Excursion Report : Kepulauan Seribu Field Trip - Modern Carbonate Depositional Environment in the Outline of Jakarta

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In February 2015, the Padjadjaran University (Universitas Padjadjaran - UNPAD) Sedimentology Research Team (Figure 1) held an excursion to Kepulauan Seribu (Thousand Islands) in the Java Sea, offshore northern Jakarta. The trip was not just about having fun and luxurious escape, but more importantly it was to enjoy the adventure with pocket-friendly expenses and gain new geological knowledge directly from the field. For a team that comprises young geologists, every side of the earth is interesting especially in relatively remote areas where earth processes' imprints are preserved better; the geological phenomena can be traced back to its formation in the past and deduced of the impact in the future.

The trip to Kepulauan Seribu began from Muara Angke dock (North Jakarta). The team joined a local boat that had a transit in the dock while buying some materials in the Jakarta coastal area for their daily supplies. The supply boats always come to Muara Angke in the weekend. The team joined the ship with fellow island visitors for just Rp 40.000,00 (approximately US$3).

The boat trip took about 1 hour to arrive at Pramuka Island, the main island in Kepulauan Seribu. A permission to visit must be obtained from the local government upon reaching the island. After permission was granted, the team walked around and observed that the Pramuka Island has a large amount of brain corals and large bivalves (Figure 2). For farther adventure, a small boat was then rented to sail around the Kepulauan Seribu area until sunset for Rp 450.000,00. The second island visited by the team was the Panjang Island, which was the farthest-north island and approximately a 2-hour boat trip from the Pramuka Island. Abundant branching corals and mollusks were observed in the island (Figure 3) and along the journey, algal and grass-covered mud bank can be seen at the bottom of the sea (Figure 7).



Figure 1. *The members of UNPAD Sedimentology Research Team during the excursion to Kepulauan Seribu, offshore North Jakarta. From left to right: Taufan, M Irwan, Achmad and M Tressna.*

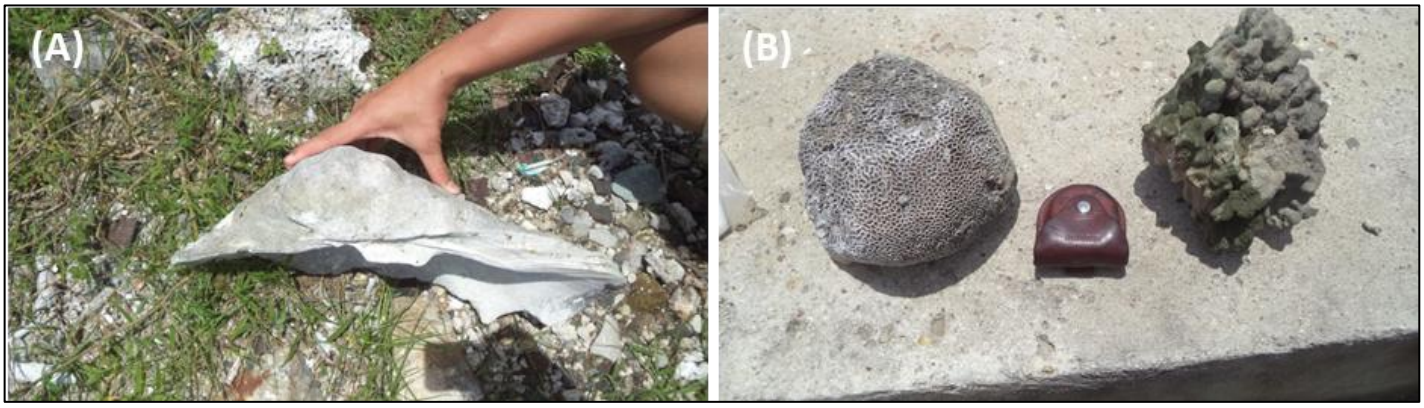


Figure 2. *Destination 1 – Pramuka Island. (A) A piece of rock (calcareous mudstone) that contains a large bivalve cast. (B) Brain corals found in the Pramuka Island.*



Figure 3. *Destination 2 – Panjang Island. (A) Abundant branching coral. (B) Mollusca found in few places in the Panjang Island.*



Figure 4. *Destination 3 – Kotok Island. Brain Coral found across the shoreline of Kotok Island.*



Figure 5. *Destination 4 – Semak Daun Island. Assemblage of brain coral at Semak Daun Island.*



Figure 6. *Destination 5 – Pari Island. Brain coral assemblage at Pari Island.*

The 3rd island visited by the team was Kotok Island, which is a turtle conservation island. Algae and branching coral assemblages were abundant here (Figure 4). Hopping to the next island, Semak Daun Island, here the fossil assemblages consist of brain corals (Figure 5). The Semak Daun Island is usually the destination island for visitors who want to stay overnight by camping in a tent. The last island to visit in the trip was Pari Island, which also contains a lot of brain coral assemblages (Figure 6). Finally, the team spent a night there in a local government-owned accommodation before heading back to Jakarta the following morning. It is interesting that the room rate was not fixed

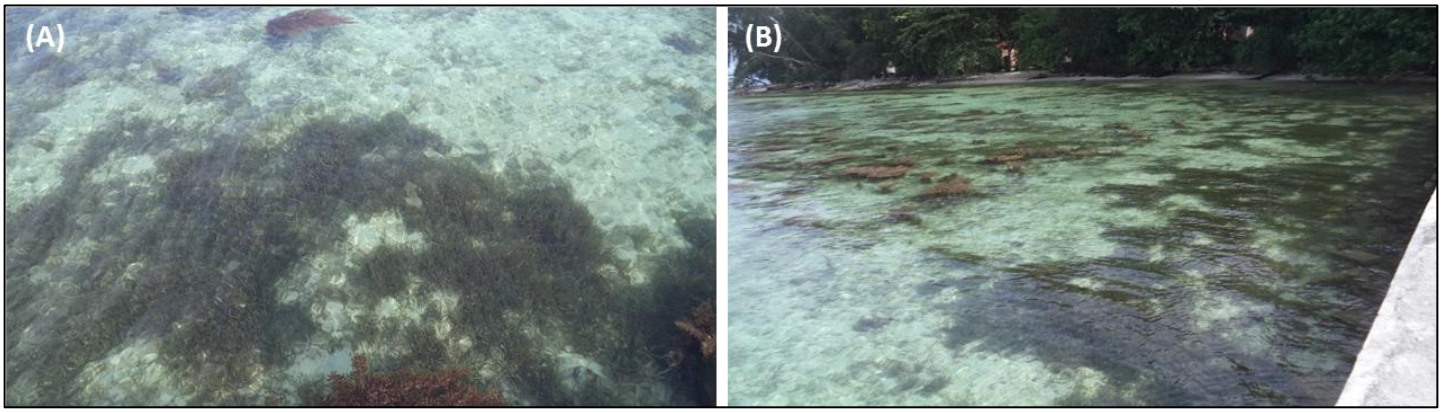


Figure 7 (A) and (B). *Grass-covered mud seen at the bottom of the shallow water between the Pramuka and Kotok Island.*

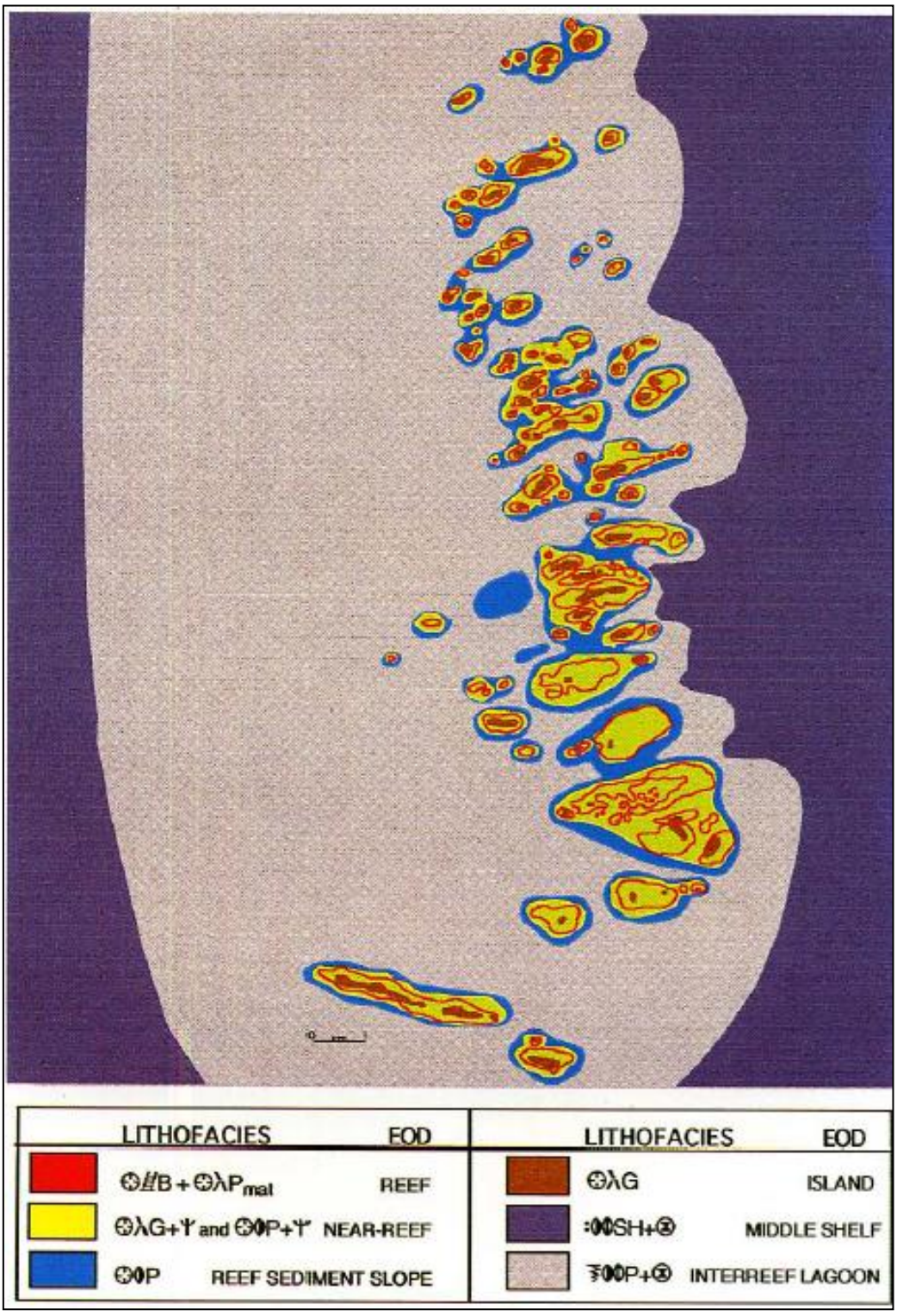


Figure 8. *Sedimentary facies map of Kepulauan Seribu (after Jordan, 1998).*

and up to the guests to pay.

The Thousand Islands region is known to comprise modern patch reef complex (e.g. Jordan, 1998). The Islands geologically show a pattern of reef growth on the edges of platforms, with sand flats behind them. Jordan (1998) sedimentologically subdivided the lithofacies in Kepulauan Seribu (Figure 8) into:

- Reef Facies: coral encrusting red-algal boundstones with an infilling matrix of coral mixed-skeletal packstones
- Near-reef Facies: coral mixed-skeletal grainstones with branching coral fragments and coral benthonic-foraminiferal packstones with branching coral fragments
- Interreef Lagoonal Facies: argillaceous foraminiferal molluscan packstones with goethite nodules
- Mid-reef Facies: arenaceous benthonic-foraminiferal molluscan shales with goethite nodules

In general, lithologies in Kepulauan Seribu region are dominated by corals and carbonate mud and sands. During our visit to Kepulauan Seribu, we observed that the corals at the southern part of the islands are dominated by brain coral and change into branching coral-dominated towards the northern part of the islands. Some vuggy porosity found in the rocks indicates diagenesis that was affected by fresh water vadose environment. Porosity-enhancing diagenesis will make the corals to have better reservoir properties compared to the mudstones which will make bad reservoir.

Indonesia has so many wonderful places that are also geologically interesting, which can be a field laboratory where we could study on by visiting them. As young Indonesian geologists, we see this fact as an opportunity to take lesson in the field because all the beaches, mountains, volcanoes and the sea are full of geological stories.

Further reading:

Jordan, C.F., Jr., 1998. Kepulauan Seribu, West Java Sea, Indonesia: A modern reef analog for Miocene oil and gas fields in Southeast Asia. Proceedings, Indonesian Petroleum Association, 26th Annual Convention & Exhibition, May 1998, p. 71 – 83.

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