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Documenting plant response to global climate change in sensitive zones

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Documenting plant response to global climate change in sensitive zones, such as the alpine, is a major goal for global change biology. Understanding how plant communities reflect elevation and substrate is critical to analyzing plant response to climate change at regional scales. Basic information on alpine plant distribution by elevation and substrate provides a basis for anticipating which species may decline in a warming climate, which are likely to persist, and which could replace those that decline. The Global Observation Research Initiative in Alpine Environments (GLORIA) is a worldwide effort to document vegetation changes over time in alpine settings using permanent multi-summit plots. The California/Nevada group currently monitors seven permanent GLORIA target regions, composed of 29 high summits in California and Nevada's alpine and subalpine zones. Summits range in elevations from 2918 m to 4325 m on substrates including dolomite, granite, quartzite, and argillized acidic volcanics. High-resolution plant occurrence and cover data from the upper 10 meters of each summit are presented. Plants from our target regions can be divided into three groups: summit specialists found only on the highest peaks, alpine species found predominantly within the alpine zone, and broadly distributed species found in the alpine zone and below. Rock substrate and microsite soil development have a strong influence on plant community composition and species richness. We present the first set of five-year resurvey and temperature data from 18 summits. We have documented some annual variation in species presence/absence at almost all sites, but no dramatic changes in total diversity. Consistent with the expectation of rising global temperatures, our soil temperature loggers have documented temperature increases at most of our sites. These data are a baseline for assessing bioclimatic shifts and future plant composition in California and Nevada's alpine zone.