

Geology Paper 19

CARBON DIOXIDE (CO₂) DISTRIBUTION IN THE SARAWAK BASIN, AND ITS RELATIONSHIP WITH ENTRAPMENT

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Carbon dioxide content in both associated and non-associated gases in Sarawak Basin fields varies up to a maximum of 90%. High CO₂ content in natural gas reduces the economic value by lowering the saleable gas volume, as well as reducing the BTU content. In addition, special infrastructures are required to develop and process gas accumulations containing high CO₂.

Understanding the likely geological parameters that control CO₂ regional distribution patterns will assist explorationist in targeting prospects with a lower CO₂ content. General current understanding on the CO₂ distribution in a basin are, CO₂ percentage increases with depth and high percentage CO₂ accumulation are of inorganic origin and tend to be associated with structures with deep seated faults to facilitate CO₂ migration up dip from basement.

However, we observe that CO₂ percentage varies vertically in a field and does not necessarily increases with depth and could also decreases with depth. CO₂ of same inorganic origin are present in several reservoirs of a field; and yet one reservoir may have very low CO₂ compared to the other reservoirs.

Field observations in the Sarawak Basin CO₂ distribution are the depth of accumulation and origin of CO₂ does not influence the percentage distribution and the geometry of traps and seal effectiveness dictates how much CO₂ the reservoir can hold.

These scenarios are also observed in Sarawak Basin. Major marine transgressive shale provides good and effective top seal. Thus reefal carbonate terminated by drowning can support higher gas column with low CO₂ content.

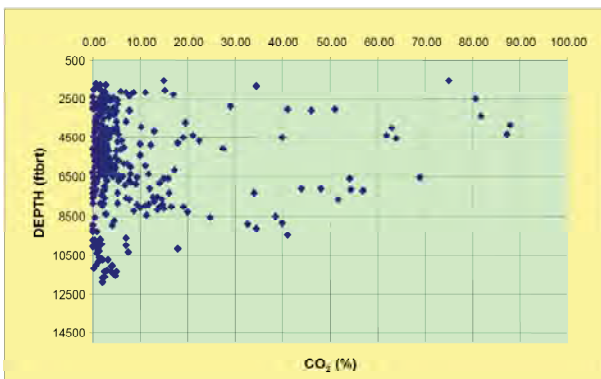


Figure 1: Sarawak Basin, Depth vs Carbon Dioxide (CO₂).

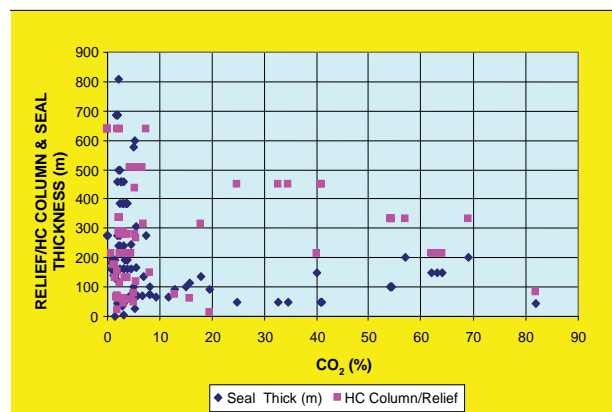


Figure 3: Sarawak Basin, Limestone Reservoir, Relief/Hydrocarbon Column and Seal Thickness vs. Carbon Dioxide (CO₂)

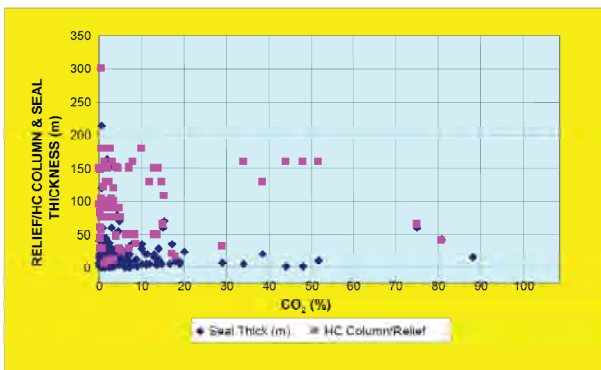


Figure 2: Sarawak Basin, Sandstone Reservoir, Relief/Hydrocarbon Column and Seal Thickness vs Carbon Dioxide (CO₂)

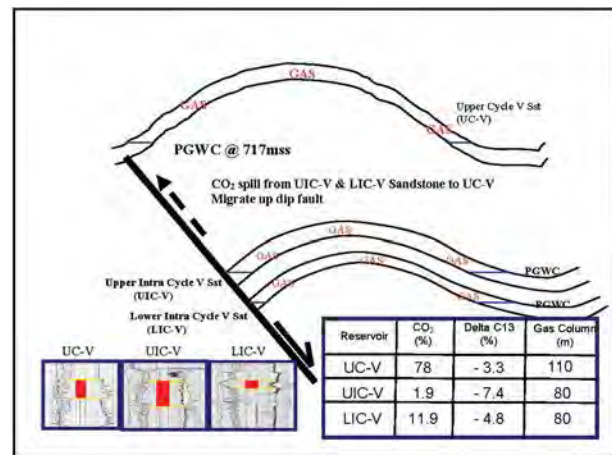


Figure 4: T3.2 CO₂ Distribution