

Multisensors and Multiplatform Assessment of Vineyard Health

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Impact on California Agriculture: California's specialty crops industry, valued at more than \$18 billion, plays a crucial role in the state's economy, with viticulture standing out as the most significant sector (\$5.5 billion). The health and productivity of vineyards are vital not only for economic reasons but also for maintaining the cultural heritage and environmental sustainability of the region.

Rationale/Introduction: vineyards face numerous challenges, including drought and soil degradation, which necessitate innovative approaches to monitoring and management. Our research aims to address these challenges by employing advanced multisensor technologies (LIDAR, multispectral imaging, and ECOSTRESS) and multiplatform methods (ground-based, UAV, International Space Station (ISS), and satellite) to monitor and assess vineyard health. This multidisciplinary approach allows us to capture a comprehensive picture of plant responses to environmental stressors, particularly drought conditions, which are increasingly prevalent in California.

Experimental Approach: The primary challenge lies in integrating data from various resolutions into a cohesive framework while preserving the unique characteristics associated with each data collection method. By combining UAV data collected at Cal Poly Pomona with satellite data from the surrounding region and ECOSTRESS data from the ISS, we aim to develop a comprehensive understanding of plant responses to environmental stressors, particularly drought conditions. Using ArcGIS Pro, we established a base grid for the study area and meticulously plotted ground data to create a detailed spatial representation.

Major Conclusions: Our preliminary findings reveal significant insights into how drought impacts both plant health and soil conditions. These observations underscore the potential of our multisensor and multiplatform approach to provide actionable information for vineyard management, ultimately contributing to the sustainability and productivity of California's viticulture industry.
