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Leveraging Climate and Governance Variability to Support Future Protected Area Risk Assessments

Amina Ly¹ and Noah Diffenbaugh^{1,2}

¹Department of Earth System Science, Stanford University, Stanford, CA, USA (aminaly@stanford.edu)

²Doerr School of Sustainability, Stanford University, Stanford, CA, USA

Protected areas are a critical tool for managing and ensuring the persistence of species biodiversity and land conservation. Their spatial extents are used to measure progress towards land protections by several international targets. However, governance type, management, and enforcement of these protected areas vary sub-nationally, and can influence the efficacy of the designation. Simultaneously, climatic conditions are coupled with species resilience, and changes in climate can be associated with shifts, expansions, and contractions of viable areas for habitat maintenance. Climate change is expected to change baseline climatic conditions globally and is likely to limit the benefits of terrestrial protected areas. Improved understanding of the relationship between governance, regional climate change, and protected areas can further enhance tracking of land cover change and inform protection strategies implemented across spatial scales. To aid in informed decision making at sub-national scales, we combine information on terrestrial sites in the World Database on Protected Areas, historic and future climate projections from CMIP6, and remotely sensed data on vegetation cover (NDVI). We leverage categorical differences in protected area management, as well as climate anomalies through time to explore their relationship to land cover change, and create additional tools for risk assessment that may be used in conjunction with local governance processes