

RENAAG
REUNION NACIONAL DE GEOTERMIA

**Bogotá
2018**

**Evidence of Mixing of geothermal fluids and
groundwater in the Quaternary Aquifer
in the Paipa Area, Boyaca, Colombia**

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AGEOCOL

ASOCIACIÓN GEOTÉRMICA COLOMBIANA



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INTRODUCCIÓN

MARCO GEOLÓGICO

METODOLOGÍA

RESULTADOS

DISCUSIÓN



INTRODUCCIÓN



SEQUÍA EN BOYACÁ

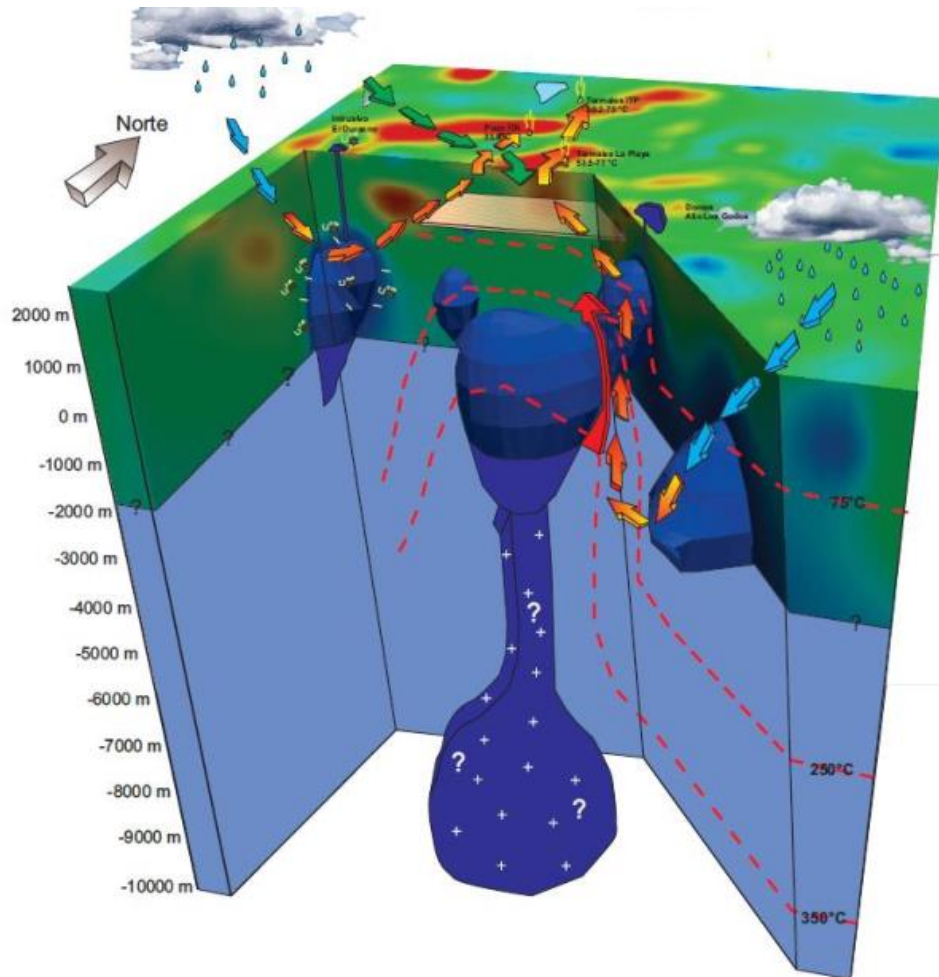
MANEJO RECURSOS HIDRICOS

MEZCLA

ALGORITMO M3



MARCO GEOLOGICO



GEOHERMAL SYST.
Fm. UNE (RESERVOIR?)
GRUPO CHURUVITA (CAPROCK)

AQUIFERS
FM. UNE, FM. LABOR Y TIERNA,
FM. TILATA, DEÓSITOS
CUATERNARIOS

Source: SGC (2017)



METHODOLOGY

DATASET

DIMENSION
REDUCTION
PCA

END-MEMBER
IDENTIFICATION

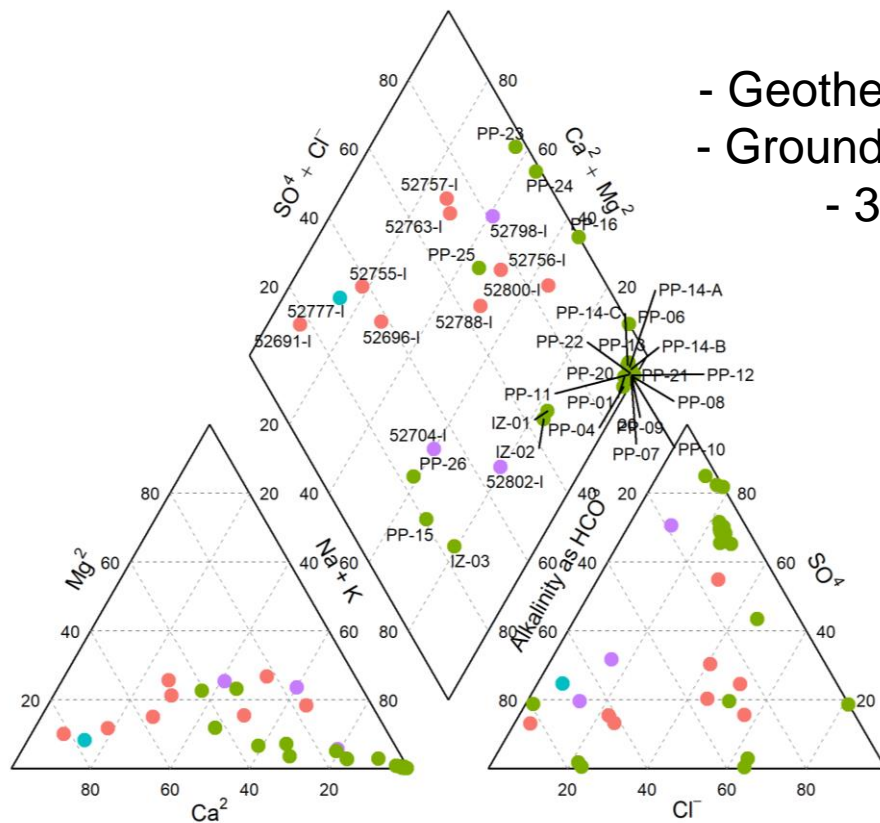
MIXING RATIO
CONSTRAINED LS



DATASET

Paipa: Geothermal and GW Samples

- Geothermal Samples (Alfaro, 2001)
- Groundwater Samples (SGC, 2017)
- 34 Samples, major ions

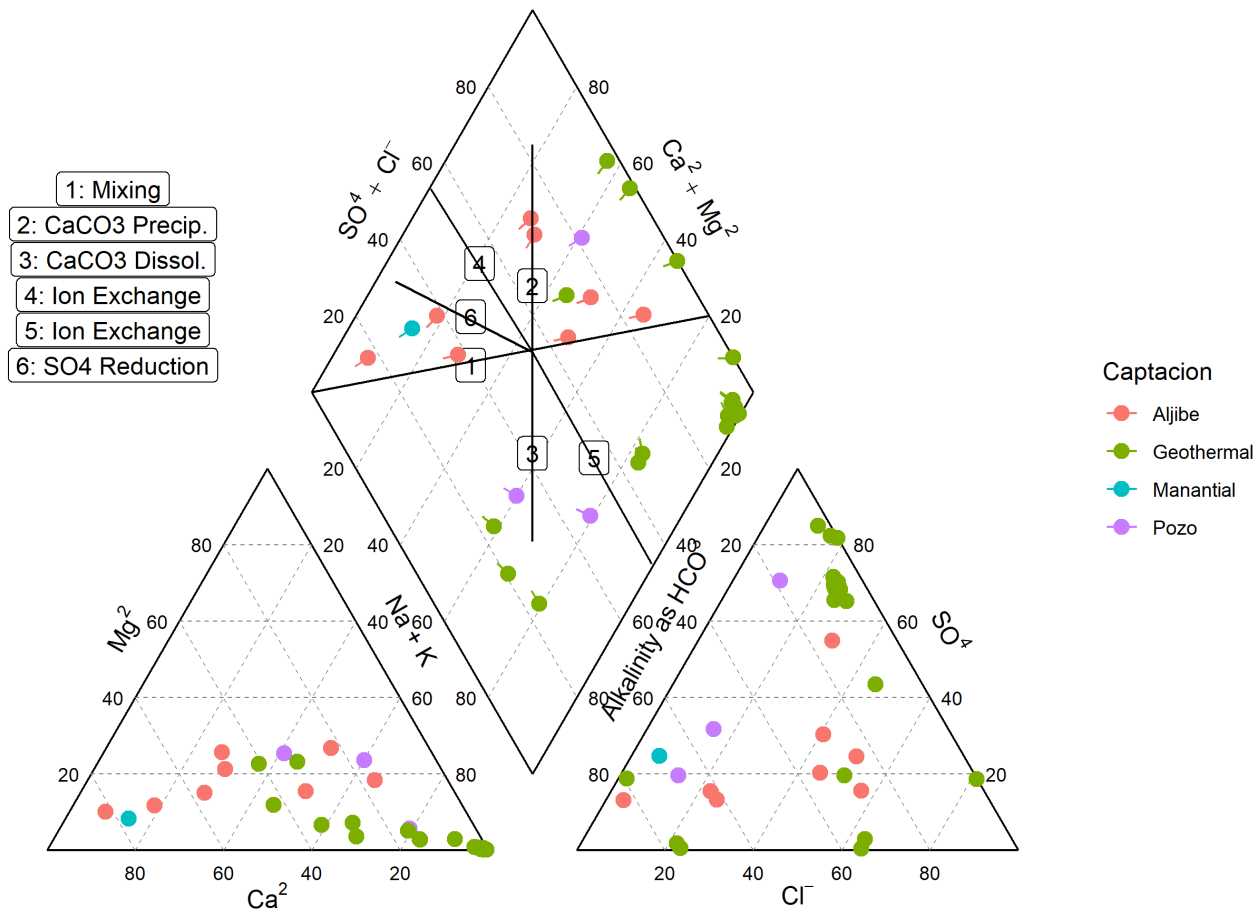


Captacion

- Aljibe
- Geothermal
- Manantial
- Pozo

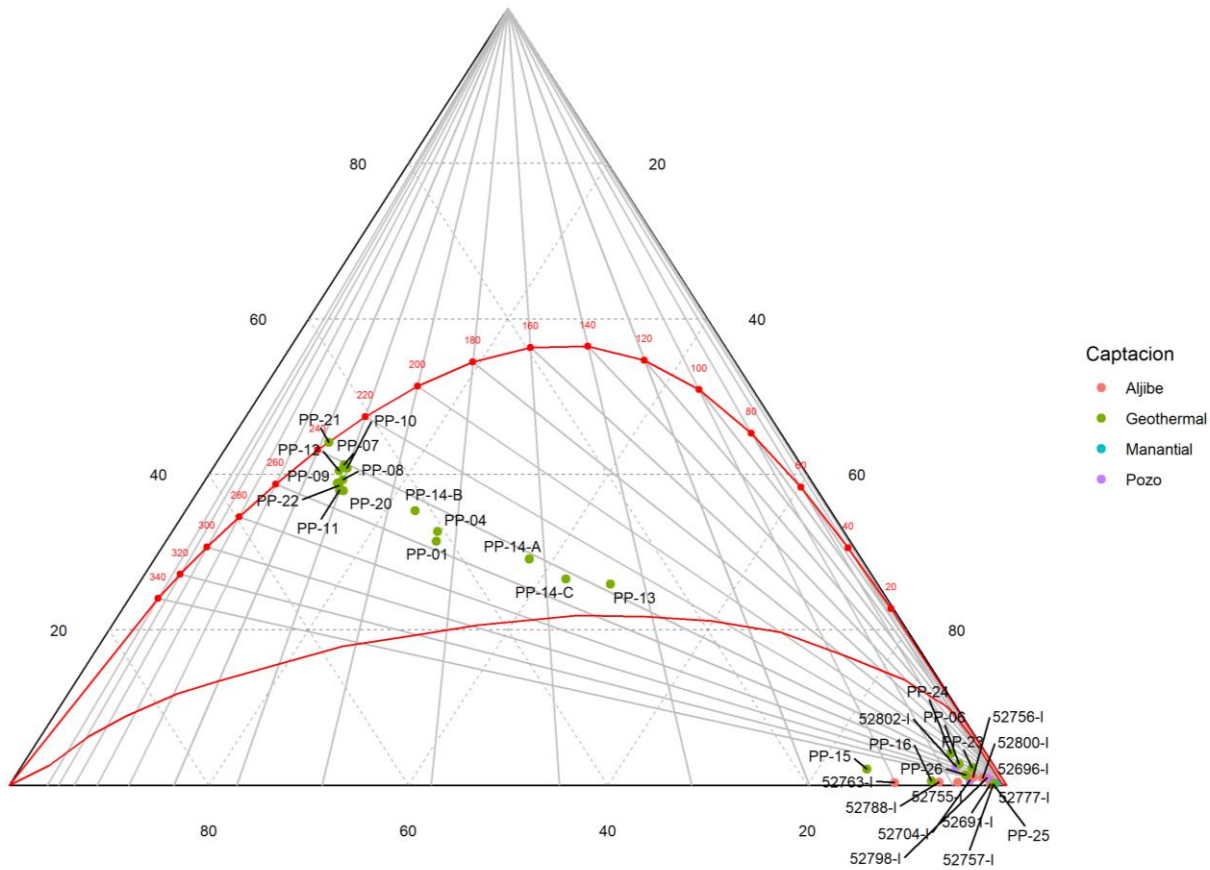
DATASET

Paipa: Geothermal and GW Samples



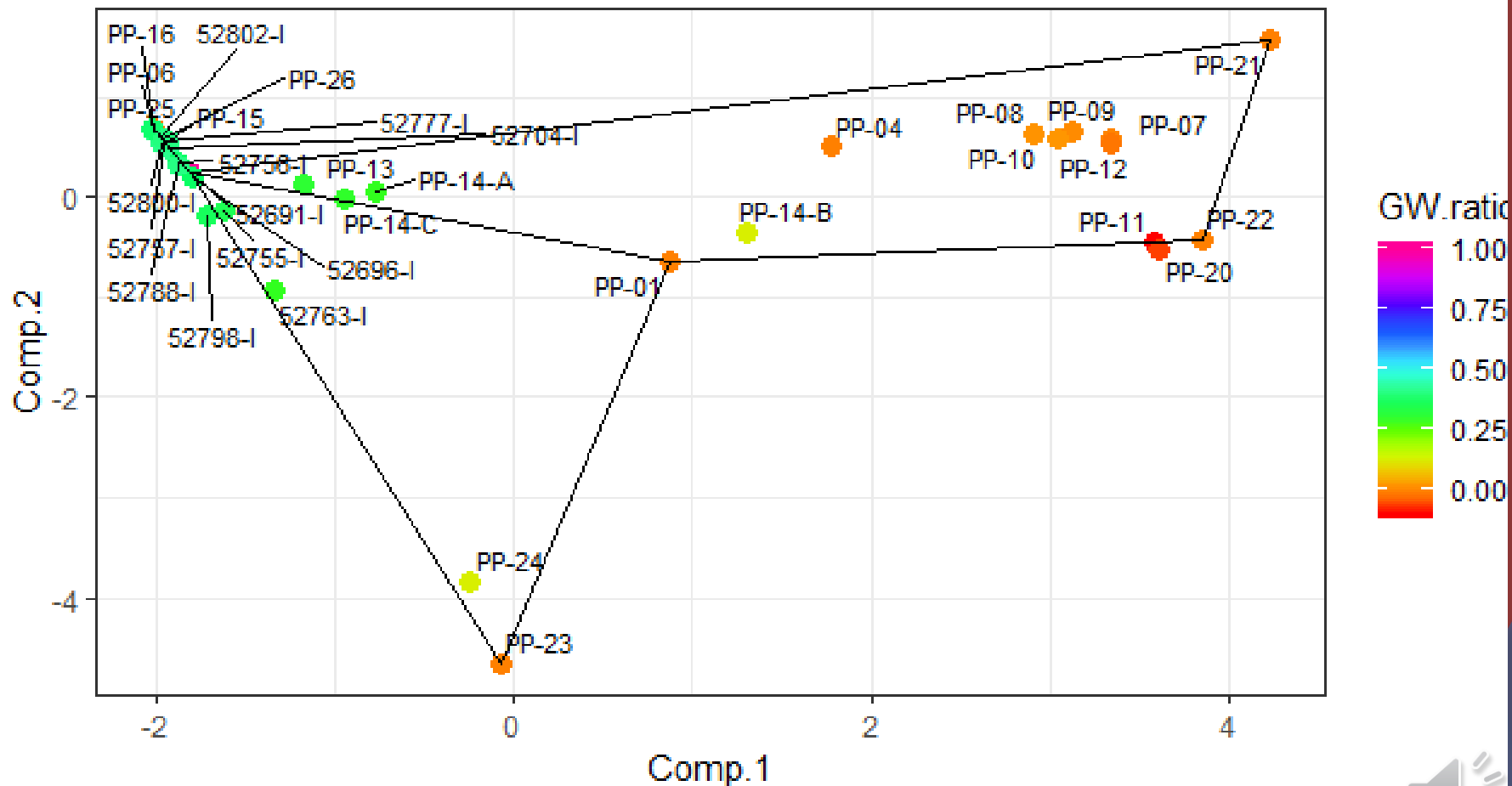
DATASET

Paipa: Geothermal and Groundwater System

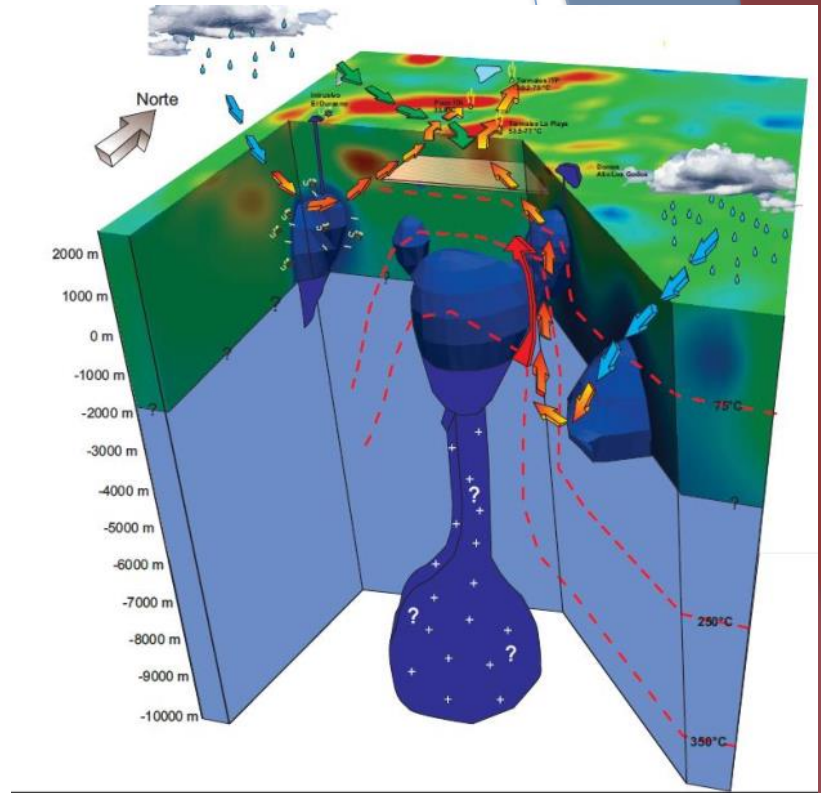
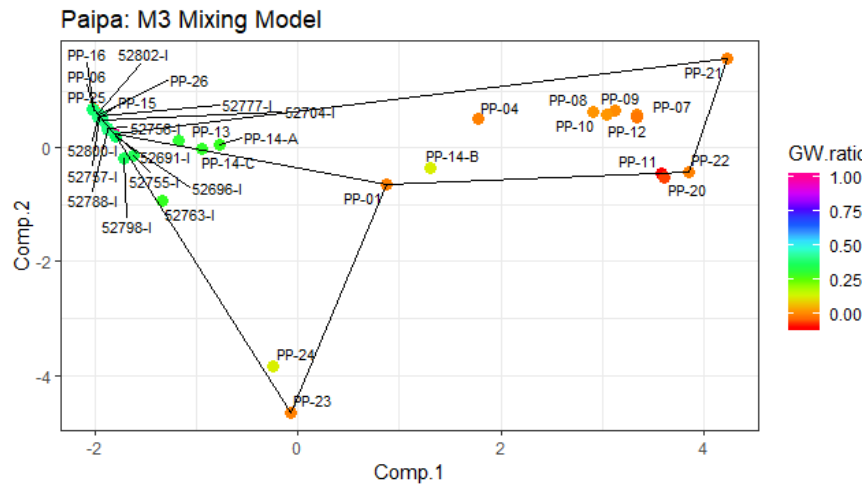


RESULTS

Paipa: M3 Mixing Model



RESULTS



Source: SGC (2017)



DISCUSSION

- MIXING GW AND GEOTHERMAL FLUIDS
- M3 MIXING APPROACH USEFUL IDENTIFY PROCESSES
- 2 GEOTHERMAL SYSTEMS (SHALLOW + DEEP)
- ADDITIONAL SOURCE CARBONATE (EVAPORITIC SORCE?)
- CHEMICAL TRENDS ARE VISIBLE





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