Exploring in Mature Basins in Sumatra (Sumatera) Island, Indonesia: A Historical Review to Challenge New Idea*

By
Avicenia Darwis[1], Sunjaya Eka Saputra[1], and Drianto S[1]

Search and Discovery Article #10139 (2007)
Posted November 3, 2007

*Adapted from extended abstract prepared for presentation at AAPG Annual Convention, Long Beach, California, April 1-4, 2007

[1]Exploration Division, BPMIGAS, Jakarta, Indonesia (avicenia@bpmigas.com)

Introduction

Sumatra (Sumatera) Island is located in western part of Indonesia. This area is mature, in terms of exploration, with 32 PSCs now working. Of these 32 PSCs, 20 are in production stage, while the rest are still in exploration stage. The exploration activities systematically began in 1865. First oil was discovered in 1885 in Telaga Said, North Sumatra. Two giant fields have been discovered in this region, since the last century: Duri field in 1941 and Minas field, which began production in 1952. Until now, the cumulative oil production from Minas Field is about 5 billion barrels. It is about 53% its recoverable reserve. The cumulative oil production from Duri Field is approximately 2 billion barrels.

Milestones of Indonesia's Petroleum History

- 1865 The beginning of systematic oil exploration.
- 1871 First well was drilled at Cirebon area, West Java.
- 1885 First oil field discovery (Telaga Said, North Sumatra).
- 1890 First oil company (Royal Dutch Co.), was founded.
- Up to 1924: Most oil fields were discovered in East Java, South Sumatra, and East Kalimantan.
- 1941 Discovery of Duri Field, Central Sumatra.
- 1966 First introduction of new contract system (PSC). The beginning of modern petroleum industry.
- 1968 Pertamina (The Government Oil Company) was founded.
- 1971 Paper by R.P. Koesoemadinata, published in AAPG Bulletin: "New Play Concept on Western part of Indonesia."
- 1971 Enactment of the "Old" oil and gas law.
- 1985 IAGI (Indonesian Association of Geologists) published the revised sedimentary basins in Indonesia, from 40 to 60, which are used up to now (Figure 1).
- 2001 Enactment of the "New" regulation on oil and gas businesses.

Discussion

In the last decades, exploration in Sumatra remained very active compared to other areas in Indonesia. There are 3 producing basins and 3 non-producing basins in Sumatra (Figure 1). Based on exploration activity, Sumatra basins may be grouped into several categories, which are:

- 1) The most active basin (more than 150 exploration wells)--represented by South Sumatra Basin with technical success around 42%.
- 2) Active basin (50-150 exploration wells)--represented by Central Sumatra Basin with technical success 52%.
- 3) Less active basin (10-50 exploration wells)--represented by North Sumatra Basin with technical success 0%.
- 4) Inactive basin (less than 10 exploration wells)-–represented by Non-Producing basins in Sumatra Region.

Until now the North Sumatra Basin has discovered 5352 MMBOE from 62 fields, with most of the discoveries having been gas; Central Sumatra Basin has discovered 30,143 MMBOE from 199 fields; meanwhile South Sumatra Basin has discovered 12,112 MMBOE from 189 fields.

There are rapid changes in exploration strategy in Sumatra prompted by several significant discoveries in the last decade that started with giant discovery Kaji-Semoga Field, by Exspan Nusantara in 1995-1996. There are 80 wildcat discoveries in all Sumatra basins, with the biggest well discovery located in South Sumatra Basin; meanwhile in North Sumatra Basin there is no discovery at all. In Central Sumatra Basin there are 33 exploration discoveries; 20 of them are reported commercial with total discovery of 83.85 MMBOE. In South Sumatra Basin there are 47 discoveries; 22 of them have been declared as commercial with total OOIP 1349 MMBOE. Generally, the plays have moved to the deeper targets and older reservoirs. The proven new plays include: Miocene synrift Talang Akar sands and Baturaja carbonates, synrift of Menggala-Pematang in Central Sumatra Basin, and pre-Tertiary fractured basement rocks of South Sumatra Basin.

Conclusion

Based on exploration activity, the South Sumatra Basin is most active basin. The present-day play concept in Sumatra basins has resulted in exploration of deeper, older targets. Proven new plays include: Miocene synrift Talang Akar sands and Baturaja carbonates, synrift of Menggala-Pematang in Central Sumatra Basin, and pre-Tertiary fractured basement rocks of South Sumatra Basin. Significant exploration is needed to evaluate the new play concept in other Sumatra basins, especially in South Sumatra Basin.

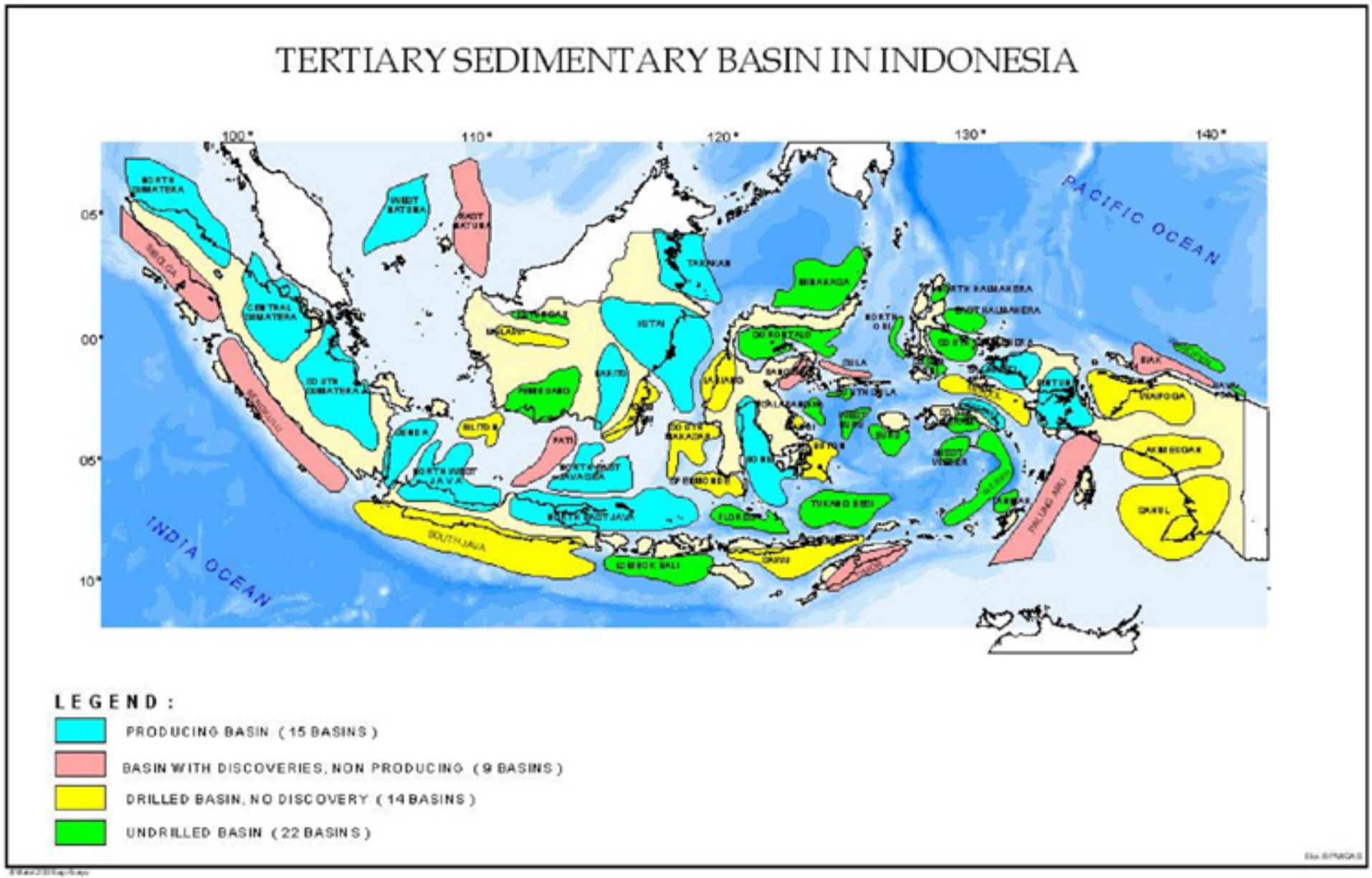

Figure 1. Tertiary sedimentary basins in Indonesia.