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Recharge and fluid circulation in hydrothermal systems in the South Andean Volcanic Zone, Chile.

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Subduction zones represent favorable environments for the development of convection-dominated geothermal systems. Within this context, in the Southern Volcanic Zone (SVZ) of the Chilean Andes both the volcanic and geothermal activity are spatially related to two regional fault systems: 1) the NE oriented strike-slip structures of the Liquiñe-Ofqui Fault System (LOFS), and 2) the mainly NW oriented basement structures of the Andean transverse faults (ATF). Regionally, the structural control given by the volcano-tectonic domains has been pointed out as a first-order factor in the chemical and isotopic composition of fluids [1][2]. The extensional geometry of the LOFS system, constitutes a permeability context that favors the vertical migration of fluids, promoting convection and fluid-rock interaction at depth [3]. On the other hand, the fluid chemistry associated with the LOFS-ATF intersection suggests lower permeability, and higher residence times of magmatic and hydrothermal fluids in the upper crust [2][4]. In this context, although the chemistry of geothermal systems is widely studied, its link with mixing rates and residence times of the waters in the geothermal reservoir is still unclear. Therefore, using a multi-isotopic approach (^{14}C, ^{3}H, CFC, and SF_6), we aim to evaluate the influence of the volcano tectonic configuration of LOFS and ATF on the circulation and recharge times of fluids in the geothermal systems of the SVZ. Preliminary results show that geothermal fluid samples present seasonal variations of CFC (CFC-11, CFC-12, CFC-113), SF_6 ,and ^{3}H. Radiocarbon data present a wide range of ages, consistently with the distribution of regional faults and the volcano tectonic domains.

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