

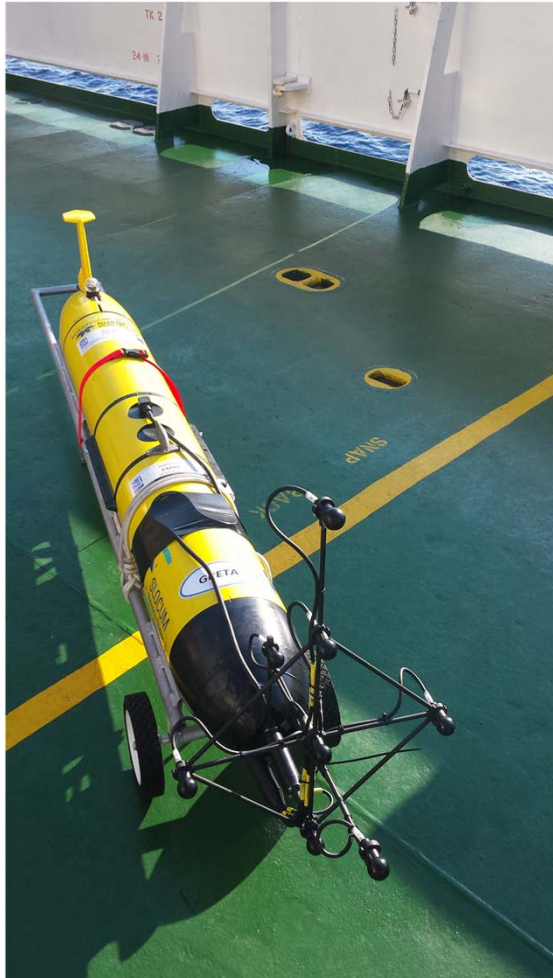
CMRE's input to ONR Seabed Characterization Experiment 2017

Seabed characterization using hydrophone/array equipped gliders and active sources

Yong-Min Jiang
yong-min.jiang@cmre.nato.int

NATO – STO – CMRE
Viale San Bartolomeo 400, 19126, La Spezia, Italy

Plan to bring: CMRE Gliders with acoustic payload and a source ITC1007



3D cross array



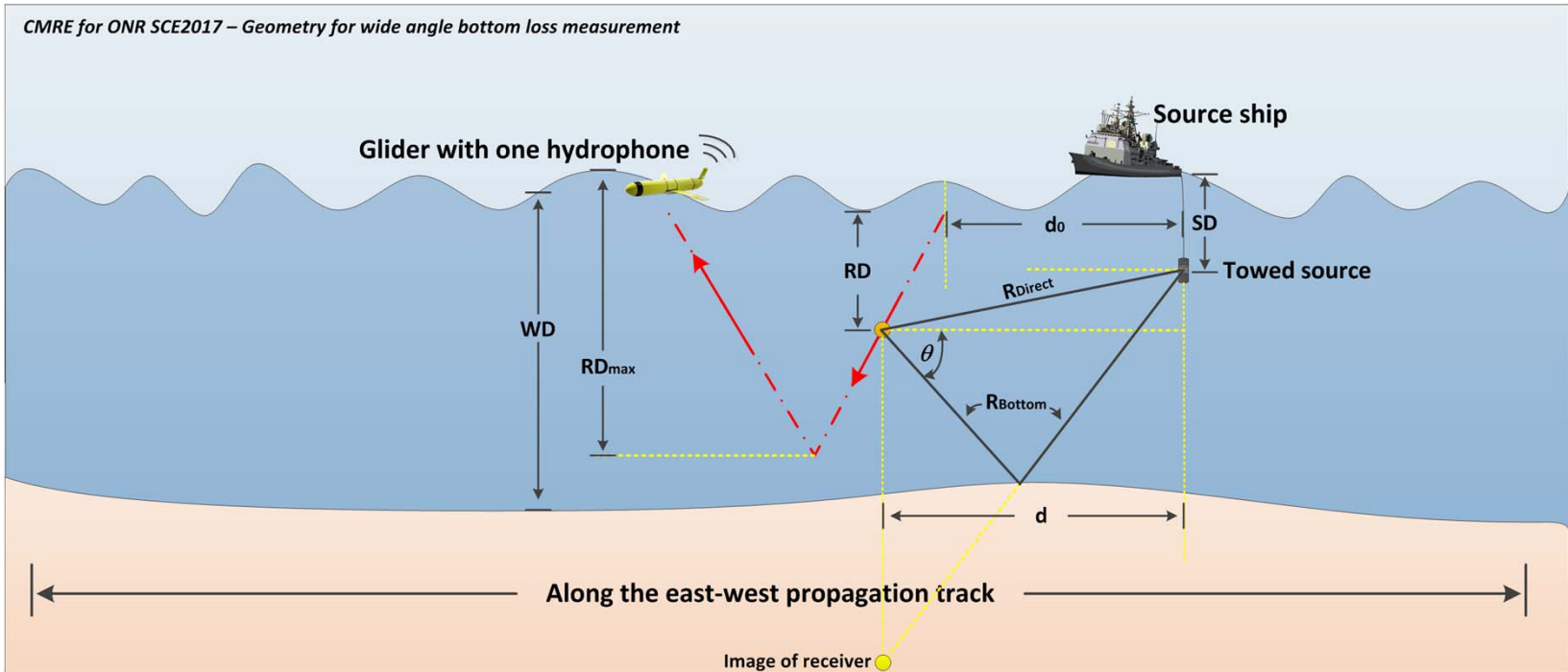
Hydrophone

with reactive behavior

Options:

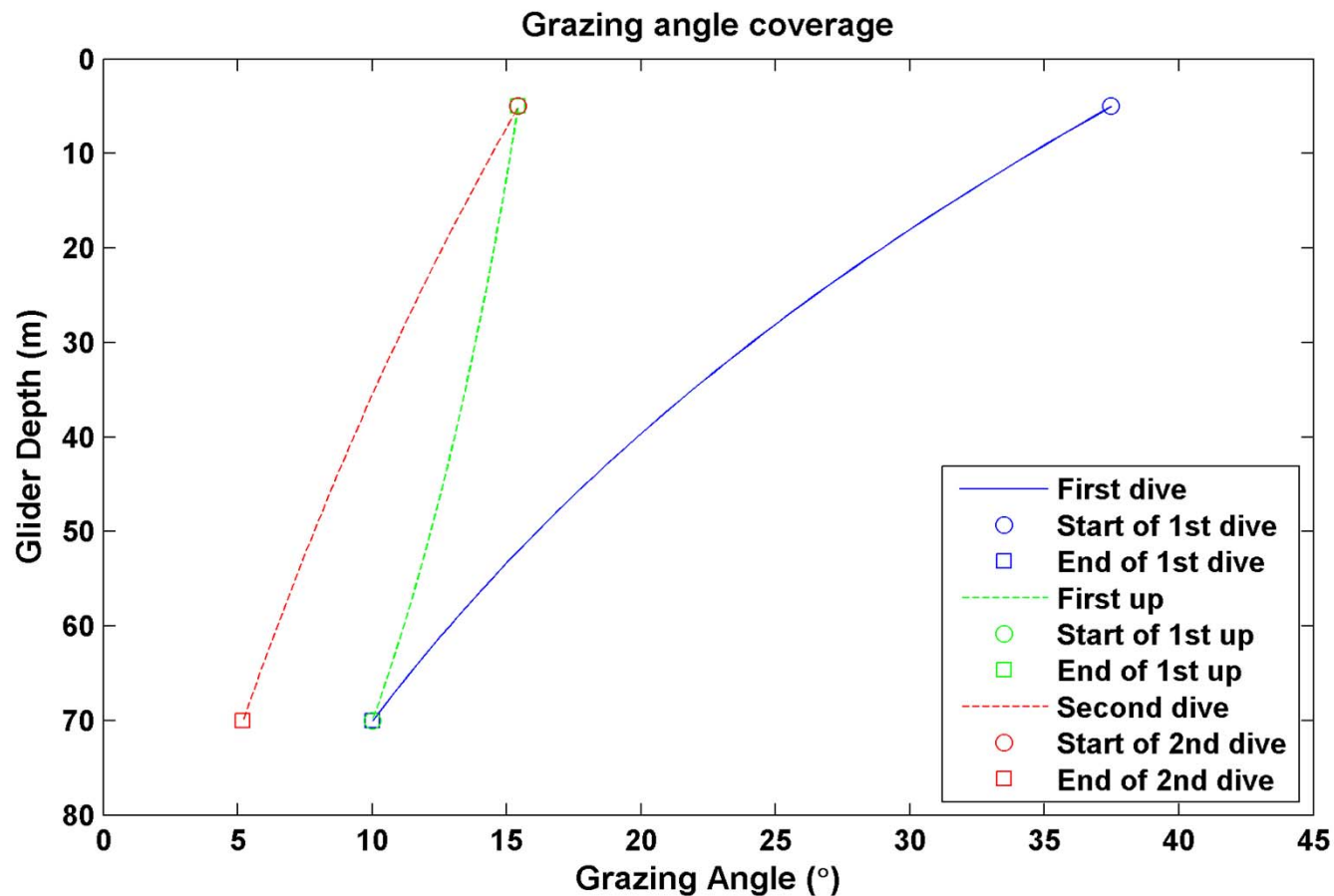
- Two with single hydrophone
- One with single hydrophone, one with cross array

Experiment I - Wide angle reflection coefficient measurement (Local)



Typical measurement time:

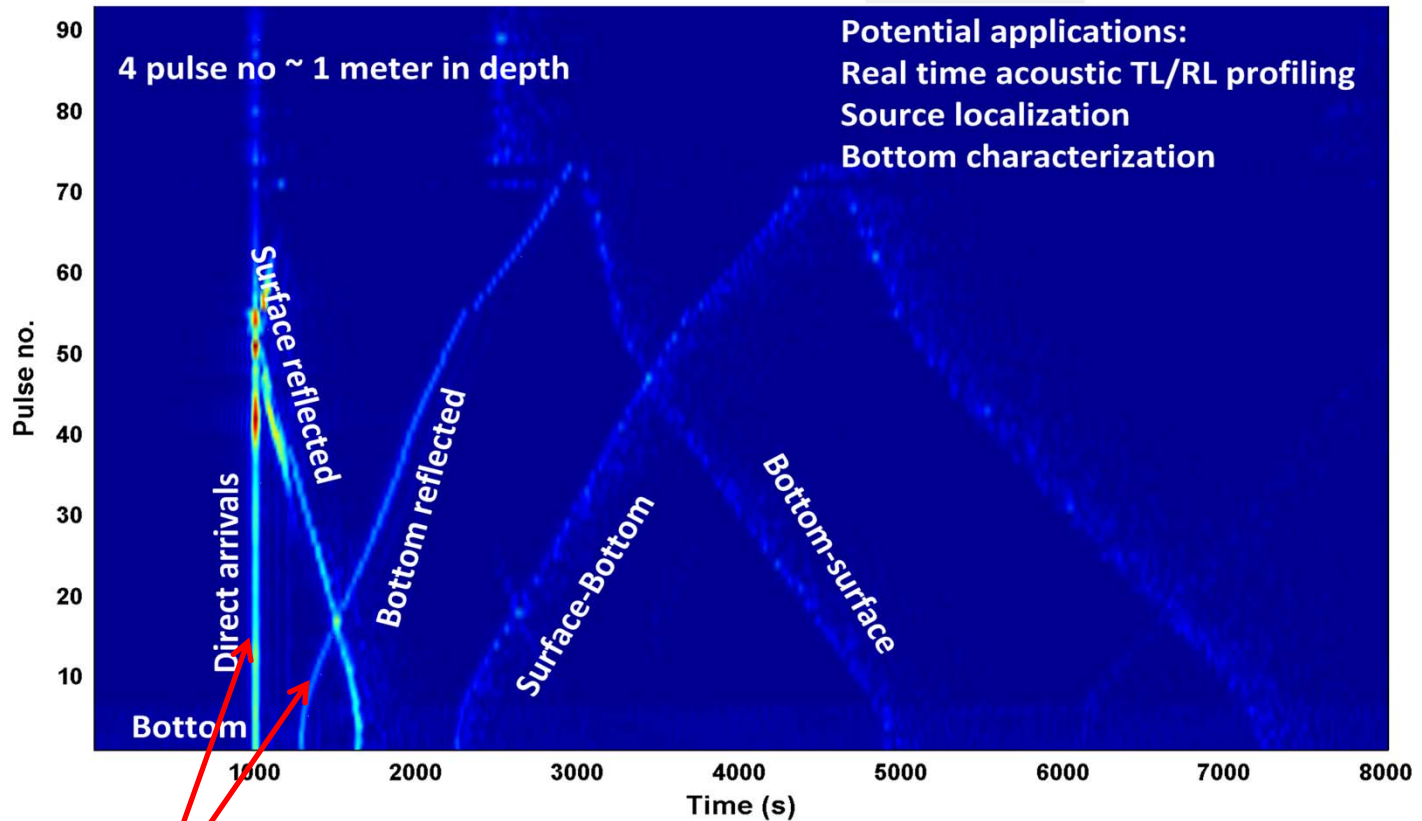
- One dive = 15 minutes
- Deploy + recover < 30 minutes
- Need good weather
- Provides SSP at the same time



For an iso-velocity SSP, $d_0 = 150\text{m}$ and $WD = 80\text{m}$, the grazing angle coverage of the first dive (the blue solid line) is from 9.8 to 38.3 degrees. The second dive (red dashed line) can grazing angle can reach 5 degrees.

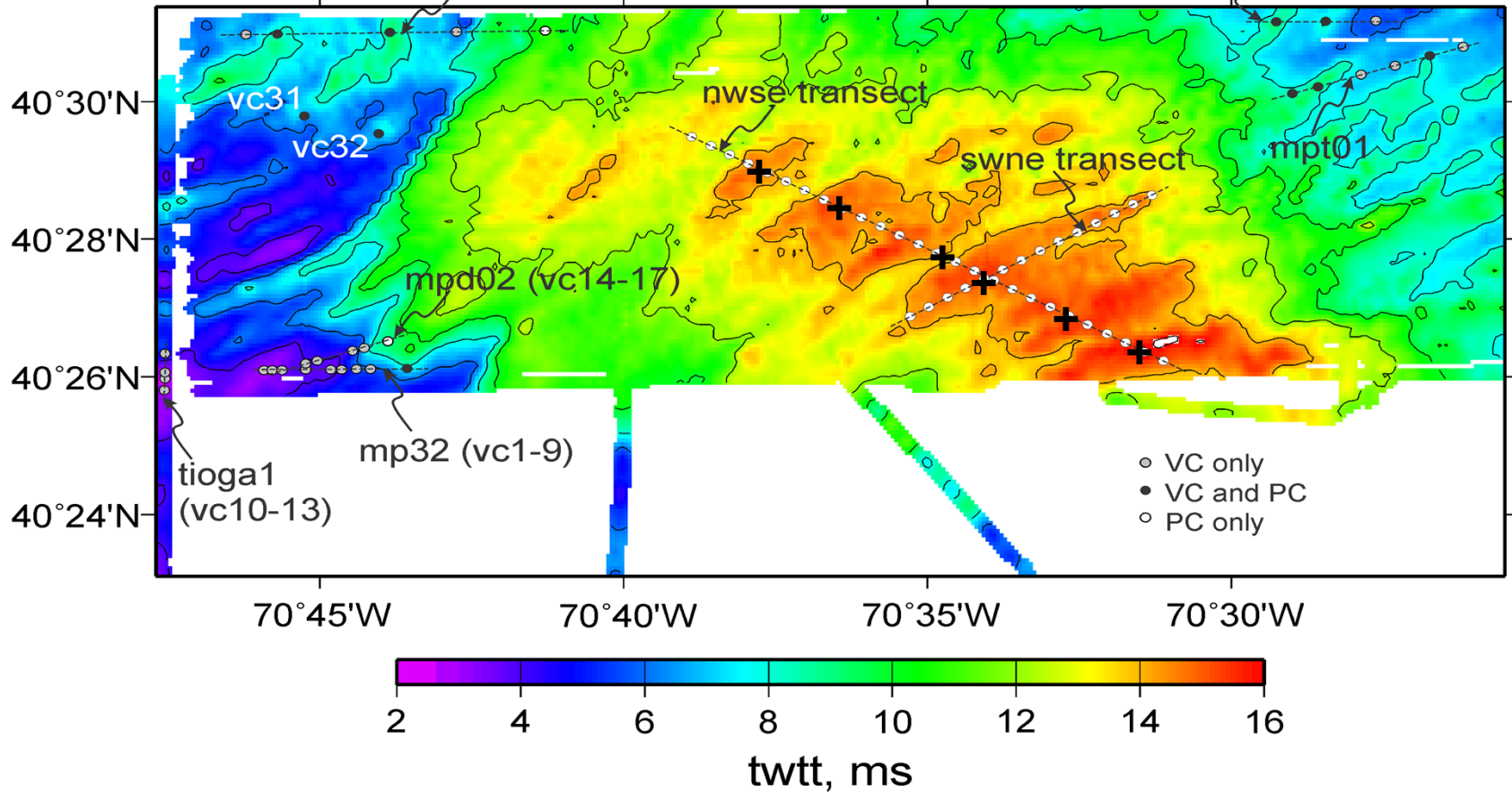
Previous measurement results from a CMRE sea trial

MED-REP14 ET, 23 April 2014



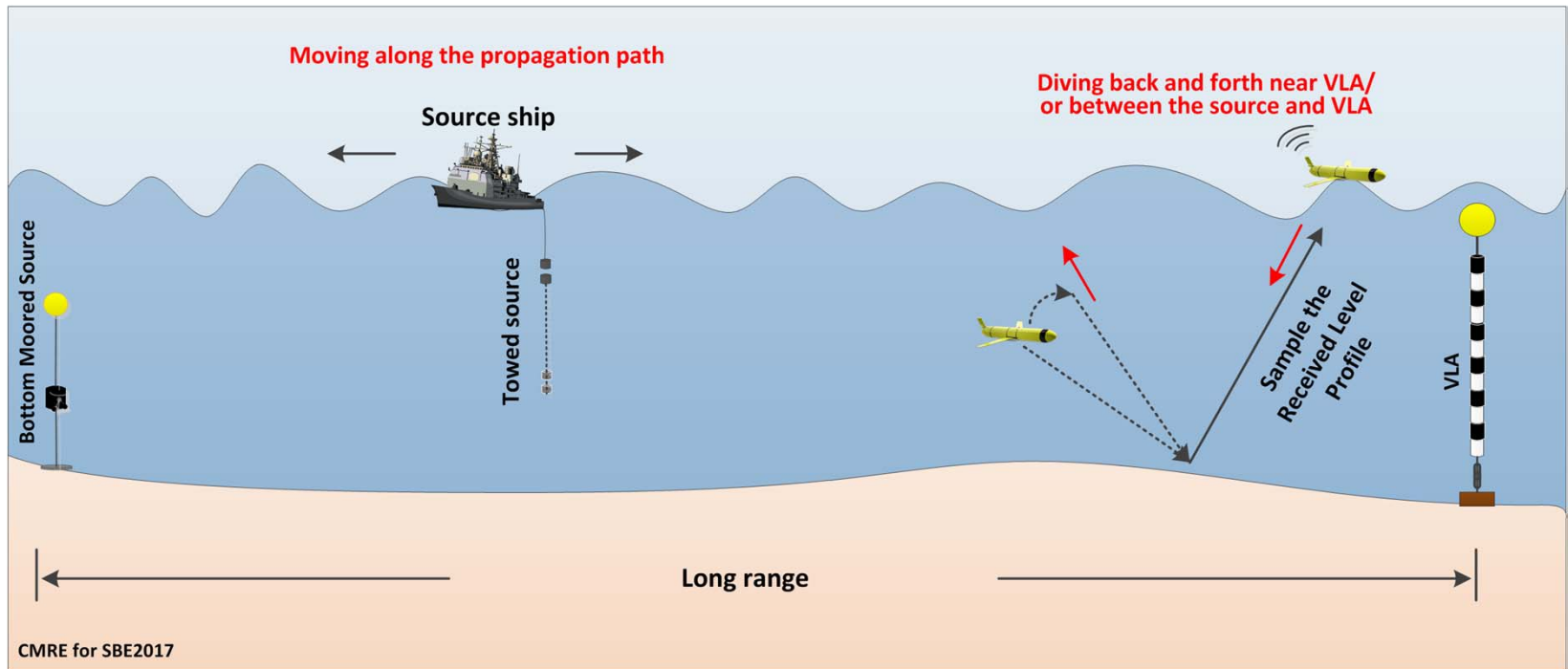
'Wide angle' bottom loss as a function of angle

Courtesy of the colleague who made this plot



- **Re-visit Charles' stations (bottom moored hydrophone/array + boomer)**
- **Different locations along the main propagation paths**
- **At least two dedicated days for 8 stations (conservative number)**

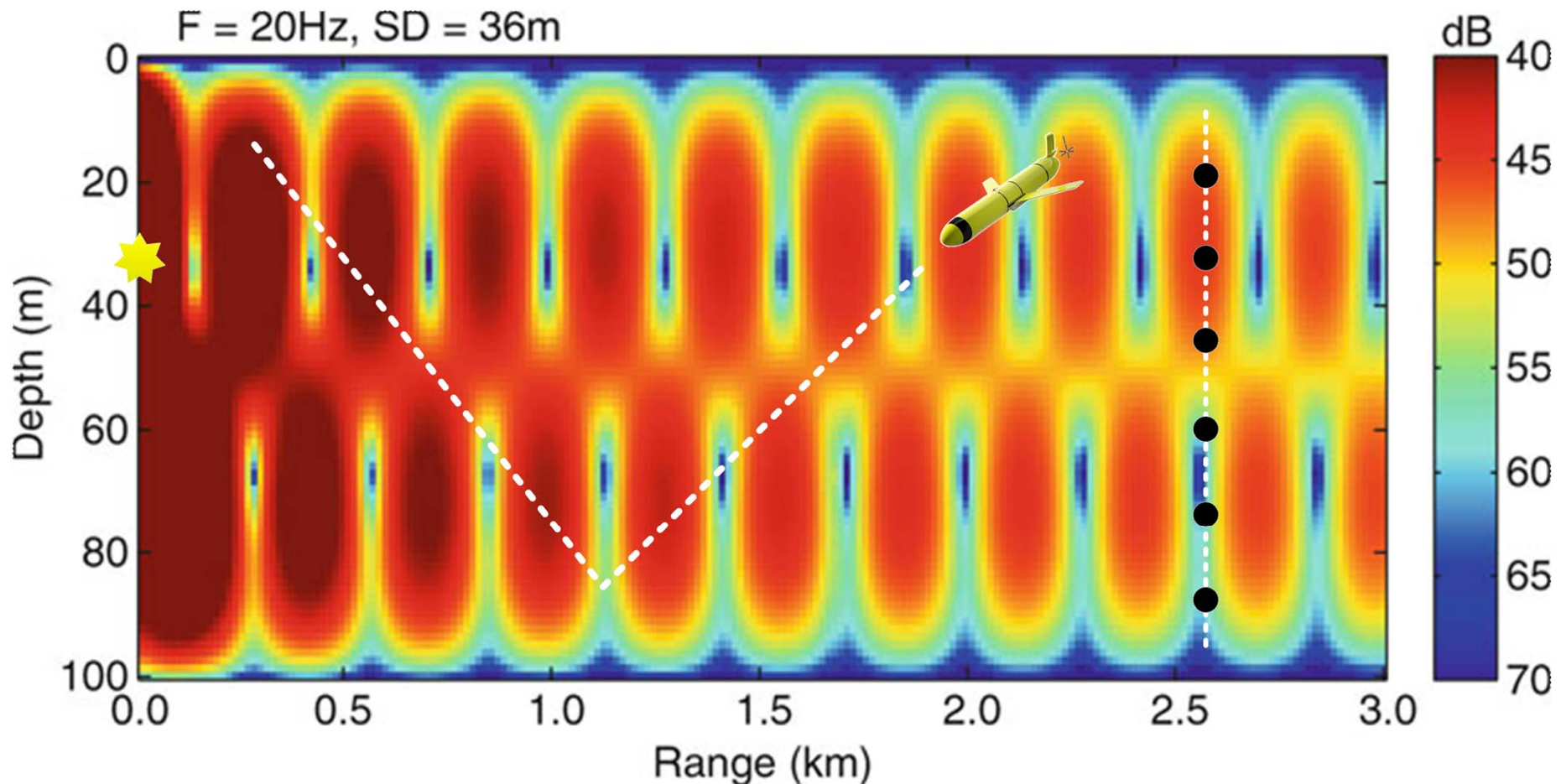
Experiment II – Acoustic field as a function of range and depth



Typical measurement scheme:

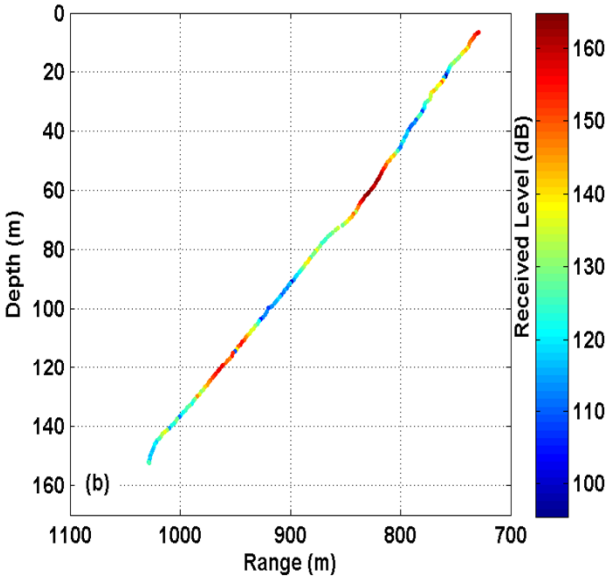
- Deploy – glides in the water around 10 days (50 kHz sample frequency)
- May redirect to desired paths
- Recover
- Provides SSP at the same time

Sample the acoustic field as a function of range and depth:



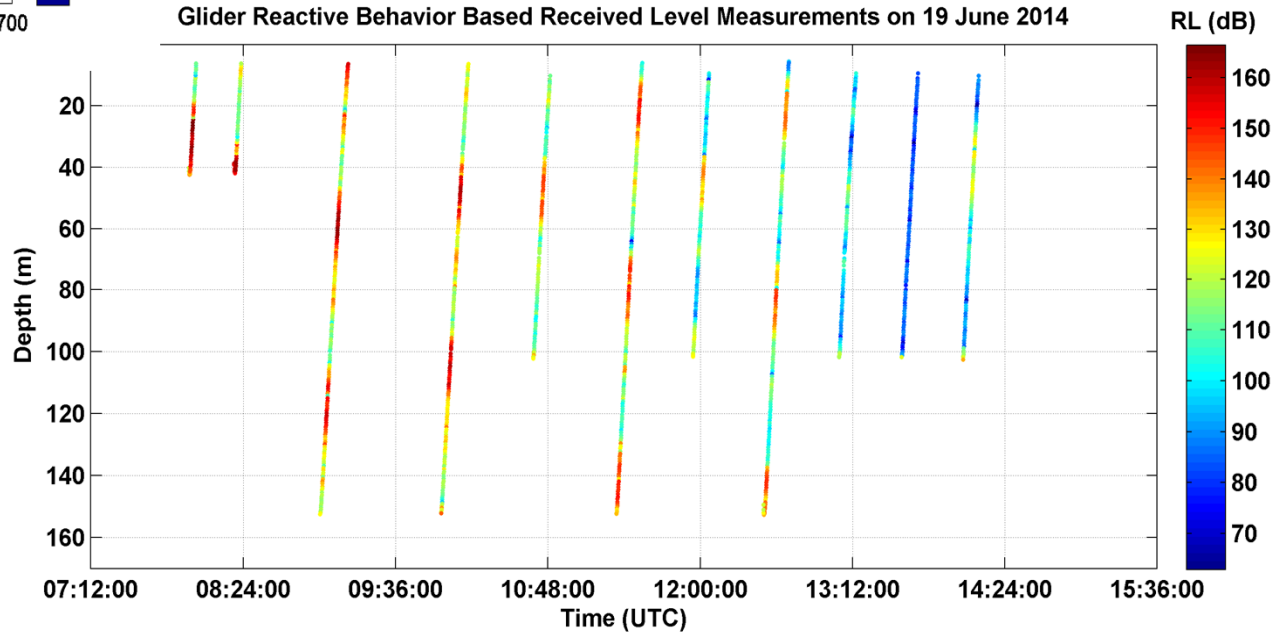
‘Computational Ocean Acoustics’ by F. Jensen, W.A. Kuperman, M. Porter and H. Schmidt

2014/06/19, 09:00:20.0-09:13:29.3



RL profile as a function of range and depth:

RL profile as a function of time and depth:



Message:

- The ship should have the capability of deploying and recovering a workboat
- Good sea states for deploying and recover the workboat:
 - For local measurements: dedicated 2 days
 - For long range measurements: Good sea state on the deployment and recovery days
- Wish to team up with the groups who have sources
 - Broadband for local measurements
 - Any source for long range propagation measurements
 - We may also bring a source ITC1007 (between 4 – 20 kHz)