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A comparative study of the hydrological role of debris-covered and white glaciers in the headwaters of the Maipo River, central Chile

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The Yeso River system, a tributary of the Maipo River Basin, helps sustain water supply for one third of Chile's population and a multimillion-dollar agricultural industry. The hydrology of these headwaters is strongly dominated by a host of cryospheric elements including seasonal snow, permafrost, rock glaciers, and white as well as debris-covered glaciers. In this research we investigate the hydrologic role of the debris-covered Piramide Glacier under current and future climatic conditions through a monitoring and modeling effort, and compare it with the behavior of the neighboring, uncovered, Bello and Yeso glaciers. This presentation features data from the first of three monitoring seasons, and establishes differences and similarities in streamflow variability patterns in relation to local meteorology. Additionally, mass balance data inferred from ablation stakes is related to regional climatic conditions, which were especially dry during the 2013 accumulation season in central Chile, with the second driest year on record. The recorded information will be employed for parameterization of debris-covered glacier mass balance models, to be coupled with basin-wide hydrologic models for water resource assessment.