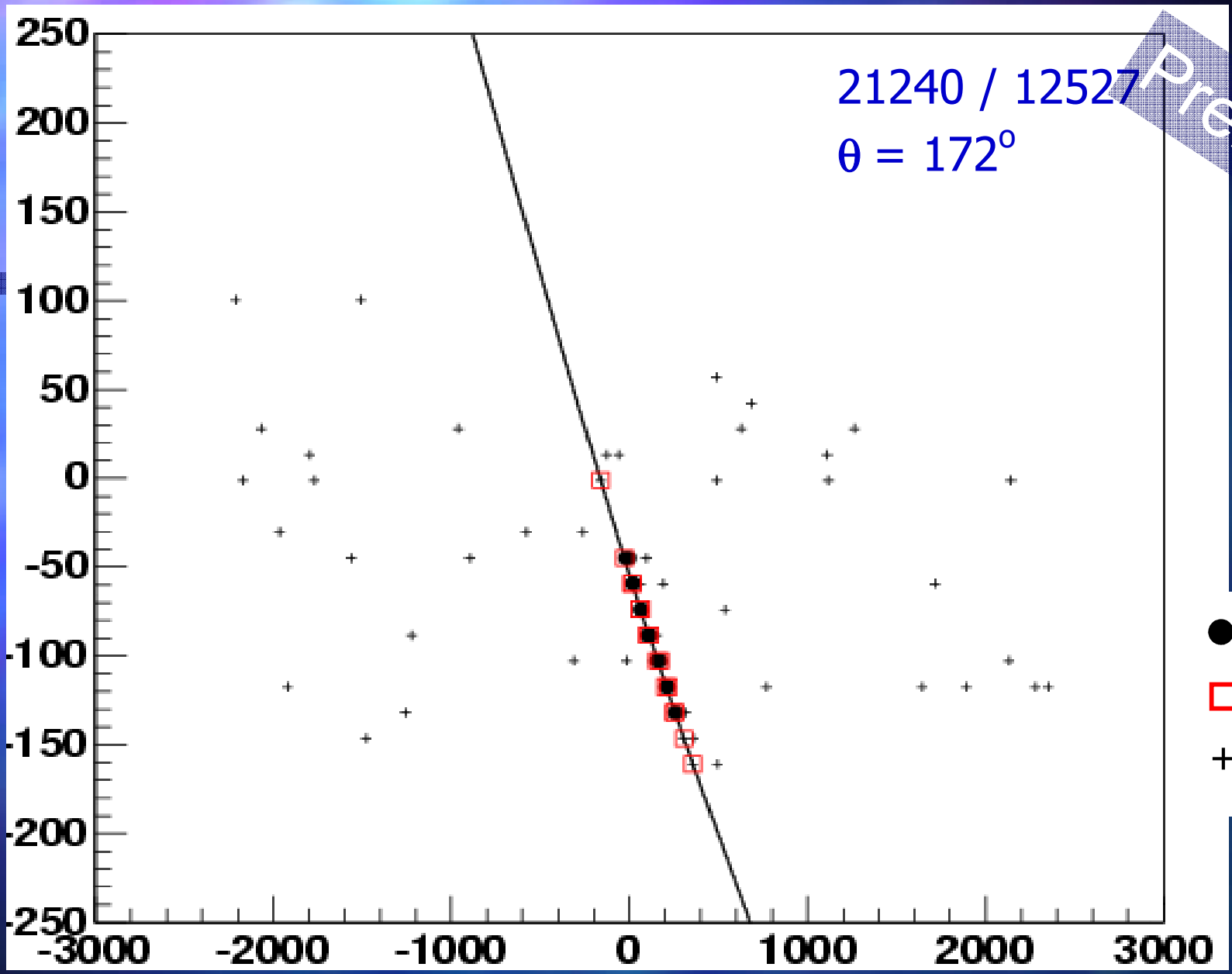
# Muon reconstruction

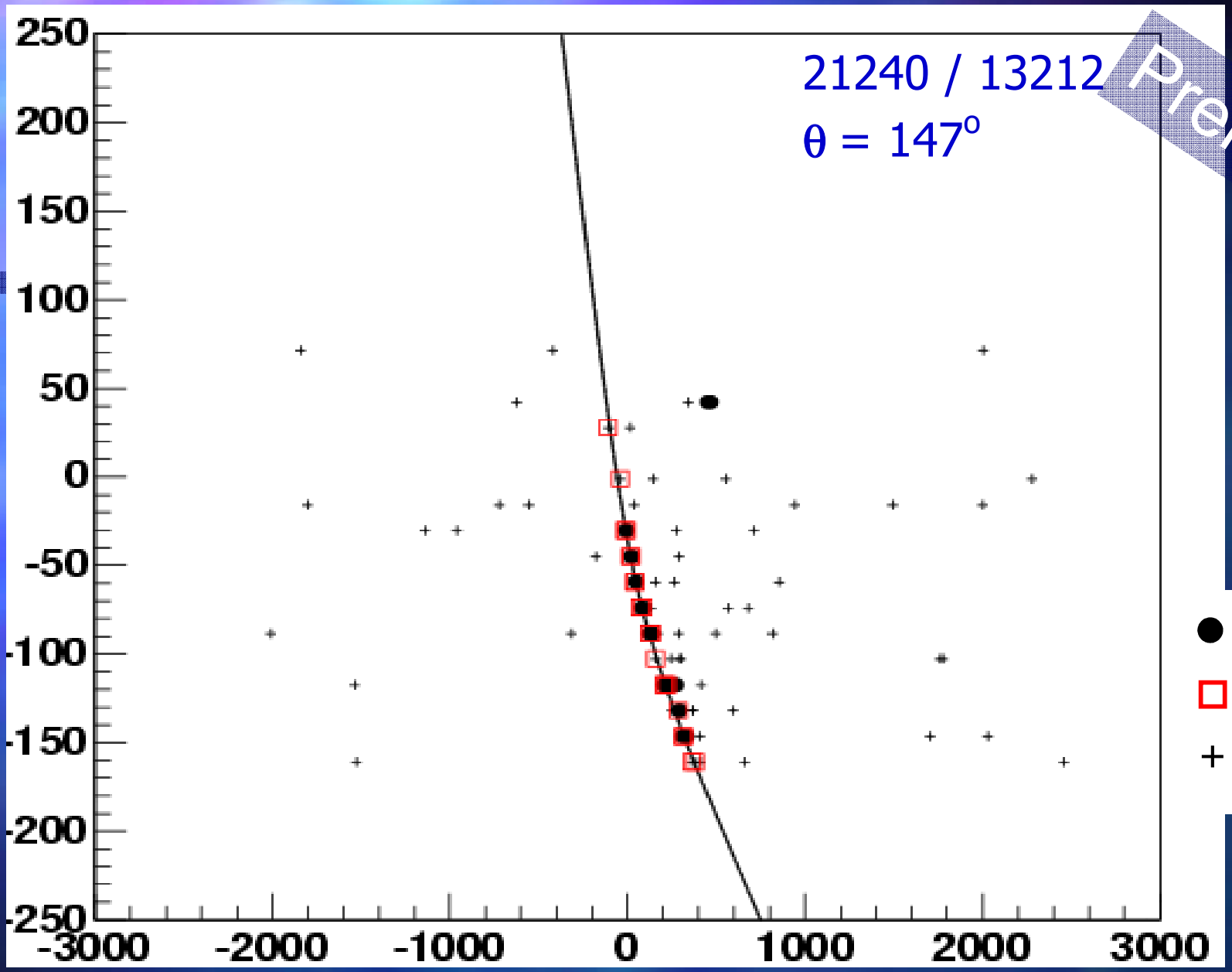
Preliminary

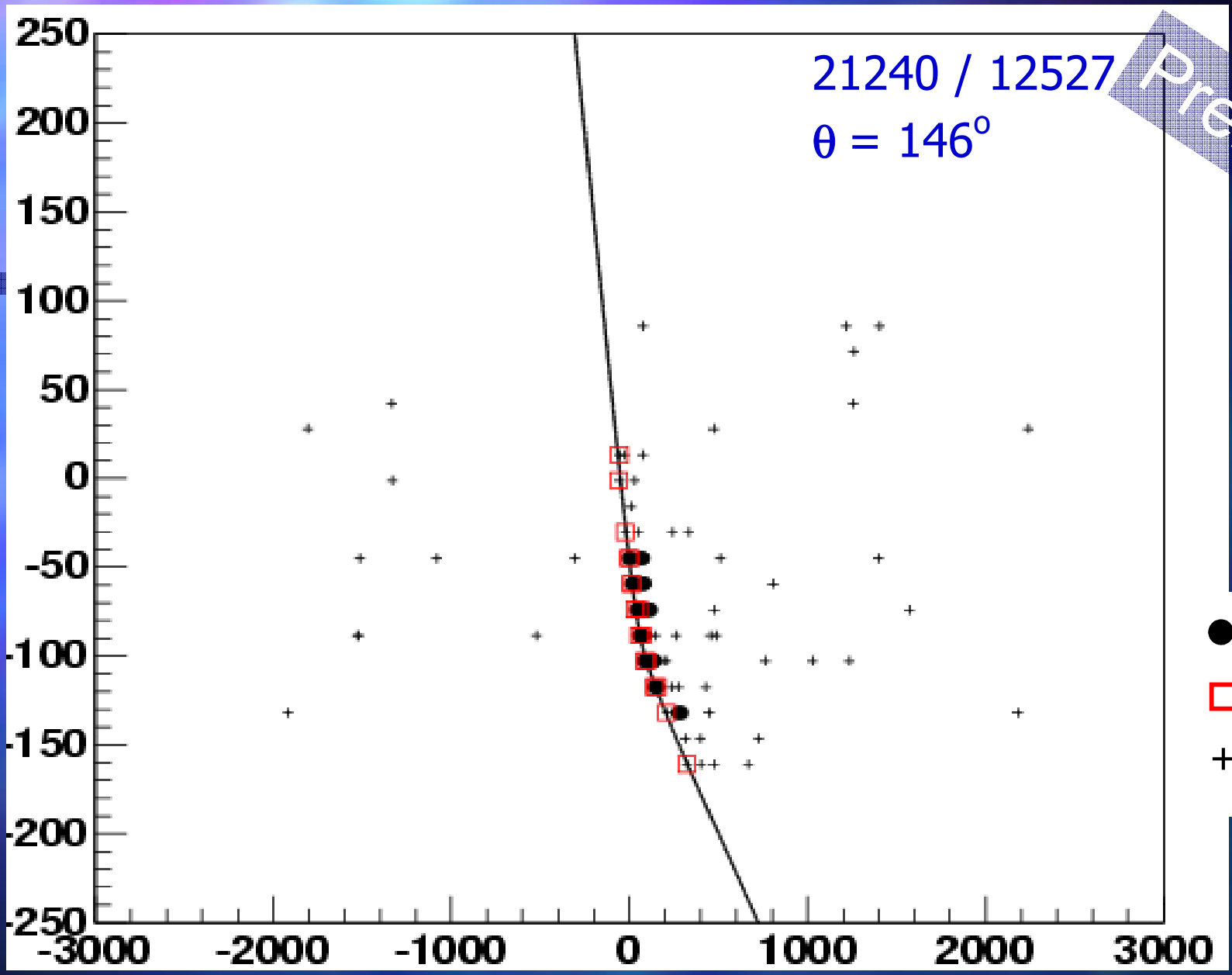
- On shore data filtering
  - Local trigger L1 : coincidence < 20 ns on storey
  - At least 4 L1 in coincidence $\rightarrow$ « Physics event »

- A single line $\rightarrow$ poor sensitivity to azimut $\rightarrow$ use 4 parametre $\chi^2$ fit

$$c(t_i - t_0) = (z_i - z_0) \cdot \cos\theta + tg\theta_c \cdot \sqrt{d^2 + (z_i - z_0)^2 \sin^2\theta}$$


21240 / 12527
θ = 172°
Preliminary
z [m]
t [ns]
250
200
150
100
50
0
-50
-100
-150
-200
-250
-3000
-2000
-1000
0
1000
2000
3000
Triggered hits
Hits used in fit
Snapshot hits


21240 / 13212
θ = 147°
Preliminary
Triggered hits
Hits used in fit
Snapshot hits
z [m]
t [ns]
250
200
150
100
50
0
-50
-100
-150
-200
-250
-3000
-2000
-1000
0
1000
2000
3000


21240 / 12527
θ = 146°
Preliminary
z [m]
250
200
150
100
50
0
-50
-100
-150
-200
-250
-3000
-2000
-1000
0
1000
2000
3000
t [ns]
Triggered hits
Hits used in fit
Snapshot hits

# What's next?

- MILOM : One year of data taking
  - Time resolution, acoustic positioning : as expected !
  -
- March 2nd : Line 1 connected
  - First reconstructed muons 48h after connexion
  - MILOM « seen » at 150 metres
- Near future
  - End 2006 : + 3 lines
  - Spring 2007 : + 4 lines
  - Autumn 2007 : + 4 lines
- Next generation : a $km^3$ instrumented volume in Mediterranean
  - Considered within the KM3Net « design study » : 9 M€ 2006-2009
  - in the list of ESFRI opportunity (European Strategy Forum on Research Infrastructures)