Geophysical Research Abstracts
Vol. 14, EGU2012-10330, 2012
EGU General Assembly 2012

Size effect on the polygon-based estimation of user's, producer's and overall accuracies

J. Radoux and P. Bogaert
Earth and Life Institute, Université catholique de Louvain, Louvain-la-Neuve, Belgium (julien.radoux@uclouvain.be)

Geographic object-based image analysis is a processing method where groups of spatially adjacent pixels are classified as elementary units. This approach raises concerns about the design of subsequent validation strategies. Thought it has been suggested that polygon sampling units should be used in validation schemes when the map is partitioned in polygons, little attention has been paid on the consequences of this choice. Contrary to the point-based sampling, polygon indeed have different spatial extents that should be used for the estimation of the primary (overall, user's and producer's) thematic accuracy indices. In this paper, the quantitative effects related to the variable size of the sampling units on the estimation primary accuracy indices are addressed.

An object-based sampling strategy is proposed and compared with other approaches used in the literature for the thematic accuracy assessment of object-based classifications. The new sampling scheme and sample analysis are founded on a sound theoretical framework based on few working hypotheses. The performance of the sampling strategies is quantified using object-based classifications results simulated for a Quickbird imagery. The different effects of the polygon size on the efficiency of the validation method are assessed. The bias and the variance of the primary accuracy estimates were used as indicators of the methods benefits.

The results show that the proposed method is the most efficient for overall accuracy estimates but not systematically better than point-based sampling for user and producer accuracy. The effect of the size distribution, characterized by the coefficient of variation, is to increase the variance of the object-based predictors. In addition, the correlation between the size and the classification accuracy may lead to systematic errors if not properly taken into account.

The results therefore suggest that the effect of the size on the estimation of primary parameters should not be neglected. Other sources of uncertainty on the map quality estimation with polygon sampling units are also discussed.