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by

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# Internal Tide Measurements with Acoustic Tomography Experiments

(INTIMATE)

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## INTIMATE Partnership

### INTIMATE'96

- S.M. Jesus, O. Rodriguez: UCEH - University of Algarve, Faro, Portugal
- Y. Stéphan, X. Démoulin: CMO - Service Hydrographique Oceanographique de la Marine, Brest, France
- E.F. Coelho: Instituto Hidrográfico, Lisboa, Portugal
- M.B. Porter: New Jersey Institute of Technology, NJ Newark, USA
- T. Folegot: Atlantide Logiciel, Brest, France

### INTIMATE'98

- J. Small: Defence Evaluation and Research Agency, Winfrith, UK

### INTIFANTE'99

- A. Pascoal, V. Barroso: ISR - Instituto Superior Técnico, Lisboa, Portugal
- O. Gasparini: Dune Ingegneria di Sistemi, Roma, Italy.

\* with the support of SACLANT Undersea Research Centre, La Spezia, Italy.



## INTIMATE Objectives

### INTIMATE'96

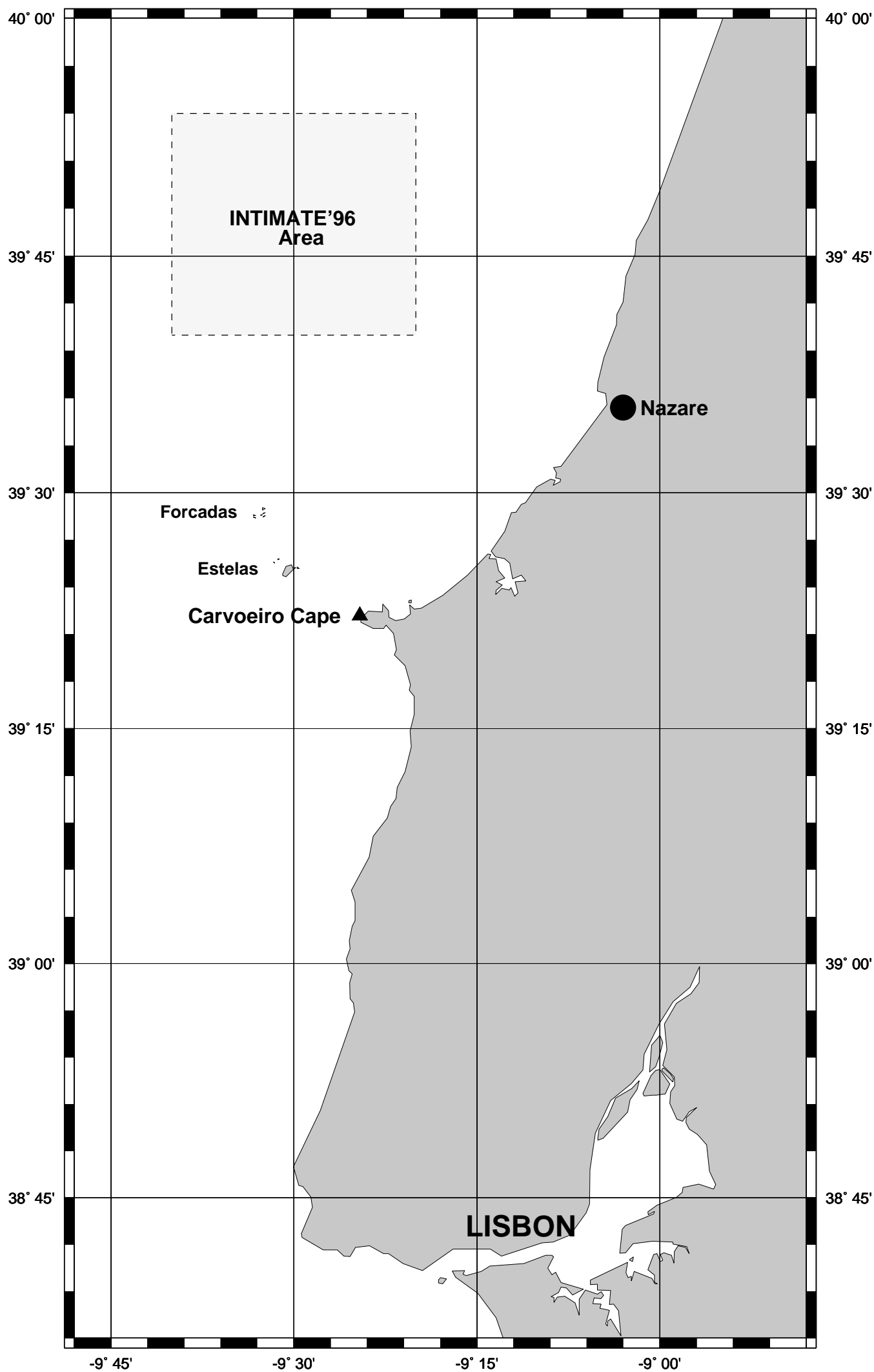
- internal tide tomography in the continental platform
- broadband geoacoustic inversion
- broadband source localization (MFP)

### INTIMATE'98

- deep/shallow water tomography
- reverberation
- nonlinear bottom topography interaction (solitons, SAR,...)

### INTIFANTE'99

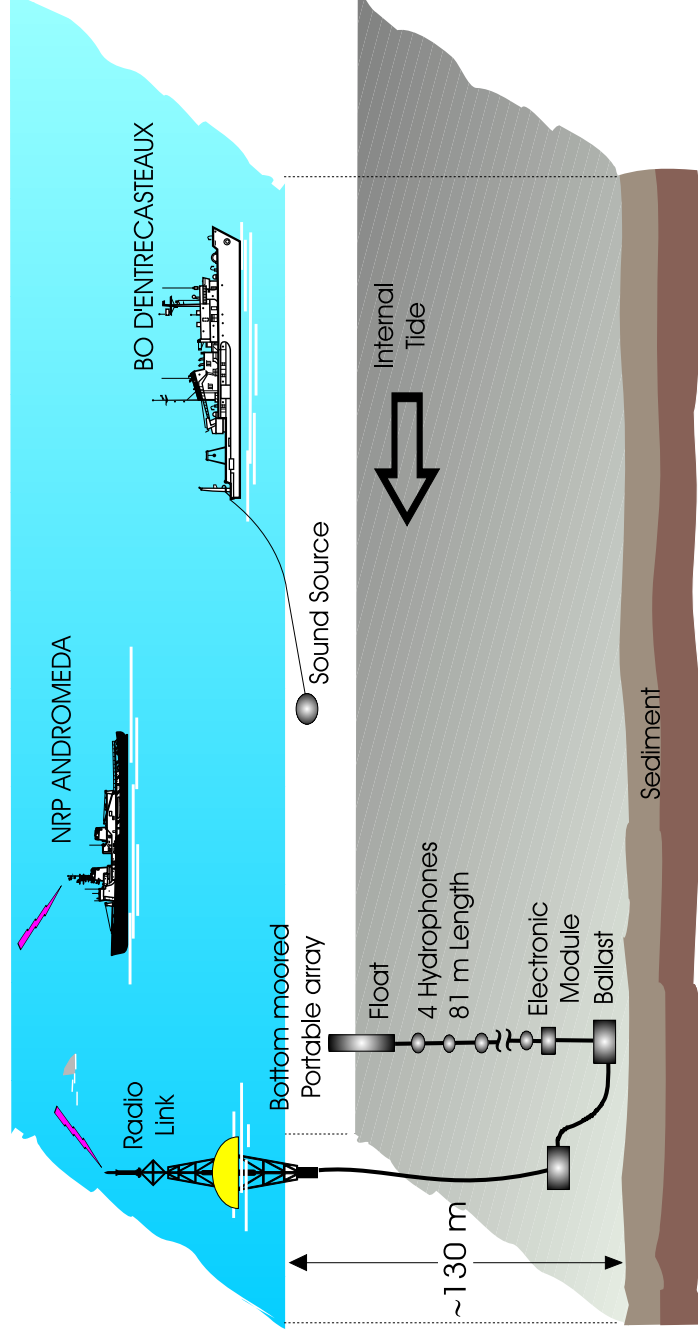
- model-based equalization for AUV communications
- AUV guidance and control
- shallow water tomography with PRN and ship noise

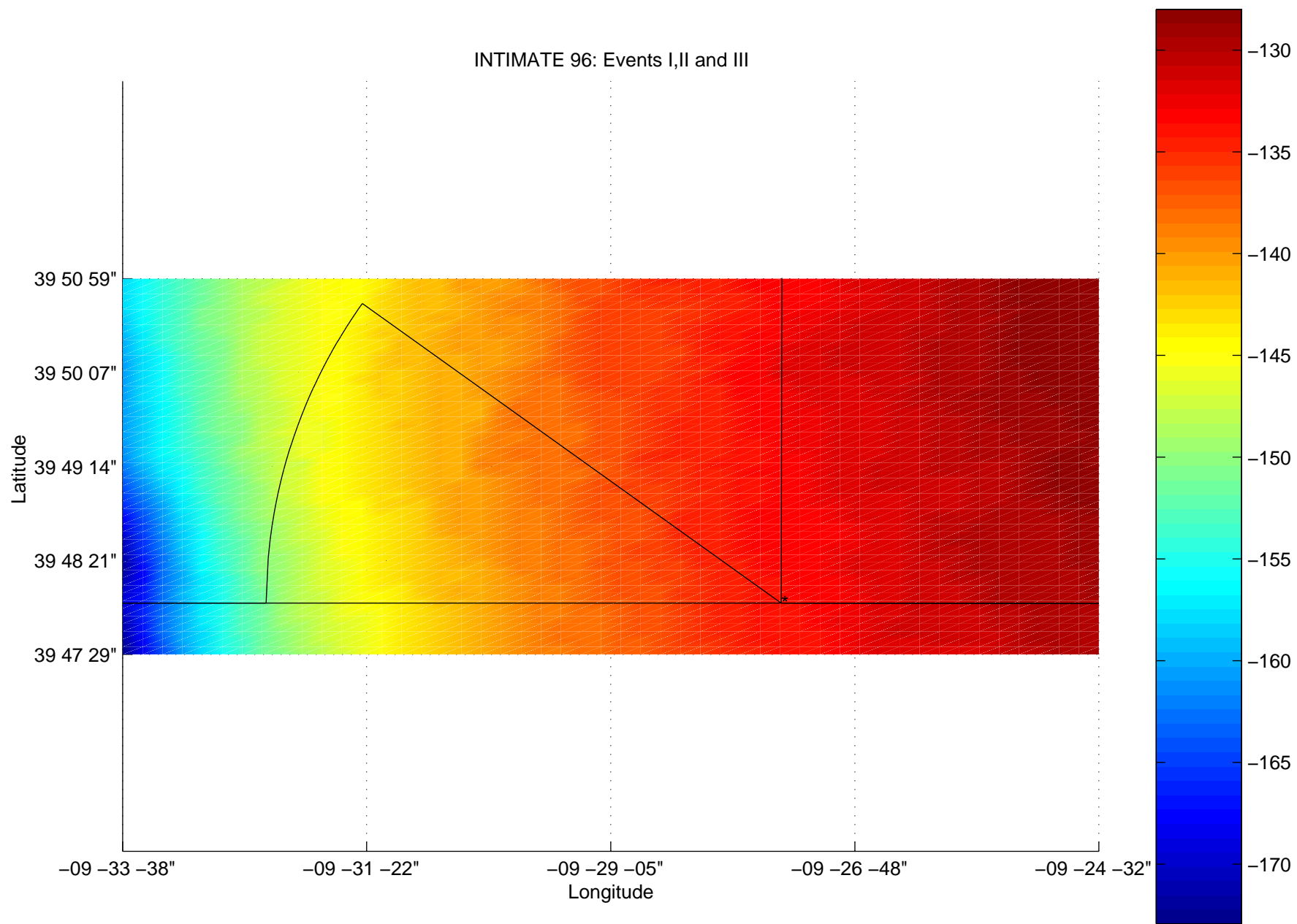


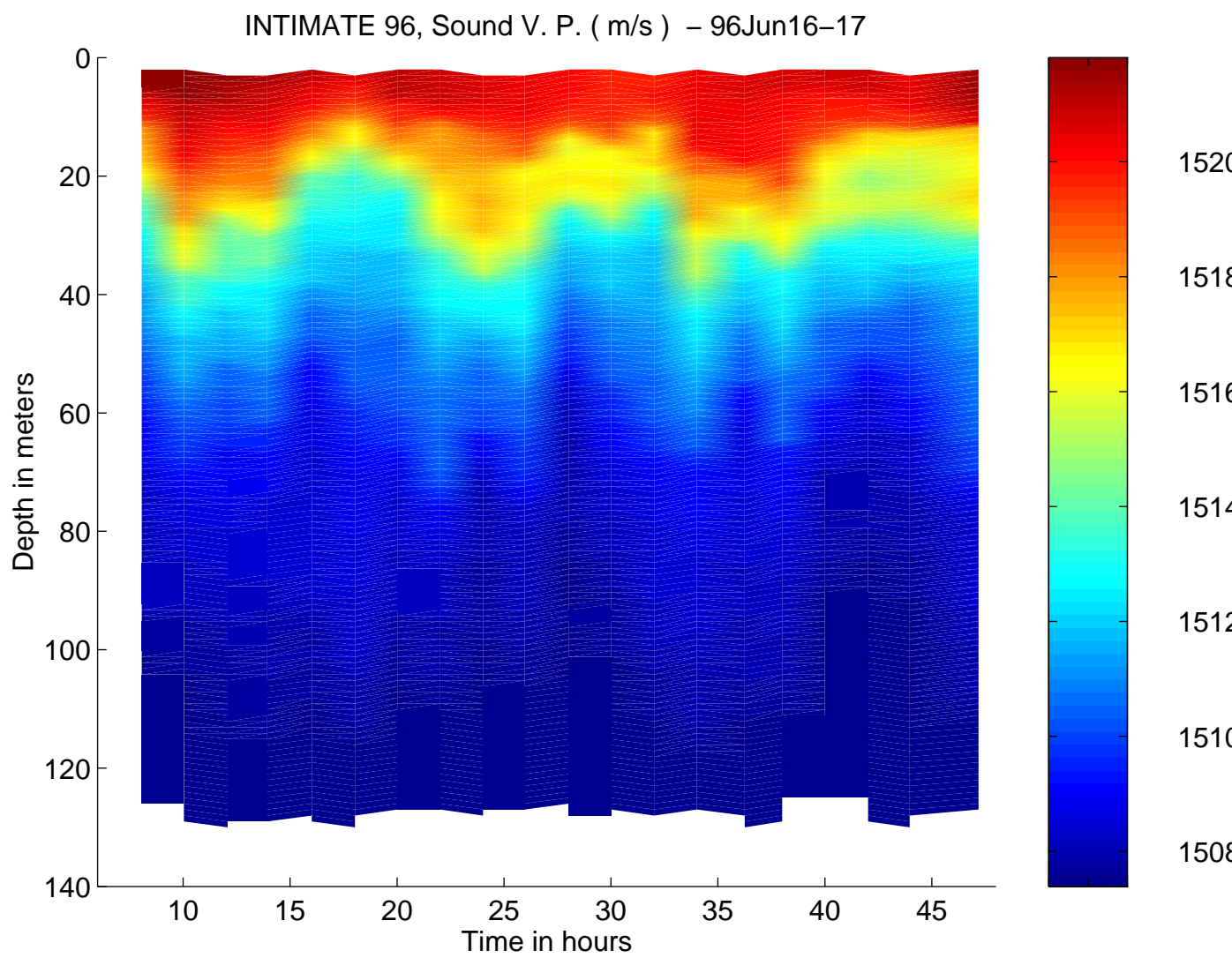


## Real Data Acquisition Scenario

### INTIMATE'96, JUN 1996 - NW Nazaré site



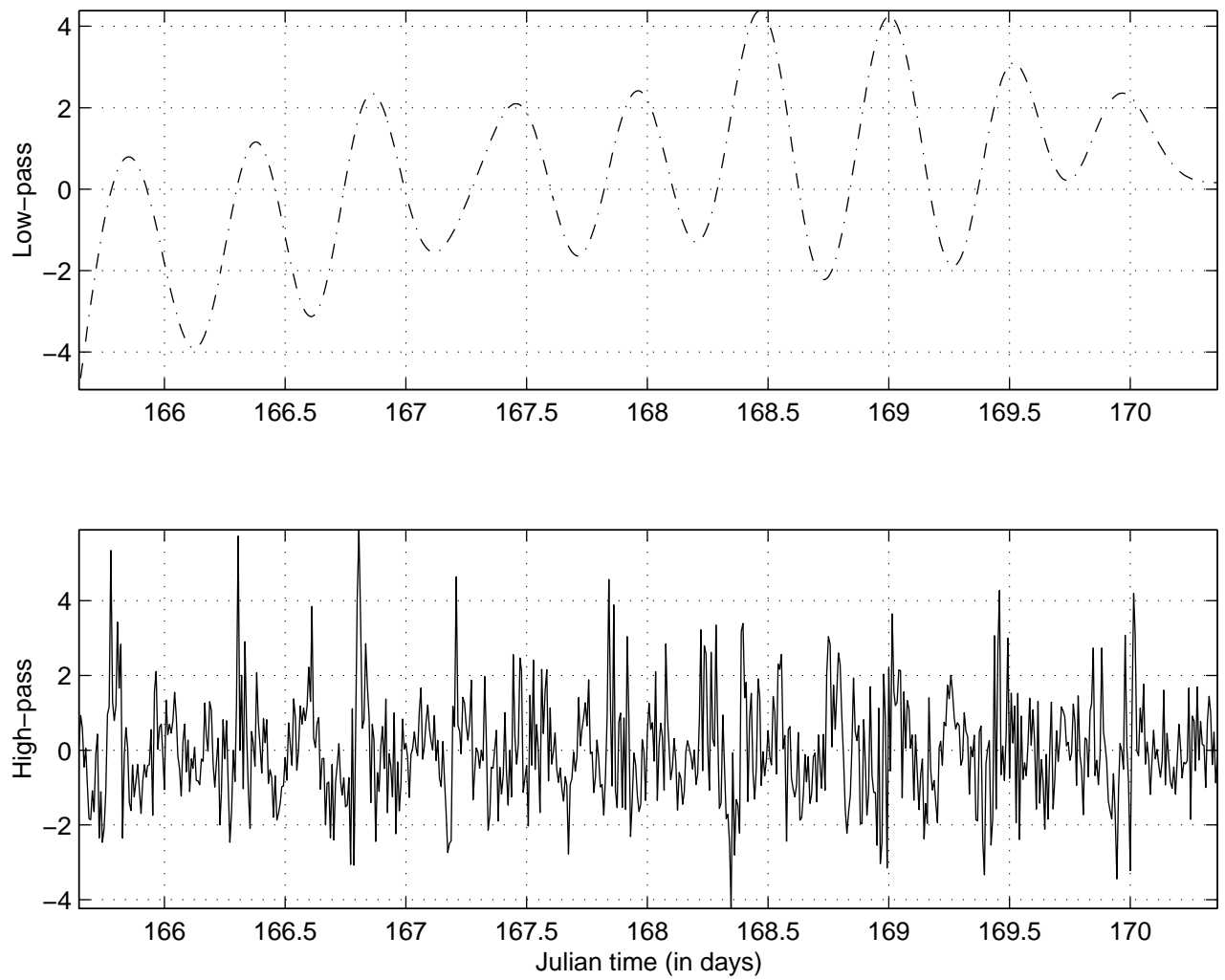


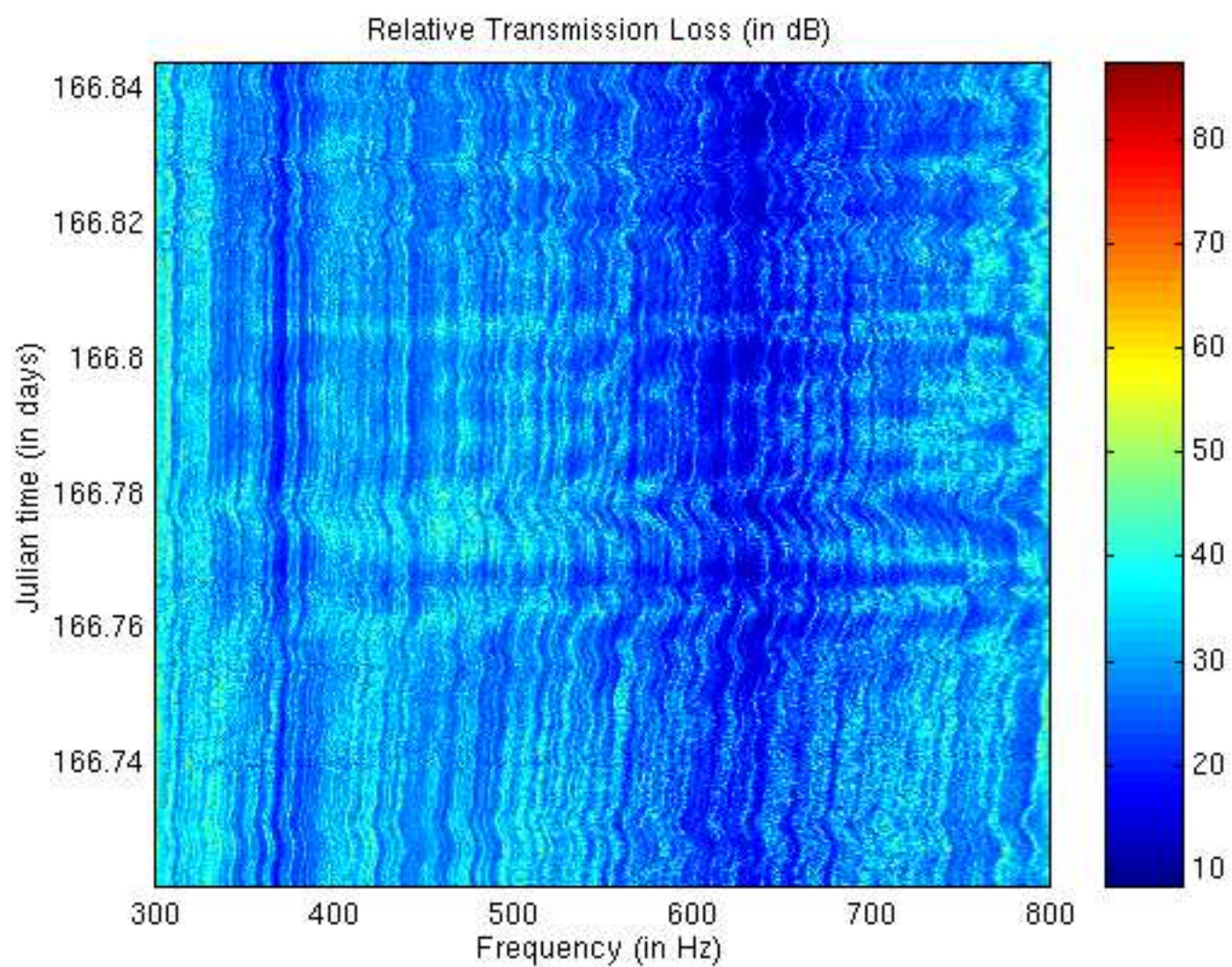


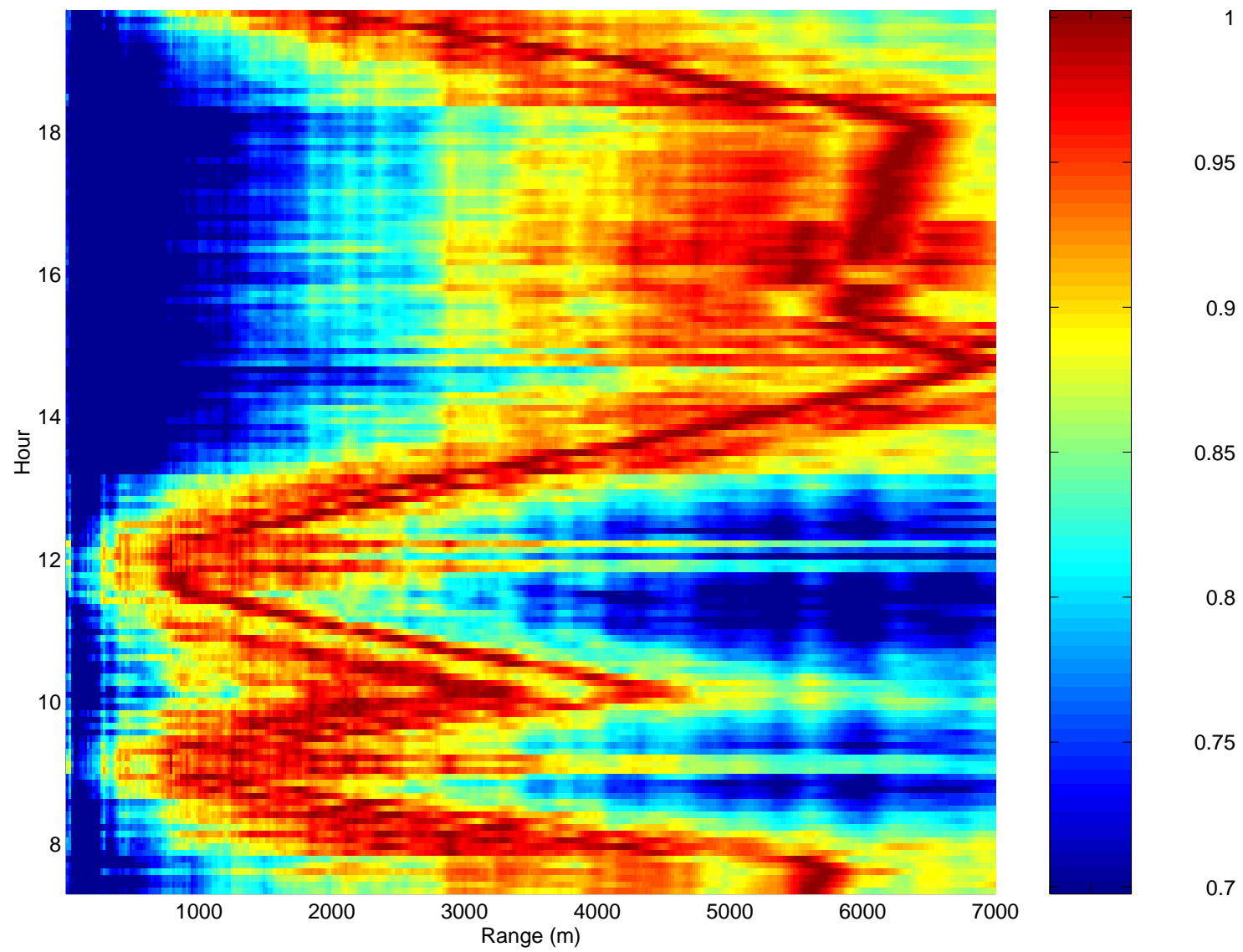


CMO tomographic inversion results does not exists in electronic format

INTIMATE'96: Temperature Modal Amplitudes-EOF<sub>1</sub>

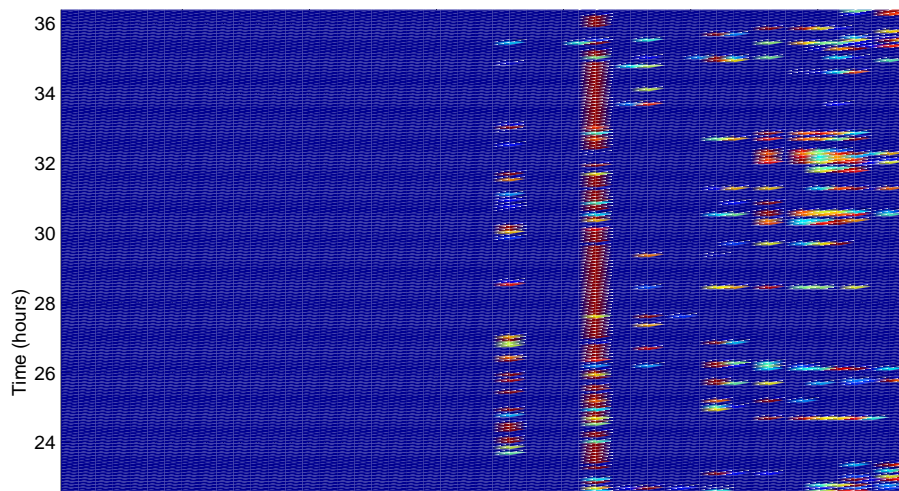
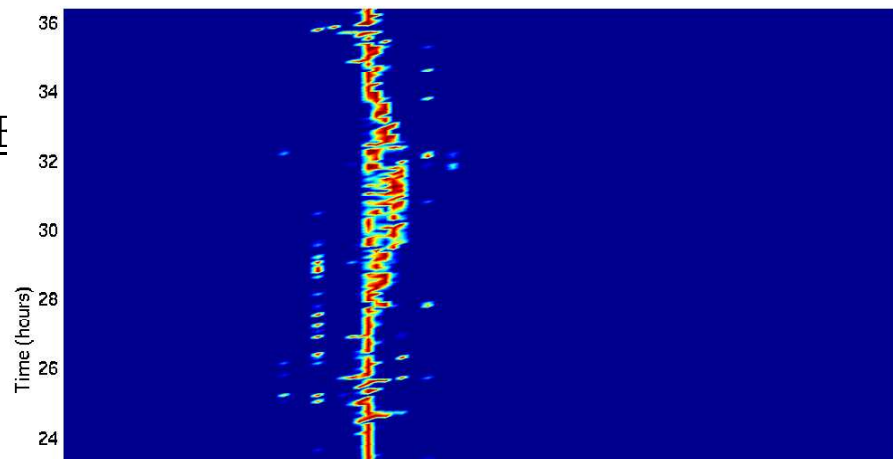




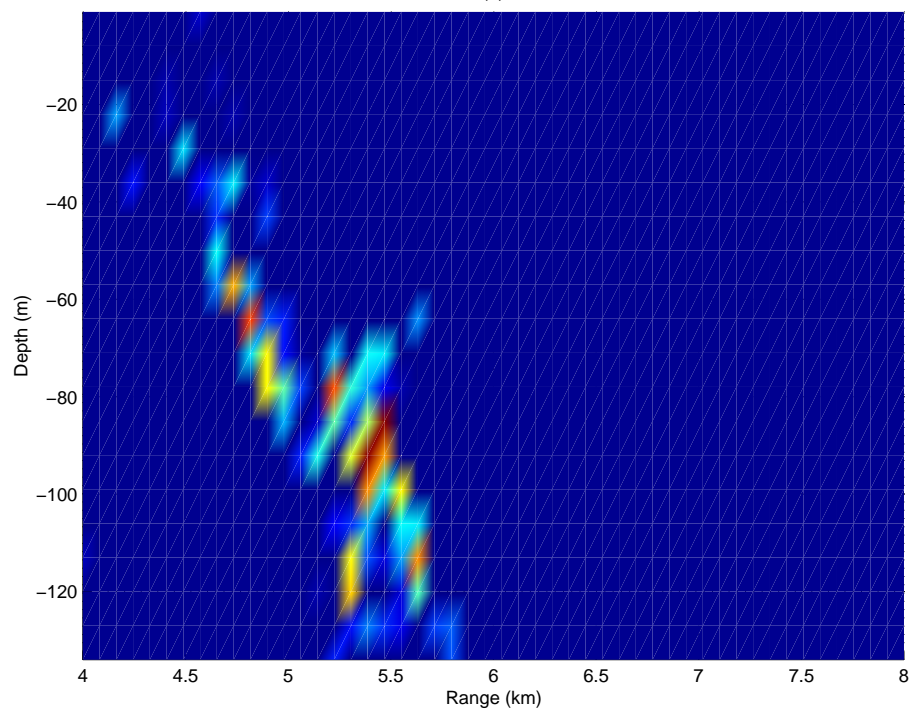


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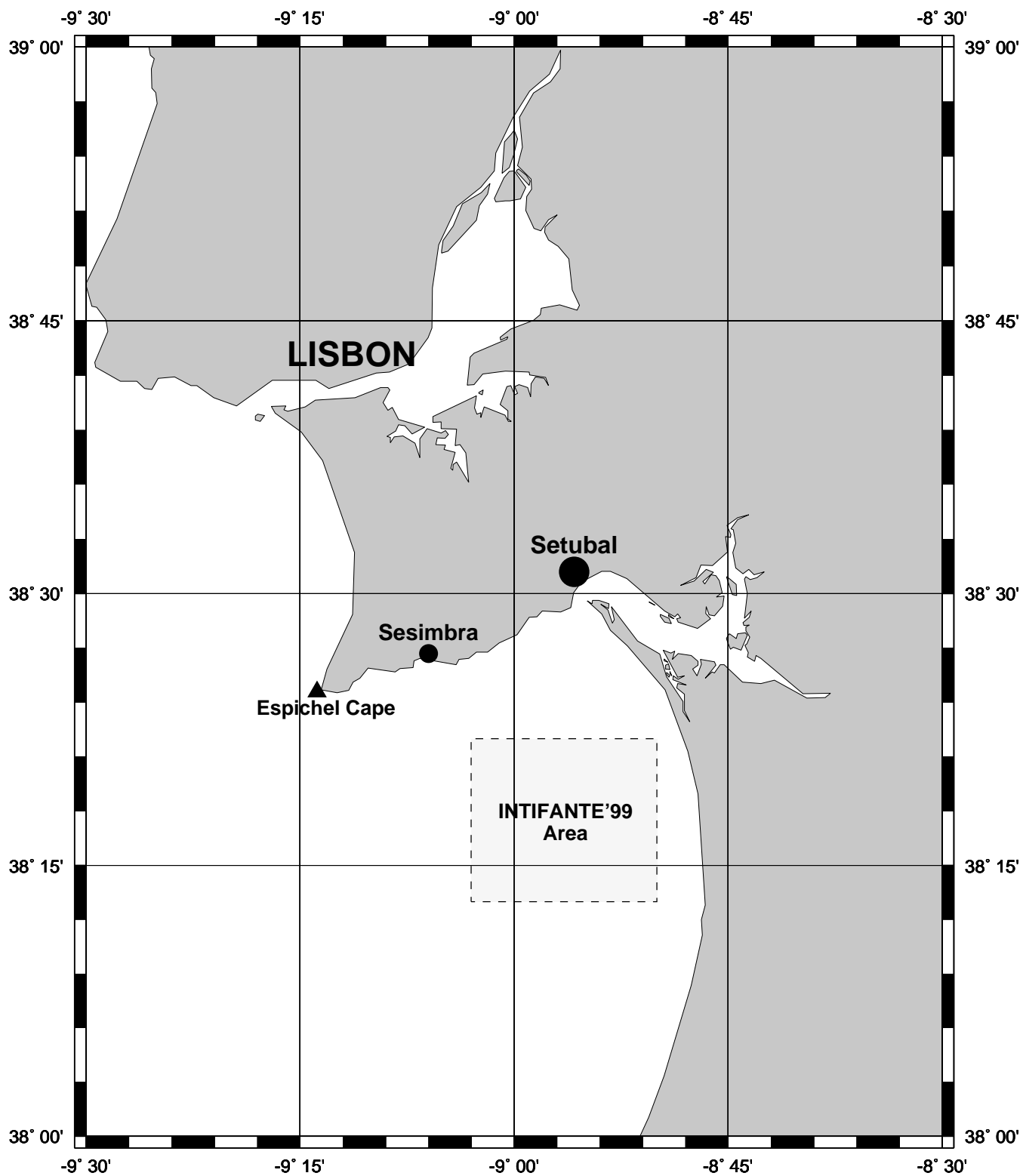
(b)



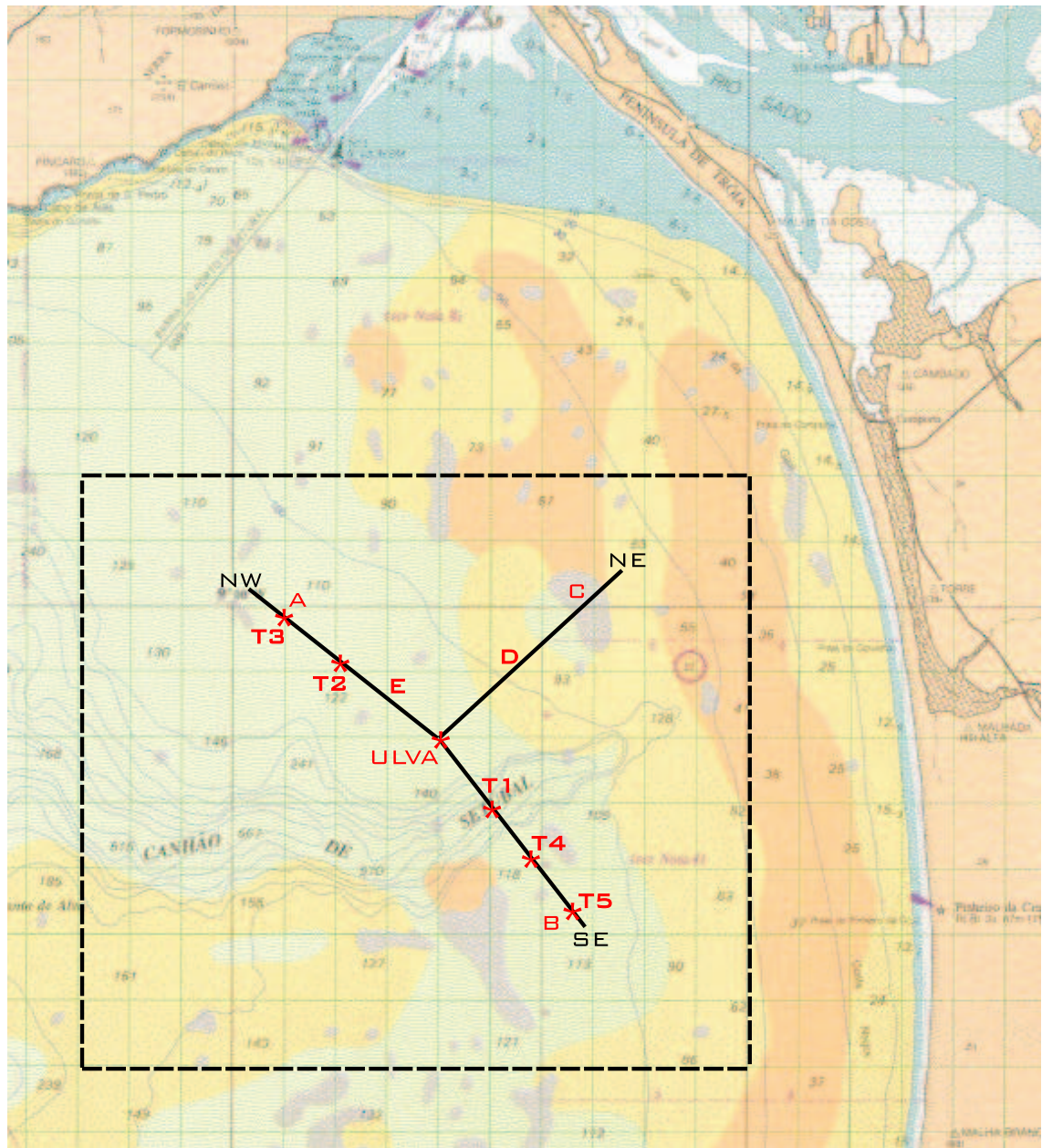


## INTIFANTE'99 Sea Trial

- two vessels from Portuguese Navy
- 3 institutions (IH,IST,CINTAL) involved in the execution and 7 on data analysis and processing
- two vertical arrays (16 hyd LF and 4 hyd HF)
- CTD, 4 thermistor chains, 10 currentmeters, 1 ADCP, 1 surface remote controlled Catamaran, 2 HF (50 khz) communication modules, DGPS, side-scan sonar, seismic survey, coring, etc...











## Conclusions and perspectives

### **...what has been done**

- internal tide shallow water tomography possible with 2 modes
- reliable single hydrophone broadband localization and tracking
- possible acoustic tracking of oceanographic features along the shelf

### **...what we are doing**

- increase robustness to environmental variability (bathymetry, oceanographic, geoacoustic,...)
- testing ship generated noise for tomography/source tracking
- AUV - surface off-vertical communications in shallow water

### **...what we would like to do**

- easy to deploy and easy to use system for environmental surveillance