Stone consolidation by biomineralisation. Contribution for a new conceptual and practical approach to consolidate soft decayed limestones

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**Supplementary data:**

S1: Deterioration patterns in elements of Ançã stone, in the Queluz gardens.

S2: Main portal of Loulé church and details of intense scaling.

S3: Limestone elements with scaling and deep cracking network in the main portal of Loulé church.

S4: Santa Cruz church, Coimbra, Portugal, in 1997, before the intervention.

S5 – Aspects of the intense spalling, scaling and deep fractures in limestone blocks of Porta Especiosa (Old Cathedral of Coimbra).

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| S 1 – Deterioration patterns in elements of Ançã stone, in the Queluz gardens. Heavy mortar reconstructions of eroded areas (top) and detail of the intense scaling and powdering (bottom). | |

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| S2 – Main portal of Loulé church and details of intense scaling. | |

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| S3 – Limestone elements with scaling and deep cracking network in the main portal of Loulé church. The extreme weakness of the stone surface makes any simple attempt to stabilize pieces into a risky operation. Any slight improvement in the softened zones will be of great benefit when addressing the stabilization of the threatening large cracks. | |

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| S4 – Santa Cruz church, Coimbra, Portugal, in 1997, before the intervention. The portal is made of Ançã stone, a weak limestone with 27-29% porosity. Powdering and scaling, with severe mass loss were deterioration features spread through the entire portal. The very dark patches in the top right photo are remains of past treatments. | |

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| S5 – Aspects of the intense spalling, scaling and deep fractures in limestone blocks of Porta Especiosa (Old Cathedral of Coimbra). | |

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