

## **Fog water yields in the hyper arid coastal Peruvian desert**

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**Background.** The “The Chilean-Peruvian arid coastal fog ecosystems under climate change: understanding biosphere-atmosphere interactions to support biodiversity conservation (2016-2019)” project analyzes the relationship between fog and the Tillandsia which is the predominant bioindicator in the Atacama Desert in Chile and the Pampa del Toro Desert in Peru. The Pampa del Toro is a hyper arid coastal desert, located in the SW of Peru, 16° south, and receives annual rainfall of less than 5.0 mm but it has the possibility of fog providing humidity and water. The origin of this fog is the cloudiness of the Pacific Ocean anticyclone that becomes advection fog when it comes into the continent.

**Aim.** To study the spatio-temporal variation of the fog and the amounts of fog water collected.

**Method.** The hourly data from two standard fog collectors (SFC) connected to Thies automatic weather stations are analyzed. The Thies weather stations, measure the following meteorological parameters every 10 minutes: temperature, humidity, wind speed and direction, rain and pressure, humidity in the soil and the fog water collected in the SFCs. Both stations are installed 15 km from the coast, at 1,055 m and 980 m a. s. l. In addition, two other SFCs connected to Davis stations, located at 980 m and 1,080 m a.s.l., are used to delimit the capture potentiality of the upper and lower layers of cloudiness. The study period is from August 2018 to June 2019. We work on an event scale (a "fog event" here is defined as a continuous recording of water from fog within a 60 minute interval, so a fog event can last many hours, but which can be interrupted for 50 minutes for example, and then continue, OSSES, P. et al., 2018).

**Results.** In the preliminary analysis, there are notable differences in collection data between September, with only 5.6 L/m<sup>2</sup>, and October with 89.5 L/m<sup>2</sup>. The greatest presence of fog is from 4 to 9 a.m. and the lowest is during hours around midday. The environmental conditions change when there is fog: the temperature decreases 2°C and the wind speed goes down to 2 m/s. There are a mean average of 35 fog events per month. The fog events collect a mean average quantity of water of 30.0 L/m<sup>2</sup>; the longest event lasted 18 hours and 8.5L/m<sup>2</sup> was collected.

**Conclusions.** Knowledge concerning the behavior of the fog in this desert is of vital importance because it is practically the only available water resource for the survival of the existing ecosystem.