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A study of earthquake-induced building detection by object oriented classification approach

Asli Sabuncu (1), Zehra Damla Uca Avci (2), and Filiz Sunar (3)

(1) Bogazici University Kandilli Observatory Earthquake Research Institute, Geodesy Department, ISTANBUL, Turkey (asli.turgutalp@boun.edu.tr), (2) Istanbul Technical University, Department of Astronautical Engineering, Faculty of Aeronautics and Astronautics, Istanbul, Turkey, (3) Istanbul Technical University, Geomatics Engineering Department, Istanbul, Turkey

Among the natural hazards, earthquakes are the most destructive disasters and cause huge loss of lives, heavily infrastructure damages and great financial losses every year all around the world. According to the statistics about the earthquakes, more than a million earthquakes occur which is equal to two earthquakes per minute in the world. Natural disasters have brought more than 780.000 deaths approximately % 60 of all mortality is due to the earthquakes after 2001. A great earthquake took place at 38.75 N 43.36 E in the eastern part of Turkey in Van Province on On October 23th, 2011. 604 people died and about 4000 buildings seriously damaged and collapsed after this earthquake.

In recent years, the use of object oriented classification approach based on different object features, such as spectral, textural, shape and spatial information, has gained importance and became widespread for the classification of high-resolution satellite images and orthophotos.

The motivation of this study is to detect the collapsed buildings and debris areas after the earthquake by using very high-resolution satellite images and orthophotos with the object oriented classification and also see how well remote sensing technology was carried out in determining the collapsed buildings. In this study, two different land surfaces were selected as homogenous and heterogeneous case study areas. In the first step of application, multi-resolution segmentation was applied and optimum parameters were selected to obtain the objects in each area after testing different color/shape and compactness/smoothness values. In the next step, two different classification approaches, namely “supervised” and “unsupervised” approaches were applied and their classification performances were compared. Object-based Image Analysis (OBIA) was performed using e-Cognition software.