EGU2020-3755
https://doi.org/10.5194/egusphere-egu2020-3755
EGU General Assembly 2020

Durability of a ventilated stone facade: A case study of a limestone facade affected by the corrosion of the anchorage system

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The mechanical behavior of a natural stone ventilated facade is inevitably based on the correct execution of both anchoring elements, stone cladding and enclosure support, either with brick masonry walls or reinforced concrete walls. In the case studied in the present work, the origin of the damages on the facade of a building located in Lisbon has been analyzed, where stone detachments were starting to occur. This enclosure is a ventilated facade cladded with Portuguese limestone Lioz slabs. Non-destructive borescope analysis of the metallic anchoring system employed was performed, as well as X-Ray fluorescence laboratory analysis (FRX) for chemical characterization of the anchoring material. Results obtained demonstrated the problem cause on the stone facade due to incorrect metallic anchoring selection and poor execution combined with stress corrosion effect, especially for slabs with larger dimensions.