**Suggested topics:** Remote sensing applications – Disaster

**Paper title:** Urban structural damage assessment with oblique UAV imagery, object-based image analysis and semantic reasoning

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**Abstract:** Structural damage assessment is a priority following disaster events but, especially in complex urban settings, remains a significant challenge. Many studies have explored the potential of virtually every type of remote sensing data, but in particular vertical data have been found to have substantial limitations, as damage information is largely restricted to roofs and proxies such as blow-out debris near buildings that may signal extensive damage even in case of an intact roof. Oblique imagery has been identified as a more useful data source that provides multi-perspective information, overcoming the perspective constraints of vertical imagery. This paper addresses damage assessment based on multi-perspective, overlapping, oblique images obtained with unmanned aerial vehicles (UAV). 3D point-cloud assessment and object-based image analysis (OBIA, also referred to as object-oriented analysis, OOA) are used to extract damage indicators from both façades and roofs. The research focuses on creating a methodology that supports the ambiguous classification that characterize especially the intermediate damage levels, aiming at producing more reliable per-building damage scores. Its idea is to provide a tool that determines the comparatively clear damage cases (very heavy damage and complete destruction), and for the intermediate and lower cases creates a virtual model of the building with the option for an analysis to switch on additional damage layers to aid in the damage scoring. The results suggest that the developed OBIA rulesets are capable of extracting all relevant damage features, and are able to cope with different types of façade and architectural scenes. This paper demonstrates that the use of OBIA to extract damage information from the buildings leads to a more comprehensive and less subjective building damage assessment that is interesting for the stakeholders in disaster response.