

Continuous fields of impervious cover at annual resolution: urbanization of the Washington, D.C - Baltimore, MD metropolitan region from 1984 to 2010

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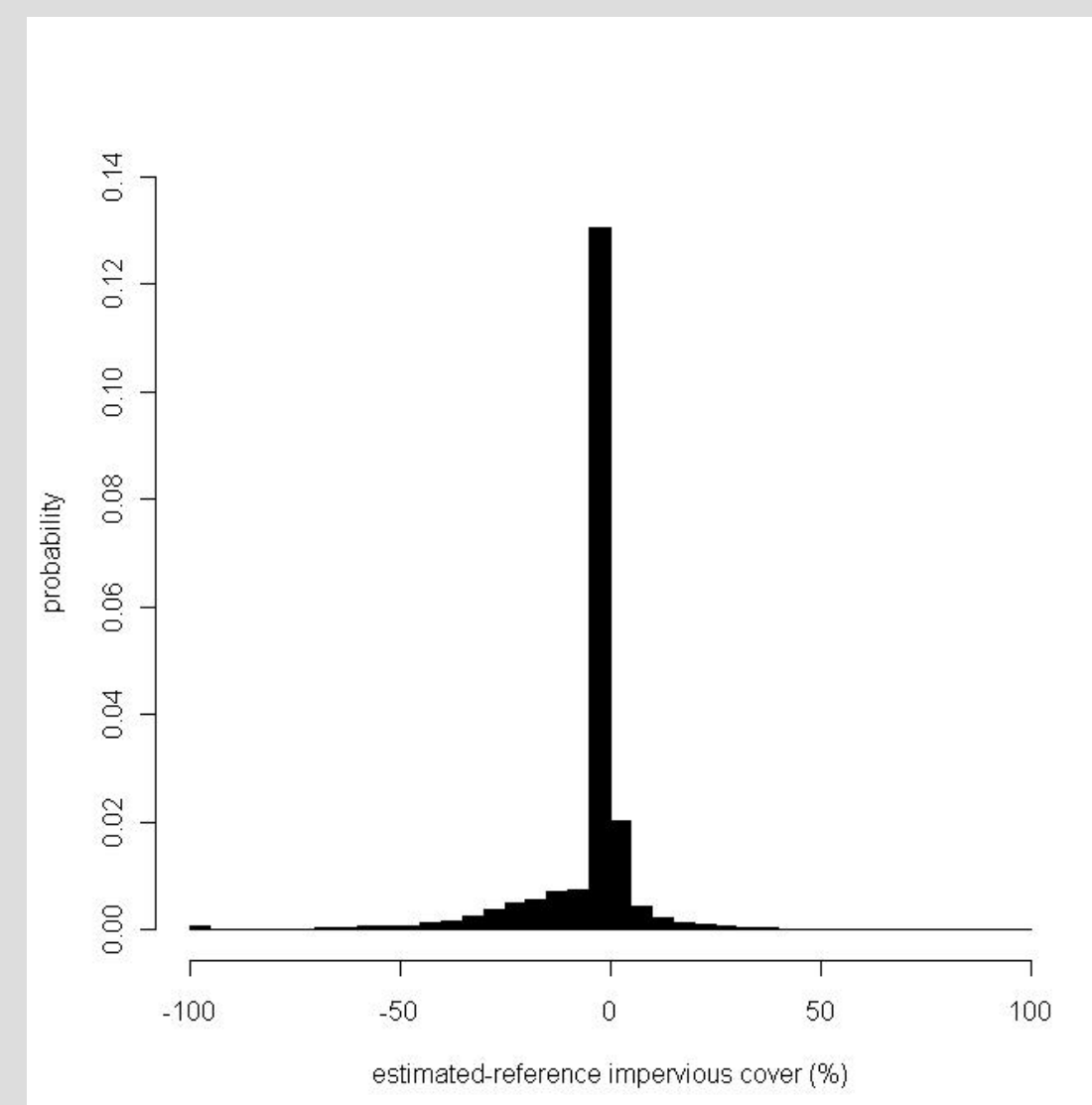
Summary:

- We developed an empirical method to retrieve long-term continuous fields of impervious surface cover at 30-m, annual resolution.
- 27 years times series Landsat images (201 WRS2 tiles) were downloaded automatically from the USGS archive.
- Based entirely on Landsat and impervious-cover layers collected from local governments, the data showed an average error of $\pm 6\%$ impervious cover over three years of test data.
- The Washington, DC – Baltimore, MD metropolitan region had 8.81×10^2 km² of impervious surfaces in 1984 and 1.176×10^3 km² of impervious surfaces in 2010, for an average annual increase of 11.35 km² from 1984 to 2010.
- The unique development patterns of each city and county were visible in the dataset, patterns which included stasis, acceleration, expansion, and intensification, but neither loss nor deceleration of urban cover in various places and times.

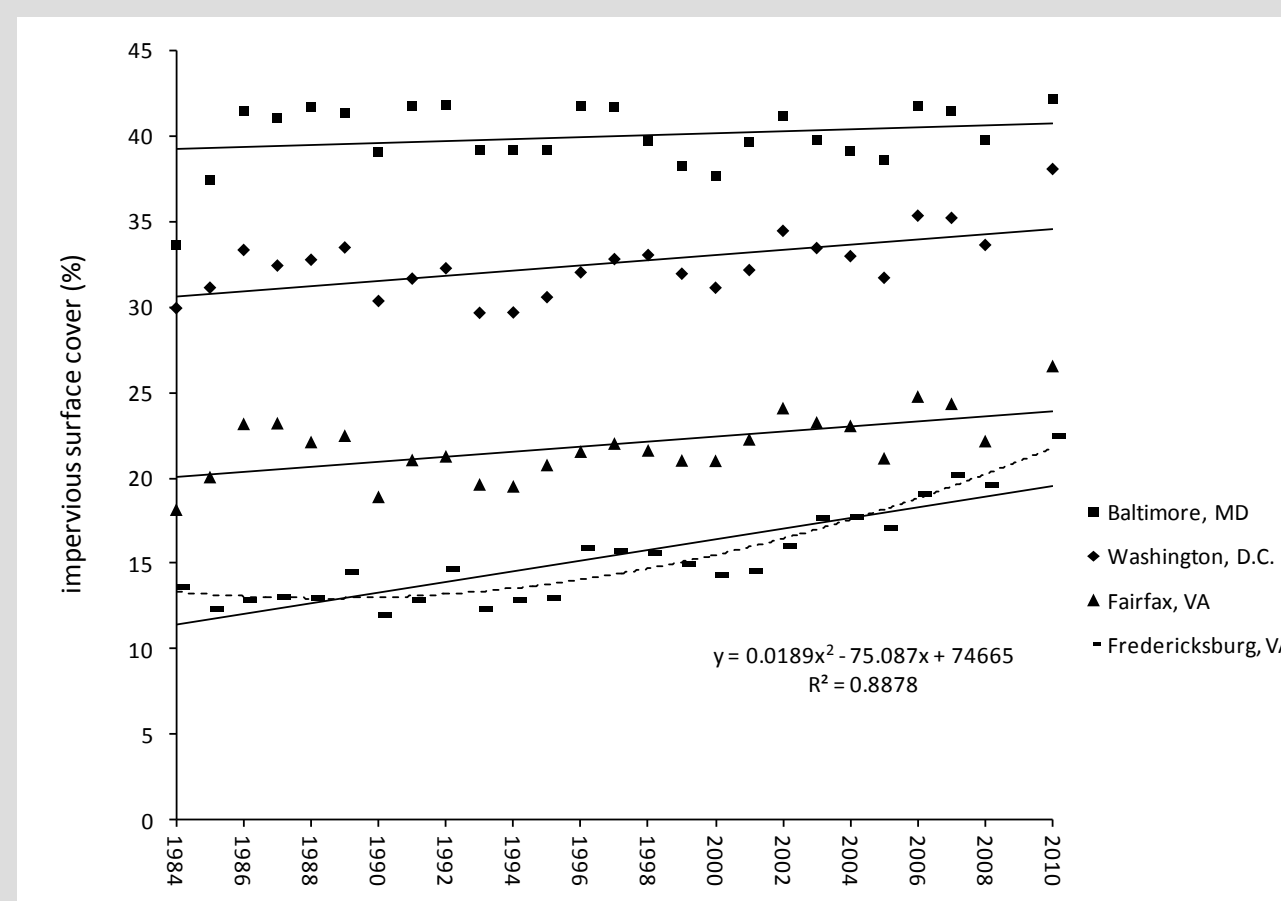
Methods and results

Regression tree model

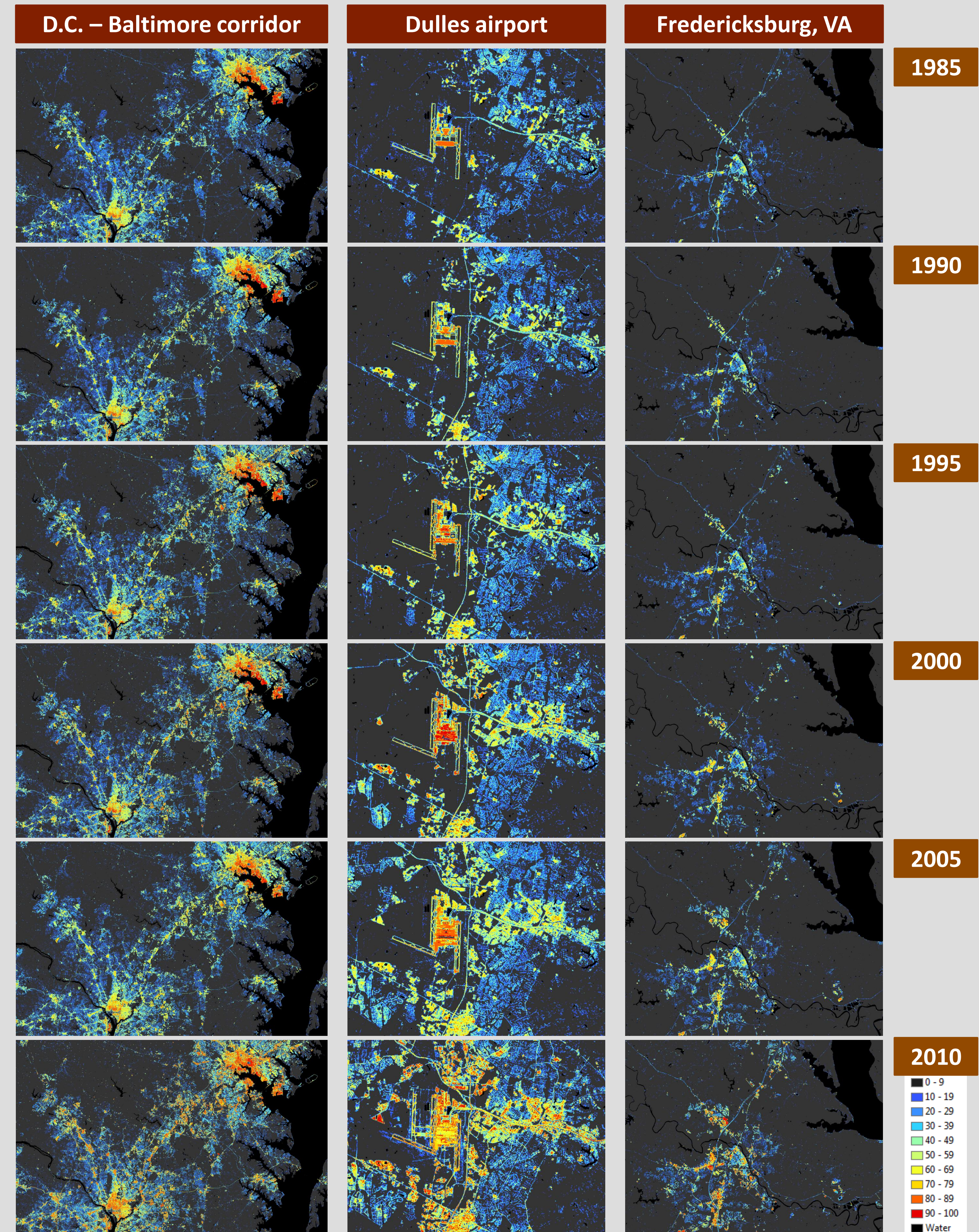
Model accuracy	Mean absolute error	Correlation coefficient
Training data	6.1%	0.68
10-fold cross validation	6.2%	0.68
Independent test data	6.1%	0.68



Distribution of error in estimates of percent impervious surface cover relative to a random 15% sub-sample of reference data withheld for validation. Data are from a pooled sample from several municipalities over three years.



Estimated change in impervious surface coverage of selected counties from 1984 to 2010.



Landsat data retrieval and training data derivation

Day-of-year distribution of retrieved Landsat images

