# Meeting of mantle $CO_2$ and organic substances formed in the crust

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The $CO_2$ accumulations in clastic reservoirs are appropriate to study of carbon cycles: (i) in these systems $CO_2$ is present in three phases (s.c. $CO_2$, dissolved $CO_2$ and carbonates) and (ii) they often contain oil, gas and other kerogen derived organic compounds.

The followings are based partly on (1, 2, 3, 4). Shallow multistacked $CO_2$ fields are developed on a structural high in the Danube Basin, W Hungary. The reservoirs consist of fractured basement and Upper Miocene lacustrine sandstones. Going upward the $CO_2$ is progressively replaced by a dry HC-gas-$N_2$ fluid. The lowermost reservoirs, filled with "pure" $CO_2$, contain traces of oil generated by Middle Miocene source rocks. Waters co-produced with $CO_2$ from the lower reservoirs, characterized by $Cl^-/Br^-$ ratio above 300, are of evaporate origin and contain up to 7000 ppm acetate. Dawsonite is a common constituent of these reservoirs. The amount of the dawsonite-fixed $CO_2$ is of the same order of magnitude than that of the reservoired $CO_2$.

Oil traces and acetate have been generated by evaporate-related source rocks, entering the oil window at 1-2 Ma before the Pliocene basaltic magmatism, well known in the basin. The $CO_2$, degassed from basaltic intrusions, replaced the oil and dissolved parts of its light fraction and of the oil-associated gases. The dawsonite is a product of the interaction between detrital albite and $CO_2$. The HC-gas-$N_2$ mixture is considered as a late thermogenic fluid generated in the metasediments of the basement by heating effect of the intrusions. When this fluid arrived to the fields, the lower reservoirs were already filled with $CO_2$ to spill-point and hence it filled the upper reservoirs, partly or entirely free of $CO_2$. Therefore the bulk of the dawsonite formed simultaneously with trapping of the $CO_2$.

(1) Cornides et al. (1986) Geochem. J. 20, 119-125. (2) Palcsu et al. (2014) Marine Petrol. Geol. 54, 216-227. (3) Vető et al. (2014) Central European Geol. 57, 53-69. (4) Király et al (2016) doi: 10.1144/SP435.15.