

HYDROGEOLOGY OF THE COPIAPO RIVER VALLEY BETWEEN TRANQUE LAUTARO AND PIEDRA COLGADA, III REGION, CHILE

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The Copiapó valley is located in an arid region with prolonged periods of drought and infrequent rains of 10-80 mm/year. The sedimentary fill of the valley contains the main source of hydraulic resources. Due to a remarkable increase in the mining and agricultural activities during the last 15 years the groundwater demands have consequently increased. Dissolved species in the groundwater are controlled strongly by geogenic effects, and consist predominantly of $\text{SO}_4\text{-Ca}$. Concentrations of dissolved solids and CaCO_3 increased downstream, and surpass the Chilean norms for drinking and/or irrigation water in: SO_4 , B, total dissolved solid, and in few cases in Cl, Na, Fe, Mn, Mg. Acid rains and/or antropogenic accidents generate local contamination by As, Fe, Cu and Hg. The hydrogeological potential is concentrated in Quaternary unconsolidated deposits. Assuming 100 km length, near 1.88 km wide, 10% average storage and saturated thickness of 65 m (average depth of wells), the estimated volume of available groundwater reaches 1,220 Mm^3 . Reservoir losses of 28 Mm^3/year (1988-1997) indicate that in a hypothetical situation in which these reductions continue, the groundwater available will be consumed in 44 years. However, geophysical data show that the dammed groundwater potential reaches 2,586 Mm^3 . Preliminary isotopics determinations and hydrological data show that most of the groundwaters are renewable through rainfall and defrosting in the heads zone, and sporadic rains in the valley.