CO_2 and N_2 contamination in J32–1, SW Luconia, offshore Sarawak

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The SW Luconia area, offshore Sarawak, is seemingly prone to CO_2 and N_2 contamination. The level of CO_2 contamination is alarmingly higher (>60%), especially in the carbonates, when compared to other areas in the Sarawak Basin. This is further evident from the recent exploration well, J32-1, drilled by SSB in the area. The well discovered five separate gas-bearing reservoirs in Neogene sands and limestones. Analysis of the gas from all the reservoirs indicate contamination of CO_2 (2-76%) and N_2 (1-12%). A high concentration

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of CO_2 was observed in the limestones and an even higher level was recorded in the overlying reservoir sands.

Although these contaminants (CO_2 & N_2) are generally thought to be basement derived, the vertical gas distribution trends of J32-1 identify the sudden influx of CO_2 in these reservoirs as late *in situ* inputs. It is possible that the gas was released from low temperature reactions of the carbonates with formation waters and from the oxidation of methane in oxygenated waters. This is possible as fluid samples from the reservoirs suggest freshwater conditions and the higher heat flow experienced by the region. The invasion of meteoric water may have occurred during the Pliocene major uplift when Sundaland emerged in the South China Sea. The distribution trend of N_2 suggests another possible origin, from humic organic matter which is in abundance in Oligocene deposits. However, the probable inputs from surface via dissolved atmospheric N_2 and from humic acids of peat swamps cannot be ruled out. The presence of the contaminants in the well is apparently in general agreement with the overall CO_2 and N_2 contamination trend seen in the area.