Paulo Arévalo

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Education

Boston University *Boston, MA*
Ph.D. in Earth and Environment. Department of Earth and Environment *2014 - 2019*
Advisors: Pontus Olofsson, Curtis Woodcock.

Dissertation: "Land change and carbon dynamics in the Colombian Amazon"

Pontificia Universidad Javeriana *Bogotá, Colombia*
B.Sc. in Ecology *2004 - 2010*

Experience

Boston University, Department of Earth and Environment *Boston, MA*
Postdoctoral Associate *2019 - Present*
- Developed tools to process and visualize the outputs of a time series algorithm applied to Landsat data, in support of land cover mapping at the global scale (GLANCE project).
- Currently developing and testing global land cover mapping protocols
- Currently developing new techniques to improve forest biomass estimation using optical, radar and lidar data

Boston University, Department of Earth and Environment *Boston, MA*
Research Assistant *2014 - 2019*
- Mapped multiple land categories and their conversions in the Colombian Amazon using Landsat time series.
- Calculated areas of change and their uncertainty using unbiased statistical estimators.
- Compared sampling methods and their relation with map accuracy to reduce uncertainty in area estimates.
- Managed and processed large volumes of data in a distributed computing environment.

Pontificia Universidad Javeriana, Department of Ecology and Territory *Bogotá, Colombia*
Research assistant *Nov. 2012 - Aug. 2014*
- Processed several raster and vector datasets, and conducted spatial analyses to aid in the creation of a national map of ecosystems at risk (IUCN red List of Ecosystems).

National Institute of Hydrology, Meteorology and Environmental Studies IDEAM *Bogotá, Colombia*
Contractor - GIS Specialist *Jul. 2012 - Dec. 2013*
- Modeled multiple future scenarios of deforestation in the Colombian Amazon.
- Contributed to the construction of a deforestation reference scenario for the Colombian Amazon in support of REDD+ activities.

National Institute for Scientific Research in the Amazon SINCHI *Bogotá, Colombia*
Contractor - GIS Specialist *Sept. 2011 - Dec. 2011*
- Supported the modeling of deforestation projections in the Colombian Amazon through spatial analyses with vector and raster data.

National Coffee Research Center CENICAFÉ *Bogotá, Colombia*
Contractor - GIS Specialist *Sept. 2010 - Dec. 2010*
- Conducted biological data analysis in support of the development of conservation strategies in coffee plantations.

Pontificia Universidad Javeriana *Bogotá, Colombia*
Research assistant *Sept. 2009 - Sept. 2010*
- Processed species occurrence data and other spatial datasets in support of the modeling of biological invasions in the Andean region.

National Institute for Scientific Research in the Amazon SINCHI *Bogotá, Colombia*
Paid internship *Aug. 2008 - Sept. 2008*
- Visually interpreted two Landsat images following the European CORINE Land Cover methodology adapted to Colombia.

Skills

Programming Python, R, bash scripting, JavaScript for Google Earth Engine
Software QGIS 3.x, ArcGIS Desktop 10.x, ENVI 5.x, IDRISI, GDAL Utilities, LaTeX.
Languages Spanish (Native), English.

Teaching experience

Boston University, Department of Earth and Environment

Boston, MA

TEACHING ASSISTANT

Jan. 2019 - May 2019

Course: Digital Image Processing.

- Taught computer lab section of the course.

Other

San José de Costa Rica, Guatemala City, Bogotá, Iquitos

INSTRUCTOR AND TECHNICAL SUPPORT

2017, 2018, 2019

- Conducted workshop on land cover change mapping and statistical area estimation.
- Provided technical support on mapping and estimation topics.

Pontificia Universidad Javeriana

Bogotá, Colombia

ADJUNCT PROFESSOR

Jan. 2012 - May 2014

Course: Introduction to Geographic Information Systems and spatial analysis.

- Taught full course to undergraduate and Master's degree students.
- Developed lectures and lab exercises conducted in proprietary and open source software (ArcGIS, QGIS).

Publications

Peer-reviewed

Arévalo, P., Bullock, E.L., Woodcock, C.E., Olofsson, P., 2020. A Suite of Tools for Continuous Land Change Monitoring in Google Earth Engine. *Frontiers in Climate*

Arévalo, P., Olofsson, P., Woodcock, C., 2020. Continuous monitoring of land surface activities and post-disturbance dynamics from Landsat time series: a test methodology for REDD+ reporting. *Remote Sensing of Environment*.

Chen, S., Woodcock, C.E., Bullock, E.L., Arévalo, P., Torchinava, P., Peng, S., Olofsson, P. 2021. Monitoring Temperate Forest Degradation on Google Earth Engine Using Landsat Time Series Analysis. *Remote Sensing of Environment, in press*.

Tang, X., Hutyra, L.R., Arévalo, P., Baccini, A., Woodcock, C.E., Olofsson, P., 2020. Spatiotemporal tracking of carbon emissions and uptake using time series analysis of Landsat data: A spatially explicit carbon bookkeeping model. *Science of The Total Environment*.

Olofsson, P., Arévalo, P., Espejo, A., Green, C., Lindquist, E., McRoberts, R.E., Sanz, M. J. 2019. Mitigating the effects of omission errors on area and area change estimates. *Remote Sensing of Environment*.

Stanimirova, R., Arévalo, P., Kaufmann, R., Maus. V., Lesiv, M., Havlik, P., Friedl, M., 2019. Sensitivity of global pasturelands to climate variation and human management. *Earth's Future*

Forthcoming

Arévalo, P., Baccini, A., Woodcock, C., Walker, W.S., Olofsson, P., 2021. Continuous above-ground biomass change estimation in the Amazon basin using Landsat spatio-temporal features. *In preparation.*

Arévalo, P., Woodcock, C., Olofsson, P., 2021. Spatial representation of errors in maps of land change. *In preparation.*

Non peer-reviewed

González, J., Arias, M., Cubillos, A., Arévalo, P. Modelación espacial de la deforestación en el bioma amazónico colombiano. In: Mas, J.-F. (ed.), 2017. Análisis y modelación de patrones y procesos de cambio. Universidad Nacional Autónoma de México, Ciudad de México. ISBN 978-607-02-9687-1.

Etter, A., Andrade, A., Amaya, P., Arévalo, P., 2015. Red list of terrestrial ecosystems of Colombia (In Spanish). In Gómez, M.F., Moreno, L.a., Andrade, G.i. y Rueda, C. (eds.). Biodiversidad 2015. Estado y tendencias de la biodiversidad continental de Colombia. Instituto Alexander von Humboldt. Bogotá, D.C., Colombia

Etter, A., Amaya, P., Arévalo, P., 2015. Forests, grasslands and páramos: fifty years of transformation in Colombian ecosystems (In Spanish). In Gómez, M.F., Moreno, L.a., Andrade, G.i. y Rueda, C. (eds.). Biodiversidad 2015. Estado y tendencias de la biodiversidad continental de Colombia. Instituto Alexander von Humboldt. Bogotá, D.C., Colombia

Presentations

Pecora 21 *Baltimore, MD*
Plenary panel: "Envisioning the future of global monitoring" *Oct. 2019*

Pecora 21 *Baltimore, MD*
Oral presentation: "Using Radar-Derived Elevation Data to Characterize Land Cover Changes Detected by Landsat Imagery in the Northwestern Colombian Amazon" *Oct. 2019*

AGU Fall meeting 2018 *Washington, DC*
Poster presentation: "Spatial Representation of Errors in Remote Sensing-based Maps: Test Application to Maps of Land Category Conversions in the Colombian Amazon." *Dec. 2018*

ForestSAT 2018 *College Park, MD*
Oral presentation: "Implications of errors in remote sensing-based maps on models of carbon emissions." *Oct. 2018*

AGU Fall meeting 2017 *New Orleans, LA*
Poster presentation: "Estimating Unbiased Land Cover Change Areas In The Colombian Amazon Using Landsat Time Series And Statistical Inference Methods." *Dec. 2017*

Pecora20 2017 conference *Sioux Falls, SD*
Oral presentation: "Using Time Series and Statistical Inference Methods to Estimate Unbiased Land Cover Change Areas in the Colombian Amazon." *Nov. 2017*

AAG Annual meeting 2017 *Boston, MA*
Oral presentation: "Obtaining unbiased area estimates of land cover change: application in the Colombian Amazon." *Apr. 2017*

Landsat Science Meeting *Boston, MA*
Oral presentation: "Obtaining unbiased area estimates for a MRV prototype: application in the Colombian Amazon." *Jan. 2017*

Research interests

- Time series of remote sensing data for land cover mapping and ecological applications.
- Estimation of carbon emissions from land cover change.
- Methods to improve change detection and mapping accuracy in the tropics.
- Spatial patterns of land cover change.