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IAF EARTH OBSERVATION SYMPOSIUM (B1)
Mitigating the Climate Crisis from Space (6)

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UTILIZING SATELLITE EARTH OBSERVATION ANALYSES AND THE ENVIRONMENT-VULNERABILITY-DECISION-TECHNOLOGY MODELING FRAMEWORK TO SUPPORT THE YUROK TRIBE IN MITIGATING CLIMATE CHANGE IMPACTS THROUGH NATURAL RESOURCE MANAGEMENT

Abstract

The Yurok Tribe is engaging in innovative conservation-based natural resource management to confront the impacts of climate change. These indigenous-led efforts focus on protecting community safety and the natural forest, land, and river resources that are connected to their economies and culture. However, decisions around the implementation of these efforts are challenging. Challenges include intersecting environmental and socioeconomic factors, understanding complex environmental trends, and a diverse network of stakeholders. This project aids the nation-building efforts of the tribe by supplementing tribal decision-making as they develop solutions to mitigate climate impacts, reduce the rate of climate change, and balance resilience, revenue, and cultural values in natural resource management. To supplement Yurok decisionmakers, a Decision Support System (DSS) is being developed as a collaborative project by the tribe and the authors. The DSS incorporates satellite earth observation (EO) analyses and employs the Environment-Vulnerability-Decision-Technology (EVDT) modeling framework. The DSS considers the interactions between the environment, human vulnerability, decision-making and technology design. This work discusses the development of the EO analyses for this DSS. Regarding the environmental component of EVDT, tree cover is analyzed towards understanding fire risk in the face of catastrophic forest fires worsened by climate change. This analysis also relates to the human vulnerability component of EVDT, as it integrated in the DSS with local socioeconomic data on the wildland-urban interface (to protect public safety) and tribal carbon sequestration projects (to protect the carbon sequestered in these forests and reduce the rate of climate change). The Normalized Difference Vegetation Index (NDVI) mean anomaly is utilized to examine sustained tree cover change. Also regarding human vulnerability, existing EO products on forest fires alerts and smoke are integrated with local socioeconomic information in the DSS towards minimizing these climate-related impacts on Yurok communities. Additionally, analyses of the Global Ecosystem Dynamics Investigation (GEDI) space-based LiDAR data are utilized to provide information on forest structure change. This information is related to the decision-making component of EVDT, as it is employed by Yurok decisionmakers in carbon project planning. These carbon projects provide the tribe with useful funds and reduce the rate of climate change. These analyses will be supplemented by aerial LiDAR data collection being explored by the Tribe. Future work will include EO analyses of tree species distribution to understand invasive conifer encroachment, and riparian vegetation on the Klamath river to mitigate salmon depletion and aid in river restoration.