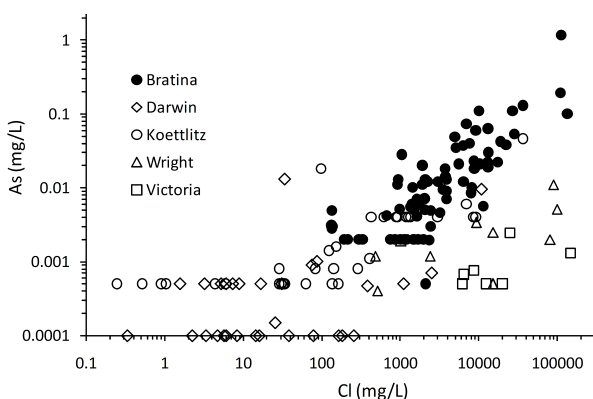


## Arsenic enrichment in pristine Antarctic meltwaters

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Arsenic concentrations of up to 1.17 mg/L have been found in a survey of pristine Antarctic meltwaters. The survey included seasonal meltwaters in ponds and large ice-covered lakes between 77°S (Wright/Victoria Valleys) and 80°S (Darwin Glacier) in Victoria Land. Meltwater composition ranged from dilute recent ice melt to highly saline brines, formed by successive episodes of evaporation and freeze concentration. Coastal ponds at Bratina Island (78°S) typically had the most elevated As concentrations, showing a positive correlation with salinity (Figure 1).



**Figure 1:** Meltwater arsenic and chloride concentrations for the 5 different Antarctic catchments included in the survey.

While arsenic concentrations are clearly elevated by the processes of pond evaporation and freeze concentration, enrichment is also moderated by the removal of dissolved As during this process. Geochemical modelling predicts precipitation of arsenopyrite under the anoxic, sulphidic conditions that prevail during winter freezing, and the formation of scorodite under oxic conditions in some ponds. In permanently stratified, ice-covered lakes, such as Lake Wilson (80°S), As is elevated in the more saline, lower water column. The As concentration profile across the oxic to anoxic transition at depth, reflects active removal processes and highlights key differences in the geochemical behaviour of As and other oxyanions; Mo and U.