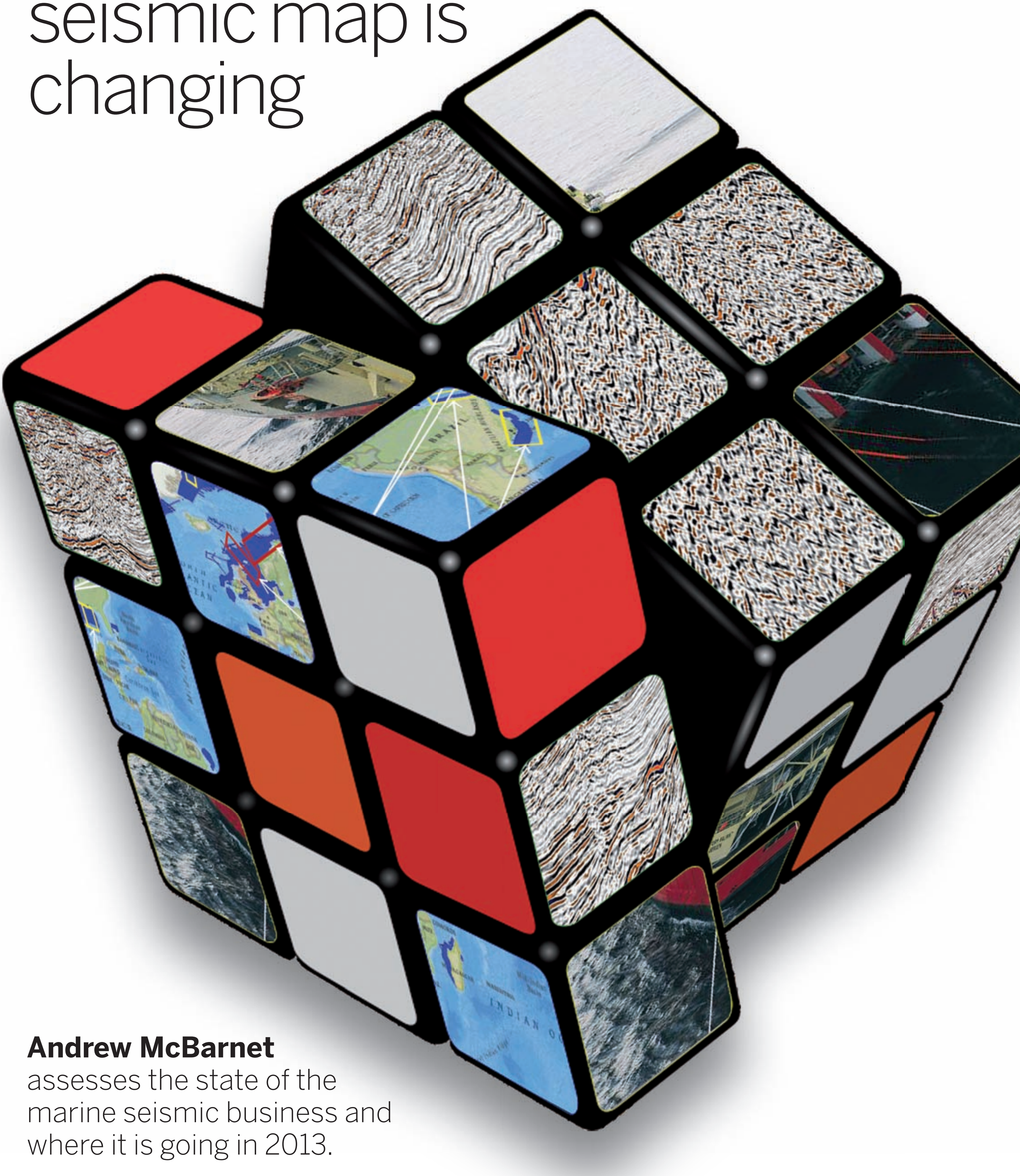
How the seismic map is changing



Andrew McBarnet assesses the state of the marine seismic business and where it is going in 2013.

Rarely, if ever, can the marine seismic business have been so busy in so many places around the world. Demand for surveys is nearly at an almost all-time high, being stimulated by increased spending by the big oil companies and the emergence of a number of new plays which have been overlooked in the past. Another highlight in this climate is the rise in the number of multi-client surveys targeting the hot plays.

The trends for 2013 are clear from a series of presentations in January by the main marine seismic players. The most optimistic assessment comes from Dolphin Geophysical citing SEB Enskilda Equity Research. It makes the assumption that the historically high correlation between seismic spending and E&P spending will continue. On this basis, seismic spending in 2012, which was up 19%, will grow by another 18% this year with nearly two-thirds accounted for by marine seismic (*see Table*). It also estimates an average price of US$115/bo in 2013 ($113/bo in 2012), which is said to provide a healthy margin over oil company estimated budgeting price of $83 per barrel.

The bigger picture put forward by Petroleum Geo-Services (PGS) is based on a range of sources (BP, IHS CERA, Wood Mackenzie, IEA and Pareto Securities) and suggests that increased non-OECD transport and industrial demand for oil between now and 2030 will be more than offset by efficiency gains and substitutions. It states that incremental world demand for oil is likely to exceed by 0.9%/year production from existing resources which are set to decline over time. Furthermore, new tight oil is not expected to contribute significantly to make up the shortfall. The unsurprising conclusion, that the decline in existing oil production is the biggest challenge in meeting future energy demand, has a silver lining for the marine seismic business: it can expect strong and sustained future demand.

The economic indices do not necessarily guarantee untroubled waters ahead for the seismic business. Starting point for any analysis must be consideration of the capacity of the marine seismic fleet to meet likely demand for seismic services.

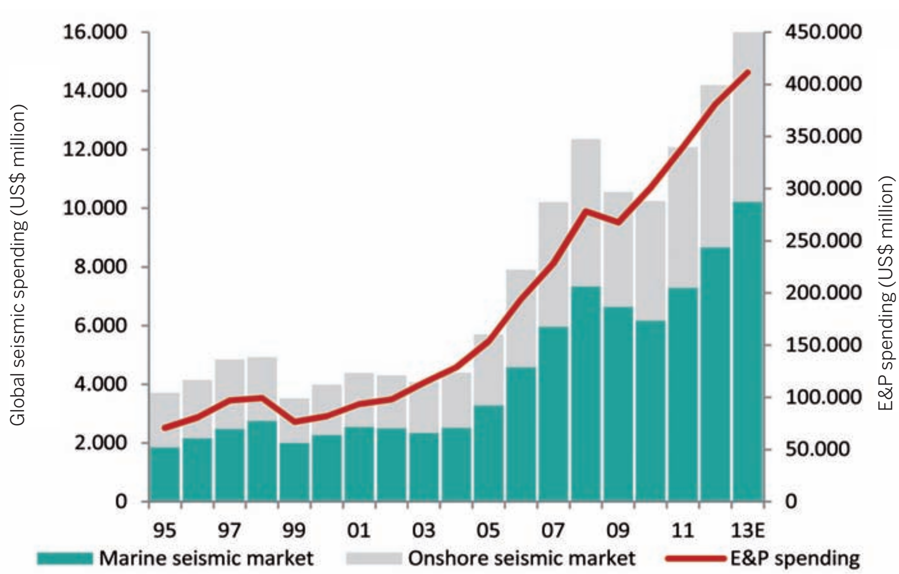
Economic balance

The perennial worry is that the balance between available vessels and the amount of work on offer will alter, as has happened so many times in the past. In this context, it is worth observing that according to PGS calculations, demand for 3D seismic from 2006 to the end of 2012 has grown by approximately 120% measured by square km. That is a hefty increase, but it has not translated into a bonanza for the major players. A two-year boom came to an abrupt halt at the end of 2008 as a result of a drop in oil company spending and the introduction of too many vessels into the market.

Vessels

Currently, vessel supply/demand balance seems likely to remain more stable than it has for a number of years. There are only seven new 3D vessels expected to enter the market over the next two years – two Titan class Ramforms for PGS (18-24 streamers), two Sanco newbuilds for Dolphin (12-16 streamers), two Amazon class for WesternGeco (14-18 streamers), and one for Sinopec (eight streamers). PGS shows this as an increase in the 3D streamer count of 5% in 2013, 2% in 2014, and 7% in 2015. Lead time for newbuilds is usually at least two years; so that, even if more vessels are announced, they will be unlikely to affect the overall balance for some time, especially if companies retire some of their inefficient, non-economic units – of which there are quite a few.

The two companies most likely to be looking to increase their capacity are Polarcus and Dolphin (*OE* last month) because neither are big enough on their own to cover business opportunities in every region of the world. Polarcus confirmed in January that a second vessel, *Polarcus Samur*, would be chartered out on long term contract, in this case to the Turkish oil company TPAO. The issue for seismic contractors is to make some real money from their fleet investment. Anecdotally, companies are still finding pricing for tenders very competitive. Dolphin is suggesting that the day rate for high-end 3D seismic vessels could rise from $220,000-280,000/day in 2012 to $280,000-330,000/day.



The seismic market is expected to grow by 18% over this year.

Source: Dolphin Group/SEB Enskilda Equity Research.

However, most companies are concerned about building backlog for their fleets, which often means adding work at a less than ideal price. No substantial increases are expected until vessel availability is more obviously limited than it is today.

In the short term the acquisition of Fugro's fleet of seven seismic vessels by CGGVeritas seems likely to depress prices. Before the end of last December, in a statement to reassure shareholders about the sale of its Geoscience division to the French company, Fugro management admitted that oil company client concern about the deal had affected the marketing of its seismic vessels. This means that CGGVeritas is inheriting a fleet that is seriously short of work. Altogether it will have 15 high-end 3D vessels and five mid-capacity 3D vessels plus two 2D vessels to manage, so expect them to be extremely competitive about winning orders. It could well be that the company – expected to rebrand itself back to its old Compagnie General de Geophysique (CGG) name – will opt to unload some capacity, and who knows, Dolphin could be a potential taker in its bid to grow.

In its outlook for 2013, Dolphin refers to the need for more consolidation, and summarizes by stating that it will continue an opportunistic approach to further develop "through a mix of consolidation and organic growth in all business segments". Reading between the lines this implies that not only would the company look at appropriate vessels to acquire, but might also contemplate a merger. It's hard to imagine WesternGeco, PGS or CGGVeritas wanting to take on Dolphin: they are engaged in their own fleet building/renewal programs linked to their proprietary technologies. This leaves Polarcus as the only other merger option. Many people were surprised by CGGVeritas making the move for Fugro, so the idea of Dolphin and Polarcus combining cannot be entirely ruled out even if the short histories, vessel inventory and management styles of the two organizations are very different.

Multi-client surveys

A conclusion that all the global players in the marine seismic market have come to is that the conditions favor increased emphasis on multi-client surveys.

This is partly economics.

Contractors have the cash and the confidence to take on the element of risk involved. If pre-funded, these surveys are potentially very profitable, especially with data library sales which can constitute a positive on the balance sheet by earning revenue for quite a few years. Dolphin is hoping for 50% pre-funding of 2D projects and 85% for 3D multi-client with a sales ratio of between 1.8 and 2.4 times the investment costs.

A combined portfolio of contract and multi-client surveys is regarded as the way to improve margins and fleet utilization. PGS, for example, says it is increasing its cash investment in multi-client from $280-300 million in 2012 (with 150% pre-funding) to an estimated $300-350 million this year (with 110% or more pre-funding). It says that approximately 40% of its 2013 active fleet capacity will be used for multi-client surveys. Industry-wide, at least 30% of all surveys are multi-client, although Polarcus puts the figure nearer 50% as a proportion of offshore seismic E&P spend. Last year, Polarcus had 9% of its fleet engaged on multi-client work but expects to increase this to 20% by 2015.

The consummate artist when it comes to multi-client surveying is TGS. It has no fleet of its own and essentially identifies survey targets, sells the project to oil company customers, and then contracts vessels and crew to carry out the surveys on short-term charters: as a result the company is invariably a client or partner of a seismic contractor. For 2013, TGS has already booked *Geco Eagle* (WesternGeco) for work to

POLARCUS

Turkish delight: *Polarcus Samur* joining Turkish company on long-term contract.

the end of April offshore Angola, *Geo Caribbean* (Fugro) for the Gulf of Mexico at least until the end of June, and *Akademik Shatskiy* for offshore Colombia in the early part of this year. For the upcoming North Sea season, TGS has contracted Dolphin's newbuild 16-streamer *Sanco Swift* for three months from July, as well as vessels from CGGVeritas and Fugro.

With this business model eliminating the cost of full-time operation of seismic vessels, TGS has proved extraordinarily successful. It has almost completely avoiding the roller coaster, cyclical revenues of marine seismic contractors. In the last 10 years, the company has grown its revenues sevenfold, from $124 million in 2001, to a record $931 million in 2012, a compound annual growth rate of 22%. The vast proportion of TGS' revenues come from marine seismic data sales, although the company has made efforts in recent years to diversify, notably with its digital well log business and lately, multi-client onshore seismic surveys following the acquisition of Canadian company Arcis Seismic Solutions.

TGS' full year revenues for 2012 were 53% up on 2011, suggesting the global spread of seismic exploration survey opportunities. Successful multi-client surveys are most often the outcome of accurately anticipating licensing rounds around the world. The majority of TGS surveys are 2D seismic over large offshore areas that enable oil company customers to evaluate the prospectivity of blocks when they come up for bid. The most profitable surveys are 3D multi-client: they are more expensive to put together but provide a much better return, which is why the major players are seeking out more of the business for themselves.

Aggressive marketing of multi-client studies can be expected to help drive the marine seismic business in 2013. At the same time, the map of prospective offshore seismic areas of the world has been subject to some unexpected additions in the last two or three years, even if the North Sea and Gulf of Mexico still generate the most seismic business.

Anticipated events

Starting in the South American region, who could have anticipated that PGS would be deploying the *Ramform Vanguard* to carry out a huge 15,550 sq km multi-client survey offshore Uruguay to cover blocks 6, 11, 12 and 15, which were awarded in the 2012 second licensing round? The company is said to be working closely with state agency ANCAP and block operators to improve the collective understanding of the regional geology. PGS also has the *Ramform Sterling* and *Ramform Challenger* working off the Falkland Islands for Noble Energy and Falkland Oil & Gas (FOGL).

The most anticipated event in the region is the long-delayed 11th Brazilian licensing round, focusing on the equatorial margin and mature basins, which is now expected to be held in May. There are 174 blocks on offer, of which 87 are expected to be offshore, much of the acreage classified as frontier.

This is due to be followed by the pre-salt round in November. Virtually all the seismic companies have Brazilian data in their libraries. After the January announcement of the eleventh round by Brazilian president Dilma Rousseff, the multi-client specialist Spectrum was quick to announce that it had recently acquired 38,588km of long-offset seismic data in areas pertaining to the round and also had other data being reprocessed.

Caribbean, Gulf of Mexico

Exploration interest extending into the Caribbean has been transformed since the deepwater discovery of oil by Tullow Oil in the Zaedyus-1 well off French Guiana. The company

Offshore seismic demand by region

Arctic Ocean
Growing, but unlikely to be substantial in the near to medium term.

North Atlantic
Strong growth in Barents Sea and high activity in the North Sea and Norwegian Sea.

North Pacific
Some activities expected in Sakhalin as well as growth offshore China.

Mediterranean
Region still affected by recent political changes but exhibiting high interest in the eastern Mediterranean.

Gulf of Mexico
Still to return to previous levels.

Caribbean & Central America
An increasingly significant province.

Indian Ocean
High activity on the East Africa Margin and a revival offshore India.

Southeast Asia
Australian waters to remain a key market. High potential offshore Indonesia and considerable demand offshore Malaysia.

South Atlantic
West Africa margin remains a key area, with Angola a hot spot. Brazil to remain slow. Sizeable surveys in 2013 off Uruguay, the Falkland Islands, Namibia and South Africa.

Source: PGS

2013 global E&P spending

Russia +7% on 2012
2013 budget US$50.3 billion

Europe +6% on 2012
2013 budget US$47.7 billion

US +0.7% on 2012
2013 budget US$139.7 billion

Middle East +11% on 2012
2013 budget US$29.8 billion

India/Southeast Asia +11% on 2012
2013 budget US$103.7 billion

Latin America +15% on 2012
2013 budget US$72.8 billion

Africa +5% on 2012
2013 budget US$24.7 billion

Source: Data from TGS and Barclays Research (*Barclays Capital Survey*) believes that the find goes a long way to proving an analog with the Jubilee discovery made offshore Ghana in 2007. The Caribbean and Central America now look like significant provinces with growing demand for seismic in the offing offshore French Guiana, Suriname and Guyana.

The US Gulf of Mexico is normally a major workspace for the marine seismic business especially with the promise of the deepwater presalt not yet fully delineated. In reality, the region has still not recovered completely from the interruptions caused by the Macondo disaster, but the prospect for seismic business will increase with ongoing leasing. The Western Gulf of Mexico Lease Sale 229 in November 2012 offered over 20 million acres. Thirteen companies submitted 131 bids, with Chevron making the highest offer of more than $17 million for a single tract. The sale was the first under the US government's Outer Continental Shelf Oil & Gas Leasing Program for 2012-17 (five-year program) and followed two other recent Gulf of Mexico lease sales. Central Gulf of Mexico Lease Sale 227 is scheduled for March, making 38 million acres available off Louisiana, Mississippi and Alabama.

The most significant, current, multi-client seismic survey in the Gulf of Mexico is probably 'IBALT' being undertaken by CGGVeritas. This is its first StagSeis dual-vessel, long-offset, full-azimuth multi-client survey in the Keathley Canyon area of the Gulf covering 221 blocks. The level of industry support has not been disclosed.

High latitudes

The other significant seismic interest in the Americas is eastern Canada. In November 2012 the Canada-Nova Scotia Offshore Petroleum Board (C-NSOPB) made four licence awards each to Shell and BP with exploration commitments of $31.8 million and $1049.9 million, respectively.

Last month, ExxonMobil probably added some value to the acreage by confirming the go-ahead to the Hebron field offshore Newfoundland & Labrador, which could contain in excess of 700mmbo. In 2011/12, PGS and TGS carried out a 22,000km, multi-client 2D seismic survey in the region.

This summer, a great deal of seismic business will once again be focused on the northwest European continental shelf. In January, the Norwegian minister of petroleum & energy, Ola Borten Moe, announced the award of 51 production licences to 40 companies in its Awards in Pre-defined Areas (2012) program, designed to maintain interest in more mature areas. Thirty-four of the blocks are in the North Sea, 14 in the Norwegian Sea and three in the Barents Sea. In eight of the areas there is a requirement to acquire new seismic data. Meantime, seismic companies on an exclusive or contract basis continue to collect data in anticipation of the 22nd licensing round awards expected this summer. There are a total of 86 blocks or partial blocks on offer, 14 in the Norwegian Sea and 72 in the Barents Sea, which can expect to see a lot of seismic action. In addition, the Norwegian Petroleum Directorate is expected to continue its own commissioning of seismic to explore the potential of the 'Grey Zone' in the Barents Sea and Arctic Ocean between Norway and Russia, following a maritime boundary agreement between the two countries.

In the Arctic region, the Greenland government is in the process of awarding further licences off northeast Greenland, first to bidders from the Kanumas group of major oil companies, and then from all-comers. A total area of 49,948 sq km is being offered. It is not clear how much seismic interest will be generated by the round, given the conditions and lack of definitive oil and gas indications to date.

Ramform Challenger: booked for Falkland Islands work.

There is also the growing assumption that possible hydrocarbon finds are likely to be gas, for which the market may be restricted from such a remote and climatically unfriendly region. Meantime, Iceland has just awarded licences to Valiant Petroleum and Faroe Petroleum, in which the Norwegian state-owned Petoro AS will have 25% stakes. Again, resulting seismic operations may be rather limited.

Investor confidence

By contrast, the UK government is hoping that its extensive 27th licensing round, announced last October, offering a total of 167 blocks, will galvanize oil and gas companies into greater exploration activity. Seismic companies expect to be in the North Sea in force. According to Wood Mackenzie analysts, investor confidence in the UK sector has been restored by a measure of fiscal agreement between government and industry, as well as the high price of oil. The

PGS

company's report, published in January, warns that exploration and production performance in 2012 was poor and may serve to dampen enthusiasm, but this is not reflected in the plans already announced by seismic companies.

Mediterranean, Africa

One of the biggest surprises on the world E&P seismic activity map is the growth of interest in the eastern Mediterranean.

This was first sparked by the Leviathan gas discovery offshore Israel by Noble Energy, which Woodside Petroleum has now bought into with a 30% interest. Leviathan and associated finds represent examples in recent years where smaller independent companies have led the way in opening up new plays. This year will see the first offshore licensing round by Lebanon and the results of the second Cyprus licensing round, where Spectrum and PGS have been notably active in acquiring seismic data to meet international interest in the highly prospective deepwater Levantine basin.

Egypt offered some previously relinquished, gas-prone acreage last year, although only four blocks were taken up. Political upheaval may have had something to do with the result. Currently Ganoup El Wadi Petroleum has 20 blocks put out to international licensing some of which are in the Red Sea and the Gulf of Suez.

African hotspots

Both sides of the African continent are now exploration hotspots. The big surprise here is the emergence of gas prospects offshore Mozambique and Tanzania with finds by Anadarko, Eni, Statoil and Ophir Energy/BG among others which complement the onshore boom initiated by the original finds in Uganda and Tanzania by Tullow and Heritage Oil.

Off the west coast, Namibia may be emerging as a country of interest, certainly as far as PGS is concerned. Last November, the company signed a 10-year multi-client survey deal with NAMCOR, the national oil company, for the acquisition of both 2D and 3D multi-client seismic. Operations are to begin with a large 2D regional survey over open deepwater blocks, which will form the basis of a future licensing round.

Like most seismic companies PGS has also been active offshore Angola which remains the single most prospective area of West Africa. So has TGS, which has just begun an extension to its 12,500 sq km 3D multi-client survey off Angola which will cover 4064km over blocks 36 and 37. According to TGS, pre-salt basins along Angola's conjugate margin pre-salt basins are similar to the hydrocarbon-rich basins offshore Brazil. The same thinking has fuelled exploration interest offshore countries such as Ghana, where last month Eni added to the country's inventory of significant hydrocarbon finds with the drilling of its first appraisal well

Seismic service off Malaysia: *Western Patriot*.

WESTERN GECO

in the Sankofa East 2A block.

This year may see licensing of ultra-deepwater blocks off Liberia and next year another Sierra Leone round following its 2011/12 initiative. In January, TGS said it would be starting its 3D multi-client Sunfish survey covering 7800 sq km in the prospective Harper Basin, offshore Liberia. The survey involves the six-month charter of the 12-streamer *Polarcus Asima*.

Meantime prospects offshore South Africa have attracted the attention of ExxonMobil. The company has agreed with Impact Oil & Gas to acquire a 75% interest in Tugela South Exploration Right which covers 2.8 million acres offshore Durban with water depths extending from the coastline to some 6500ft, which may explain why it has not been an exploration target in the past. Future exploration rights cover a further 16 million acres in water depths ranging to 9800ft. In addition ExxonMobil says it has executed a technical cooperation permit with the South African government to study the exploration potential of the deepwater Durban Basin covering some 12.4 million acres.

Last November, Dolphin won a second offshore South Africa contract. It involved acquisition of around 6250km of 2D seismic for Anadarko in partnership with PetroSA using its vessel *Artemis Atlantic*.

There are some indications that the once highly active offshore India market may be reviving but a surer bet seems to be the continued healthy seismic survey activity in the waters of Southeast Asia and Australia/New Zealand. Indonesia, for example, has just launched its second bidding round with a number of offshore prospects in the mix. One seismic company with work in the region is WesternGeco. The company has been awarded by a BP subsidiary what is described as one of the largest marine seismic surveys ever offshore Indonesia covering over 9000km^2 in the new concession blocks West Aru I and II.

The Indonesian survey was mentioned during the announcement of parent company Schlumberger's latest financial results. Another survey highlighted was offshore Malaysia where WesternGeco completed for Petronas a first commercial survey using its Obliq sliding-notch broadband acquisition and imaging technique combined with Coil Shooting single-vessel, full-azimuth acquisition. The Coil Shooting method was intended to resolve illumination challenges while the Obliq technology is said to have provided greater penetration in deeper targets. The company is also carrying out a 4D seismic survey for Sarawak Shell offshore Malaysia using its *Western Patriot* vessel.

WesternGeco is believed to be focusing more attention on the Asia-Pacific market which is providing a steady source of work from a number of areas. Last December, New Zealand Petroleum & Minerals awarded 10 petroleum exploration permits which it said would represent $82 million in committed exploration spending and up to $776 million should the permits all reach their full five-year term. The blocks awarded were in the Pegasus, Great South and Taranaki Basins, and a further concession round is planned for this year as part of an annual process.

According to Deloitte Petroleum Services, the proposed May 2013 Australian Offshore Petroleum Acreage – which has still to be formally launched – includes a total of 31 blocks mainly offshore Western Australia spanning the Bonaparte, Otway, Gippsland, Browse, North Carnarvon and Perth Basins. The new acreage will help to sustain the level of seismic in the region.

Even from this broad brush picture of current marine seismic activity worldwide, it is clear that there should be plenty of opportunities for the marine seismic fleet worldwide. The scale of possible survey work can sometimes be concealed because seismic companies are quiet with regard to upcoming contracts and especially multi-client surveys.

What we can deduce is that the preconditions for steady or better marine seismic business are about as favorable as can reasonably be expected. That can't be a bad thought for the rest of the year. **OE**