

## **Mapping Decades of Development in Volcanic Zones: Night Lights vs. Land Use**

**Christopher Small<sup>1</sup>, Karen Holmberg<sup>1</sup>**

<sup>1</sup>Lamont-Doherty Earth Observatory/Columbia University, New York University

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Satellite imaging of anthropogenic night light, land cover, and land use change provide spatially and temporally explicit indications of development in volcanic zones worldwide. We use annual composites of night light brightness from the DMSP-OLS and VIIRS dnb satellites to map changes in lighted development near historically active and Holocene volcanoes and validate these changes using Landsat satellite imagery of land cover changes. Decadal changes in DMSP-OLS night light post-1992 fused with higher resolution VIIRS dnb night light imagery indicate increased urban development in the past two decades in volcanic contexts. Vicarious validation with multi-temporal Landsat imagery indicates that additional land cover change has occurred in areas closer to active volcanoes that is separate from lighted development. In particular, agricultural land use appears to be expanding in the vicinity of several active volcanoes worldwide. While this suggests that exposure to volcanic hazard may be increasing, actual risk assessment must be made on a case-by-case basis and cannot meaningfully be inferred from aggregate analyses like these. Use of satellite observations for change analysis, however, can serve as an important reconnaissance tool to identify areas where location-specific risk assessments may be warranted.