

# CHANGE DETECTION OF BUILDING FOOTPRINTS FROM AIRBORNE LASER SCANNING ACQUIRED IN SHORT TIME INTERVALS

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## ABSTRACT:

Several recent studies have shown that airborne laser scanning (ALS) of urban areas delivers valuable information for 3D city modelling and map updating. However, building footprint detection from multi-temporal ALS lacks in comparability because of changing ALS flight parameters, flying season, and influences of interpolation settings if digital elevation models are used. So far, less attention has been paid to change detection of buildings within a short term time span (approx. three months), where major problems are the high variability of vegetation over time and to distinguish between temporary objects and little changes of buildings currently under construction and demolition, respectively. We introduce an object-based workflow to investigate (i) how unchanged objects can be defined, (ii) which variability in the object appearance is allowed to define an object as unchanged, and (iii) at which threshold a change can be indicated. The test site is situated in the city of Innsbruck (Tyrol, Austria) where ALS data is available from summer and fall 2005. In an initial step building footprints are derived by an object-based image analysis (OBIA) detection method for each flight independently. The parameters for the building detection are derived for a training site where no changes on buildings occurred between all epochs and the building footprint representation is identical to the cadastral map. The cadastral map is used as training data set to estimate the building detection parameters. Then the object features such as shape index and height variation of buildings derived from the different flights are compared to each other and separated into the classes unchanged buildings, new buildings, demolished buildings, building part extension and retreated building part. The results are verified by a visual inspection comparing the results with an elevation difference image of the epochs.

**TOPIC:** Lidar and laser scanning

**ALTERNATIVE TOPIC:** Change detection and process modelling