Cold Water Travertine Shrubs: Implications for Pre-Salt Shrubs in the South Atlantic

Li Guo[1], Robert Riding[2], and Aurélien Virgone[3]

[1]CASP, Cambridge, United Kingdom.
[2]University of Tennessee, Knoxville, TN, United States.
[3]TOTAL, Pau, France.

ABSTRACT

Shrub-like carbonate fabrics are predominant elements in Pre-salt reservoirs and their origin is still uncertain, especially as few good Pre-Salt analog systems are known. Debate issues include whether or not the shrubs are travertine and whether or not they are microbial. The reasons for a non-travertine origin given by Saller et al. (2016) are: 1) low water temperature precipitation suggested by stable isotopes, 2) large distribution area, and 3) repeated interbedding with lacustrine facies. In addition, no spring vents have been observed in Pre-salt fields (Saller et al., 2016). However, these reasons cannot totally rule out the possible travertine origin of shrubs in the Pre-salt reservoirs. This study assesses the origin and distribution of shrubs in continental carbonate settings. The results show: First, travertine shrubs can form in cold groundwater as observed in travertines in China, with groundwaters of 11°C. Second, travertine shrubs can exhibit extensive spatial distribution and can be repeatedly interbedded with micritic limestones, as observed at Tivoli (Chafetz and Folk, 1984). Travertine vents are not always exposed in quarries (such as in central Italy) and would be even more unlikely to be penetrated in boreholes. Therefore, more studies need to be carried out in order to further understand the origin of the shrub structures in the economically important Pre-salt carbonates. References: Chafetz, H.S. and Folk, R.L. 1984, Travertines: depositional morphology and the bacterially constructed constituents: Journal of Sedimentary Petrology, 54, 289-316. Saller, A., Rushton, S., Buambua, L., Inman, K., McNeil, R. and Dickson, J.A.D (Tony). 2016. Presaltstratigraphy and depositional systems in the Kwanza Basin, offshore Angola. AAPG Bulletin, 100, 1135-1164.