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Fog water collection in the hyper arid coastal Atacama desert (20°S). Differences, contrast and coincidence between different geographical locations

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Purpose: Fog water collection has been studied in the coastal Atacama, but mainly in separated or unique location, thus the main purpose of this research is to characterize and describe the fog water yields, from a seasonal to daily variability, comparing different geographical locations, which cover different distances to the coast and altitudes. The value of this research lies in the integration and synchronization in time of the different locations, allowing a better understanding of fog water as an alternative water resource.

Method: Five Standard Fog Collector (SFCs) conected to meteorlogical stations (2 Campbell and 3 Thies) and measuring records every 10 minutes were locatedin a transect from 750 m asl and 2.3 km from the coastline to 1.220 m asl and 10.75 km from the coast. Monthly fog water amount averages were contrasted and double checked with a reservoir backup. Statistical process were carry out, in order to characterize and compare the fog water yields and atmospheric variables. Comparison with remote sensing information and optical devices installed in the area (GOFOS) were also used to improve the trustability of the data.

Results: There is a clear seasonality in the area, with higher differences and oscillation from coast to inland. The fog water yields, as expected, decrease from west to east (5 l/m2/day coast to 1 l/m2/day inland). Daily cycle is also defined, being slightly different among he coastal and inland sectors (morning evening peak and evening only respectively). There is a relation in time between the events in the area, mainly below the inversion layer, over this, behavior look like is under other drivers.

Interpretation: Results show a defined spatial variation strongly related with distance to coast and elevation. Inversion layer seasonal variation also define different behavior and water availability. Daily cycle is also related with seasonality in terms of one or two water collection peaks in a 24 hours frame

Conclusion: The consideration and feasibility of the use of the fog water as an alternative resource implies an accurate quantification of its potential. The characterization and better understanding of how local geographic factors influence its potential is of great importance for a territory of hyper aridity. Especially if the water need are increasing and the production should be considerable.