



## ESR DATING OF FOSSIL TEETH: IN WHICH EXTENT THE THICKNESS OF ADJACENT TISSUES SHOULD BE TAKEN INTO ACCOUNT IN THE EXTERNAL BETA DOSE RATE EVALUATION?

### SUPPLEMENTARY MATERIALS

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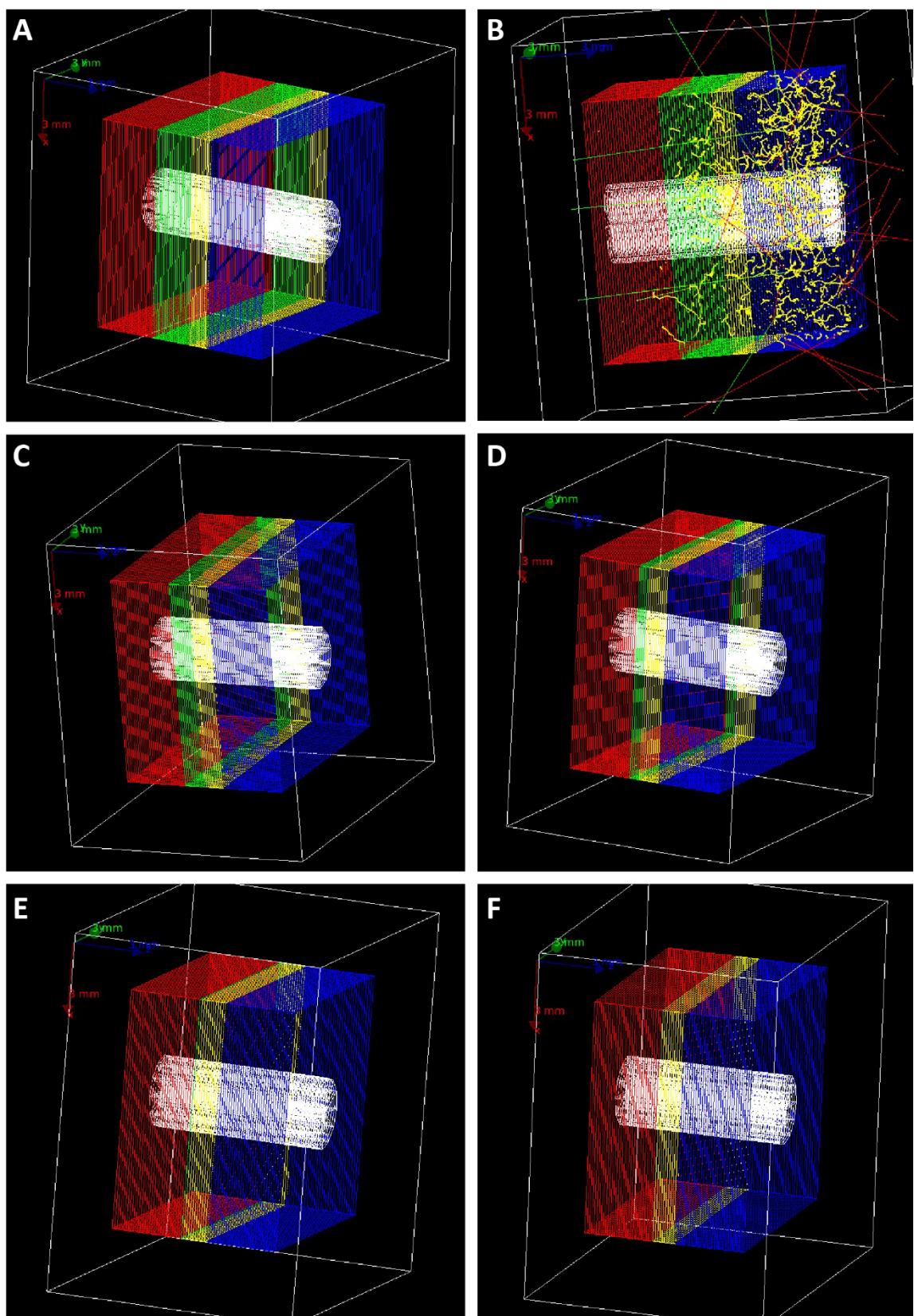
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**Table S1.** Basic characteristics of the materials used for the simulations with DosiVox.

Material	Density (g/cm <sup>3</sup> )	Water content (% of dry mass)	Components (% of dry mass)	
			1	2
Sand	1.80	15	SiO <sub>2</sub> (100)	-
Cement	2.95	5	Hydroxyapatite [Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)] (83)	CaCO <sub>3</sub> (17)
Dentine	2.95	5	Hydroxyapatite [Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)] (83)	CaCO <sub>3</sub> (17)
Email	2.95	0	Hydroxyapatite [Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)] (91.7)	CaCO <sub>3</sub> (8.3)

**Table S2.** Beta dose rate values derived from the simulation of the 5 cases. A mean value was extracted over the full thickness of the enamel layer. To mimic the standard ESR dating sample preparation procedure, the outer 30 microns (3 voxels) of each side of the enamel layer were removed. Equilibrium in the U-238 series of dental tissues and sediment was assumed.

Case	Cement thickness (mm)	Sediment beta dose rate (Gy/ka)	10 ppm of U-238 in cement			20 ppm of U-238 in cement			30 ppm of U-238 in cement		
			Cement beta dose rate (Gy/ka)	Dentine beta dose rate (Gy/ka)	Total beta dose rate (Gy/ka)	Cement beta dose rate (Gy/ka)	Dentine beta dose rate (Gy/ka)	Total beta dose rate (Gy/ka)	Cement beta dose rate (Gy/ka)	Dentine beta dose rate (Gy/ka)	Total beta dose rate (Gy/ka)
1	2	0.000	0.178	0.909	1.088	0.357	0.909	1.266	0.535	0.909	1.445
2	1	0.003	0.163	0.902	1.067	0.326	0.902	1.230	0.489	0.902	1.393
3	0.5	0.015	0.127	0.900	1.042	0.255	0.900	1.169	0.382	0.900	1.297
4	0.1	0.068	0.043	0.899	1.010	0.086	0.899	1.053	0.130	0.899	1.096
5	0	0.100	0.000	0.898	0.999	0.000	0.898	0.999	0.000	0.898	0.999



**Fig. S1.** 3D models developed for the DosiVox simulations. A: Case 1 (2 mm-thick cement); B: Case 1 with a visualization of the beta emissions from the U-238 series; C: Case 2 (1.0 mm-thick cement); D: Case 3 (0.5 mm-thick cement); E: Case 4 (0.1 mm-thick cement); F: Case 5 (no cement). Keys: red = sediment, green = cement; yellow = enamel, blue = dentine and white = cylindrical probe.