Session HS8.1.8
Water scarcity and management in dry regions: from groundwater to the vadose zone

EGU22-4017

Vulnerability of aquifers on volcanic islands: the case of La Palma and El Hierro (Canary Islands, Spain)

by

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Contents

ARSIONE project

- ARSINOE is financed by the European Commission with a total budget of 15 million euros
- Main goal:
  - Developing and implementing innovative climate change adaptation measures and solutions across Europe
- Web: https://arsinoe-project.eu/

Study case 5

- Located in Canary islands (Spain)
- ARSINOE will focus on the ecological transition and vulnerability of aquifers in volcanic islands
- ARSINOE will take into account the interdependence between water and agriculture

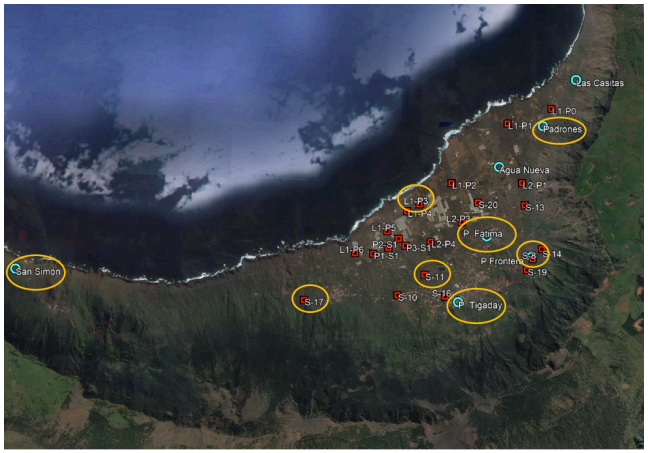
Study case 5: Methodogy

- Study of the aquifers on the islands of El Hierro and La Palma
- Creation of hydrogeological models of the two islands
- Simulation of different future climate scenarios Study of the vulnerability of the aquifers in these scenarios
- Transfer of knowledge to other island regions in Europe

Sampling in Hierro island

- The whole island is monitored
- Level, conductivity and temperature sensors
- Data is collected every two hours
- In parallel, work is being done on the geological and hydrogeological model with historical groundwater data for the island

Sampling in Hierro island

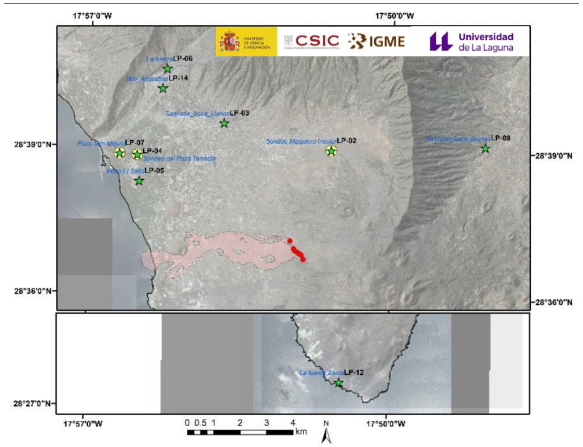


Sampling in Hierro island

Sampling in la Palma island

- During the sampling of the island of La Palma, a volcanic eruption occurred
- In addition to the sampling for the hydrogeological model, a study of ashes in the water was carried out

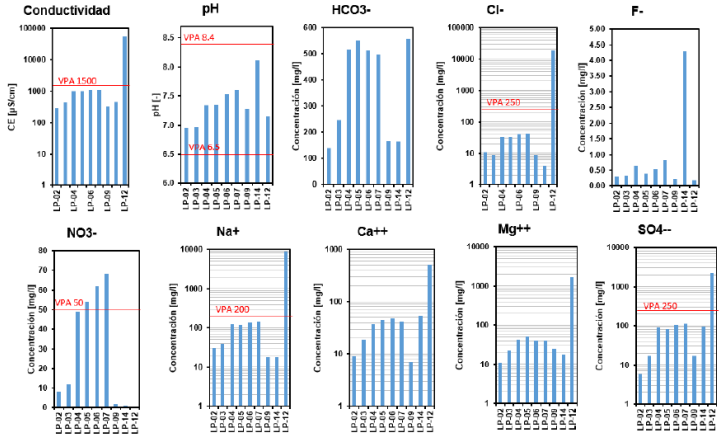
sampled boreholes and wells (La Palma)



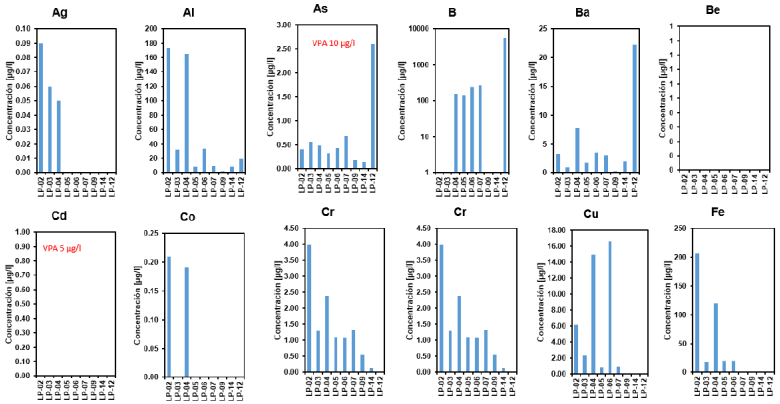
Physical parameters sampled in the field (La Palma)

Dia	Etiqueta	Nomre	Conductividad [µS/cm]	Temperatura [ºC]	pH [-]	Eh [mv]	Profundidad Nivel Freático [m]
18/10/2021	LP-02	Sondeo Matadero Insular	810	21.1	6.85	116.5	355.08
18/10/2021	LP-03	Trasvase_boca_Llanos	855	19.2	6.69	154.1	
18/10/2021	LP-04	Sondeo del Pozo Teniscla	1034	22.3	7.19	133.2	93.50
18/10/2021	LP-05	Pozo El Salto	1074	19.1	7.18	111.2	102.55
18/10/2021	LP-06	La fuerza	1117	20.6	7.43	117.3	11.85
18/10/2021	LP-07	Pozo San Miguel	1125	21.5	7.54	123.1	29.10
19/10/2021	LP-09	Trasvase_boca_Brenas	831	18.9	7.07	127.1	
19/10/2021	LP-12	La fuente Santa	15888	27.6	7.08	108.8	
19/10/2021	LP-14	Bco_Angustias	883	19.5	8.19	77.2	

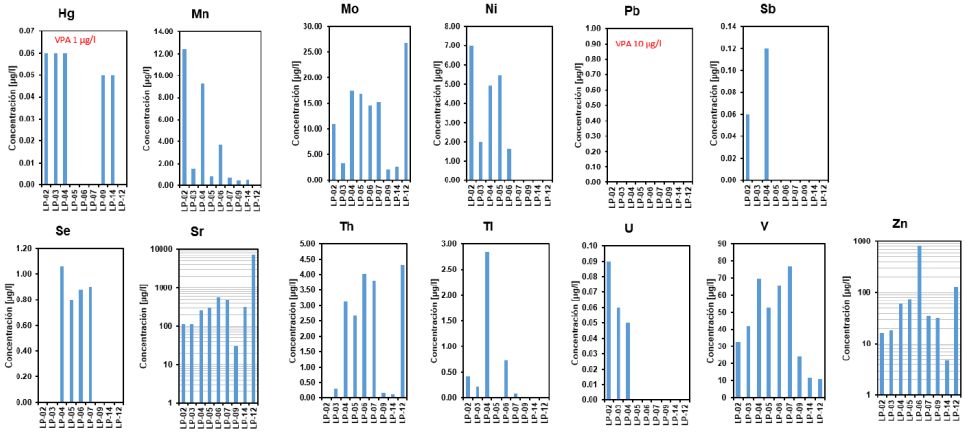
Chemical analysis of water samples (I)



Chemical analysis of water samples (II)



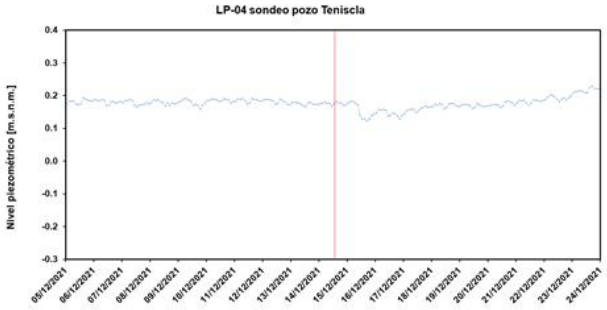
Chemical analysis of water samples (III)



Conclusions (La Palma)

- In the case of the island of La Palma, no effect of the eruption on water levels was observed
- Only a small drop in water level was observed at one of the points studied
- No effects of heavy metals in groundwaters were observed
- It is necessary to re-analyse the metals after the rainy season
- The aquifer is still being monitored
- The geological and hydrogeological model is under construction

Lowering of the water level, at the end of the eruption (LP-



Conclusions (Hierro)

- In the case of the island of El Hierro, the first results are expected in September
- The geological model of the island is now complete
- The hydrogeological model is being finalised with the island's historical groundwater data
- The model will be improved with data from the last campaign
- Simulations of climate change scenarios will begin at the end of the year

Video of the sampling carried out on the island of El Hierro

Video of the sampling carried out on the island of La Palma

More information & questions…

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THANK YOU