

Evaluation of climate variability and temperature extremes in the colombian Andes region.

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Introduction

The study of a country's thermal regime is one of the basic instruments to assess the appropriate actions to face consequences of climate variability. The approach used in this assessment, applies an objective method that allows the evaluation and planning of preventive measures to contribute with the reduction of health risks associated to the extreme thermal sensations in Colombia.

The results will be a valid and useful resource to show the benefits of climate research, while at the same time will facilitate the evaluation of different thermal adaptation patterns of the local populations settled in a relatively small territory, but with extraordinary diversity of geographic-natural regions and microclimates. They will also offer a wide set of observations that can contribute with the planning of climate change adaptation initiatives implemented by governmental institutions at the municipal level.

This work presents the first results to this novel approach to support national the development of national policies, due to potential improvement of health care strategies centered on the effects of extreme climate variation

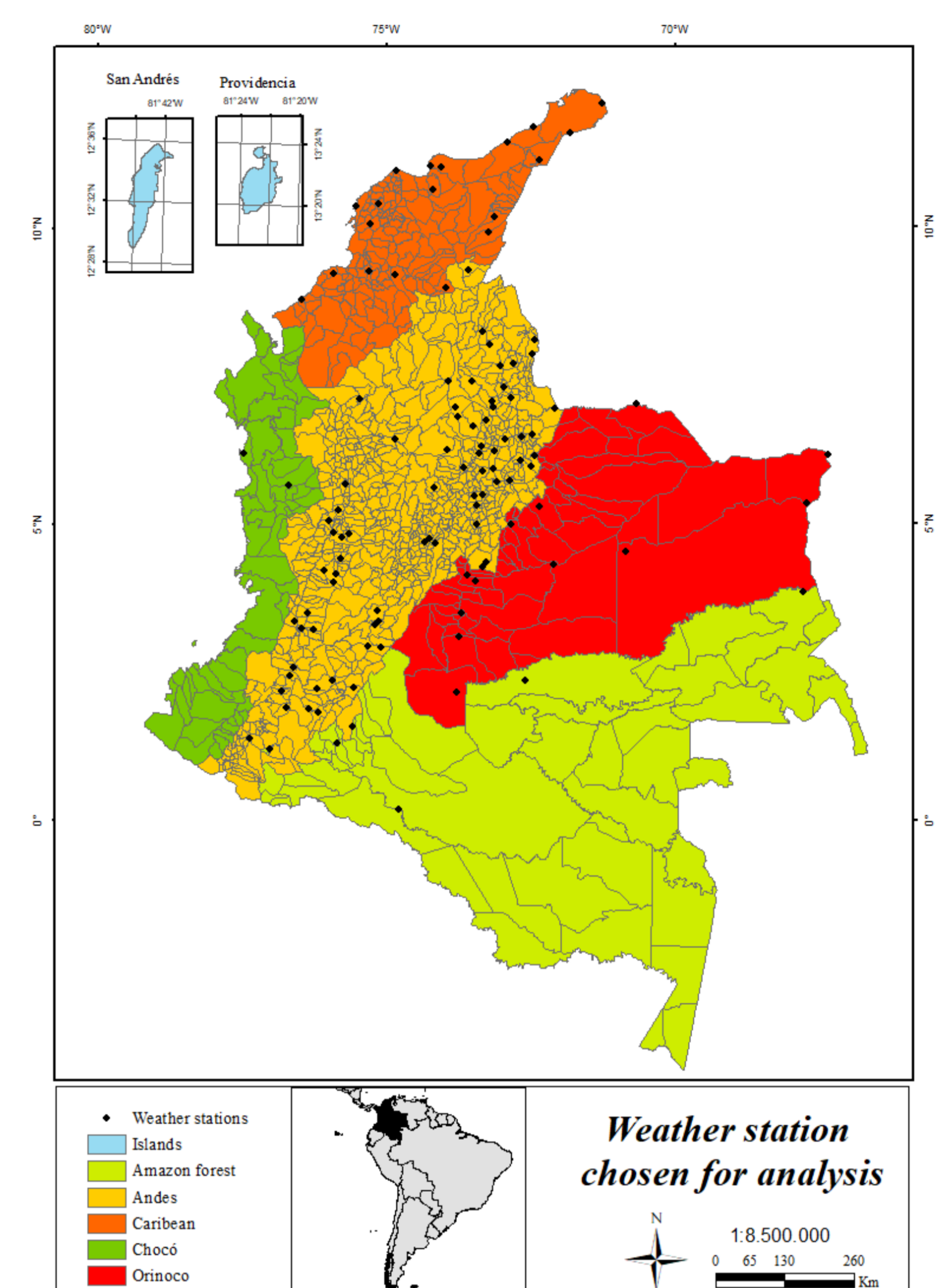
Materials and methods

- The analysis of daily extreme air temperatures considers a period of 30 years (1980-2015). A number of weather stations will be chosen out of the 450 distributed on the colombian territory with data for the studied period. This weather stations will be representative of the thermal regime of the five natural regions of the country.
- Characterization of the climate variability will follow the study of the max/min temperature complex by Lecha & Florido (1989). It consists on the preparation of a contingency table that shows the simultaneous behavior of the maximum and minimum daily temperature values. As shown in figure 1.

Minimum	Maximum	<=10	<=15	<=20	<=25	<=30	<=35	>=35
		1	2	3	4	5	6	7
>25	A					A5	A6	A7
<=25	B				B4	B5	B6	B7
<=20	C			C3	C4	C5	C6	C7
<=15	D		D2	D3	D4	D5	D6	D7
<=10	E	E1	E2	E3	E4	E5	E6	E7
<=5	F	F1	F2	F3	F4	F5	F6	F7
<=0	G	G1	G2	G3	G4	G5	G6	G7
Legend		Description						
		Very hot. Intense sensation of sofocating heat.						
		Hot. Little thermal oscillation.						
		Hot. Great thermal oscillation.						
		Comfortable.						
		Cold and very cold.						
		Special						
		Non observable.						

Results

- A hundred and thirteen (113) weather stations were chosen out of the 450 available for the time period between 1980 and 2015. Of this, sixty five (57%) are localized in the Andes region. Six (5%) in the Amazon forest, eleven (10%) in the Orinoco region, twenty two (19,5%) in the Caribbean, eight (7%) in the Chocó or Pacific region and one (1,5%) in the islands region.
- The distribution of the weather stations follows the distribution of the population of the country. According to Perez (1989), 80% of the colombian population lives in the Andes region of the country. The IDEAM (2014), also acknowledge this fact and attributes it to the need of assessing natural resources in productive ecosystems, risks to natural hazards as floods and air quality.
- Thirteen (11%) of the chosen stations are localized above the 2000 meters over the sea level and the lowest temperature registered is $-9,8^{\circ}\text{C}$ in the center of the Andes region.
- Twenty two (19,5%) of the station are localized above 100 meters over the sea level and the highest temperature registered was 40°C in the Caribbean región.



Conclusions

- The results are a valid and useful resource to show the benefits of climate research, while at the same time facilitate the evaluation of the different thermal adaptation patterns of the local populations settled in a relatively small territory, but with extraordinary diversity of geographic-natural regions and microclimates.
- There is difficulty in the analysis of temperatures extremes in Colombia due to the lack of metadata for the available data from the weather stations. The first approach to the analysis of this data shows multiple stations with big gaps of data, marked differences between the time periods available and the list of information made available by the IDEAM.

Literature cited

PEREZ PRECIADO, A. Atlas y Geografía de Colombia. Bogotá: Lectores, Circulo de, 1989.

LECHA, L.; FLORIDO, A. Principales características climáticas del régimen térmico del archipiélago cubano. La Habana: Ed. Academia, 1989.

Acknowledgements

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