Report of Oceanology International Exhibition, 9-11 March 2010

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Seafloor Resources, JRG4-B3

1. Introduction

Oceanology International is the world's premier meeting for ocean technology and marine sciences community. There are still many ambiguities on the ocean, its resources and its impact on human society. Every 2 years, people from many different research and industrial areas come together to share their new ideas and products in these fields. I was a participant of the program "Messementoring" from the Cluster of Excellence "The Future Ocean". The Messemenrtoring is a program from Transfer of Technology and the ISOS. Here I was under mentoring of Prof. Ernst Flueh from IFM-GEOMAR.

2. OI2010

After approximately 40 years of establishing this exhibition, in OI2010 over 550 exhibitors from about 30 countries gathered which many of them provided new products and services. There were around 6600 attendees from 89 different countries. Many different areas covered by OI2010 such as Marine geology and Geophysics, Mining, Offshore Oil and Gas, Renewable Energy, Oceanography, Subsea Engineering, etc.

On 11th March, the oceanology international career day sponsored by International Marine Contractors Association (IMCA) provided a series of talks which opened a window for students and graduates to meet industrial companies for their future job. Several scientific vessels provided information on their scientific tasks for visitors.

In addition, there was a conference in which the latest technical developments in the marine science and technology discussed. They covered many different aspects of marine science like Navigation and Positioning, Hydrography/Geophysics, Marine environment, Geotectonics and Ocean observations.

3. **Exhibitors in field of geophysics (specifically seismic)**

During this exhibition I talked to different companies mainly working in offshore seismic exploration. We shared our knowledge about the-state-of-the-art technologies and methods. In between, I became familiar with newly established companies which are going to improve their softwares and recording systems. Meanwhile, some companies were willing to take my CV in order to offer job opportunities after fulfilling PhD. Here are a few examples:

- Fugro: this company is a multinational company working in a wide range of geosciences data acquisition, processing and interpretation. They are doing 2D and 3D offshore seimics in various prospects mainly to find hydrocarbon reservoirs.
- Gardline Geosurvey: This company is also working in a vast area in the world and they are specialists in 3D geohazard assessments and interpretations services. This interpretation is also can be deployed in the field to provide real-time interpretation. Key aspects of this interpretation are seabed morphology interpretation, multiple attribute analysis, shallow water flow studies and shallow gas hazard analysis.
- GEO: this company is manufacturer of marine and fresh water multi-tip sparkers, boomer systems, mini-streamers and interfaces, Piston corer and Vibrocorer as well as two softwares called Geo-suite All-work and mini-trace. Geo-suite is a newly developed software which provides us 2D and 3D viewing of seismic data, fast processing and easy tools for interpretation.
- Geometrics: this company is the manufacturer of seismic recorders and receivers
- GeoCoda: this company is manufacturer of recorder systems for seismic refraction seismic data acquisition as well as sidescan sonar data acquisition. They are also developing a software for 2D data interpretation.

4. **IFM-GEOMAR stand**

IFM-GEOMAR was running a stand in German pavilion presenting mainly two instruments: (Ocean Bottom Seismogram) OBS and Piezometer.

- OBS

This tool has been further developed by scientists in IFM-GEOMAR of late so as to reduce its size and increase its mobility.

There are two major reasons for using OBSs; 1- the mechanical velocity in water does not come into our calculations 2- all the OBSs are active for the entire area during seismic data acquisition; thus there are more active seismic channels and the hyperbolas made by reflectors in shot gathers are more complete and the data has more fold.

The method of acquiring data with this instrument is common receiver gather. In this method, there is one or two shots (simultaneously) which are going to be recorded by OBS and at the same time by a short streamer (a line of receivers). The entire line (or area) is covered by OBSs, which are all located on the seafloor with order of 100 meters interval. If water currents change the position of OBSs during locating them, we have to apply spatial corrections on the data. Once the source of energy releases, all the OBSs and hydrophones record the data and keep listening it for 5-10 sec. Since the resolution of OBS data lonely is not high enough and the type of data is different to reflection seismic, we use a set of streamers (in case of 3D seismic); however they are quiet short and they gather almost vertical reflections. Shot interval in this recording is ~15 sec.

In the end we have two sets of data made by OBS and reflection seismic. These two datasets can help us to have more accurate velocity models in order to have better interpretation for complex structures.

- Piezometer

  This newly designed instrument is used for those areas we are keen to study the movement of sediments, specifically for those areas which contain hydrocarbon, or to study mass wasting, or slope areas, etc.

  A pipe (like core sampling pipe) which is permeable at the end of it enters the sediment. There is another internal pipe which is isolated by external one. This pipe in connected to the recording tool and the pressure is measured in this part (difference between the local pressure and pressure at the seafloor).

  Depending on the type of sediment and the portion of sediment layers in the pipe, porosity and the amount of water in the sediment, this pressure may be different.

  After one record, the yellow part of instrument (see figure below) is separated from the body and come on the sea level and informs scientists about its location. The instrument keeps its position until next data acquisition (usually half a year to a year; the battery life takes 1-2 years). This instrument can be carried by ROV as well.

5. Scientific vessels and Career day

There were a couple of scientific vessels which were open for public to visit and discuss. Here are some examples (those vessels I visited):

- HMS cattistock, which is one of the most advanced mine hunters in the world equipped with a sonar which can detect small mine-sized objects over 1000m from it up to 100m depth.
- Seabeam, which is a small size vessel and specialized in high-resolution hydrographical mapping in water depth between 3-150 m.
- Flatholm, which is multidiscipline and is used mainly for geotechnical, geophysical and hydrographical surveys.

In the last day of exhibition, a series of talks in the frame of career day took place in the conference hall. Several companies introduced themselves and their open positions for students and graduates.