



Photo: Thomas Smith

All eyes on Brazil

Brazil has traditionally been overlooked as an energy provider, but recent discoveries in the deepwater Santos basin are changing this perception. The new discoveries lie approximately 270km south of Rio de Janeiro.

Since announcing that it had become self-sufficient in oil in 2006, Brazil has continued to enjoy exploration success, with a number of exciting finds being announced in the last year, particularly in the deepwater Santos Basin.

In 2007, Brazil announced the discovery of a giant field 250km off Rio de Janeiro on the south-east coast. This find, Tupi, opened up a whole new frontier area in the deepwater Espirito Santo, Campos, and Santos Basins, as well as a new play in the pre-salt reservoirs. With proven reserves for the country at the time standing at 13 Bbo, the estimated 8 Bbo in Tupi increased Brazil's oil and gas reserves by more than 50%.

This was followed earlier this year by the discovery of the gas condensate Jupiter field about 30km to the east of Tupi, which Petrobras believe could be as large as Tupi (GEO ExPro No 2, 2008, p. 59). Both fields lie in water depths of over 2,000m and about 5,000m below the seabed, beneath a 2,000m thick salt layer.

Further excitement was generated in recent months by the discovery of yet another possibly giant field in the Santos Basin. A spokesman for Brazil's National Petroleum Agency announced that the Carioca field, in block BM-S-9, 270km south

of Rio de Janeiro, "could contain reserves as large as 33Bbo". This would push Brazil well up into the major league players in the oil industry. In comparison, the world's largest oil field – Ghawar in Saudi Arabia – had original reserves of approximately 85 Bbo, while the world's fourth largest field, Safaniya in Saudi Arabia, which is also the world's largest offshore field, had original reserves of 38 Bbo.

However, the Brazilian state oil company, Petrobras, operator of the Carioca field, together with 30% partners BG, both issued statements refuting these figures, saying that drilling of their appraisal well, Sugar Loaf 1, was at far too early a stage for an accurate estimate to be made. It has been suggested that the 33Bbo figure may come through adding together the reserves of nearby fields in the wider deepwater Santos Basin area, including Tupi and Jupiter discovery, which are less than 100 km to the east. Alternatively, the estimate may apply to a giant structure which is thought to extend over several blocks, including acreage for which the Brazilian government had not yet awarded licences. This suggests that the structure may cover up to 3,000 km² (the equivalent of 5 North Sea quadrants).

Interestingly, Petrobras and their partners have in the past said that they thought that Carioca was actually smaller than Tupi.

The Carioca discovery well, drilled in September 2007, flowed at a rate of approximately 2,900 b/d of light 27° API oil, and 2 MMcf of gas. The reservoir is the Early

Cretaceous Guaratiba formation, which as a carbonate is less predictable than a sandstone reservoir and can have production difficulties, making the task of estimating field size even more difficult.

At the moment the Campos basin, lying to the north-east of the Santos basin, accounts for 80% of Brazil's oil output, but production comes from layers above the salt, and from fields lying closer to the shore and in shallower waters. Developing these exciting new deep discoveries will therefore present a number of technological and economic challenges. According to Petrobras' Exploration & Production director, Guilherme Estrella, "the area can lead us to a new vision and to new production concepts. It will be an oil and gas producer that will be very far away from the coast. This is an opportunity for us to create new technologies, to advance with innovations."

A few of these innovations are unprecedented at Petrobras, such as the possibility of opening caves in the salt to serve as gas reservoirs until the project goes online.

Petrobras' goal is to start producing in Tupi in 2010, with a pilot project of 100,000 barrels per day (5% of domestic production).

The excitement over these probably inflated figures for Carioca demonstrates the 'oil fever' that seems to be sweeping Brazil, but it would appear that there are indications that the deepwater Santos Basin is now being considered as one of the great new oil and gas plays.



Cartography: GeoPublishing

The deepwater Santos Basin, which lies south-west of the prolific Campos Basin, is being considered one of the great new oil and gas plays.