KTB-related Fluorine anomaly : an appeal for worldwide search from recent findings in NE Brazil

[1]MARINI, F. and [2]ALBERTAO, G.A. [1]Ecole Nationale Superieure de Geologie, BP40, 54501 Vandoeuvre-les-Nancy Cedex, France; [2] Petrobras. Av. Elias Agostinho 665, Macaé –RJ, Brasil.

The best-documented transition from Maastrichtian to Danian formations in NE Brazil occurs in the type-section of the Pernambuco-Paraíba basin (Poty quarry, beds A to N), 15 Km North of Recife, State of Pernambuco.

The salient feature in this section is a unique, 60 cm-thick tsunami-sequence, spanning from beds D to I. Its topmost, 1-2 cm thick clay-bed I, bears shocked quartz and both TOC (1.1 %) and Ir (0.69 ppb) anomalies. This D-I succession is akin to the impact-related, megawave sequence, marking the KTB in most localities around Gulf of Mexico.

Our detailed study of F profile across beds A to N (now based on 23 samples) also reveals a prominent F anomaly —5.57 % F— in this same bed I, strongly contrasting with F below 0.3% in all other beds. Accuracy of these results firmly rests on the special potentiometric technique of the SARM/CRPG-Nancy (Det. lim. : 20 ppm, precision better than 5% for F>500 ppm). Moreover, this F anomaly matches the unique diagenetic features of bed I : (a) "Fluorite spherules" (0.6-0.8 mm in size) made of porous aggregates of Fluorite crystals, and (b) smaller, "Phosphate-looking", aphyric spherules in which nanometric Fluorite prevails over common Fluorapatite (by up to 60%).

This F-anomaly might result from F-release by major impact into thick, F-bearing evaporite series, as suggested from both geological features of the most probable site of impact, and known occurrences of F in evaporitic environments. We thus advocate more systematic search for F in KTB deposits, paying special attention to marine sequences around Gulf of Mexico.