Evaluation of climate variability and temperature extremes in Colombia: Opportunities for the outlining of climate change and human health adaptive strategies.

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Introduction
Climate change acts as a multiplier of existing human health problems (MCMICHAEL & WILCOX, 2009). Therefore, the need arises to create measures to improve the population’s adaptive capacity to deal with human health risk associated to extreme meteorological events. Colombia already has public policies aiming to develop climate change adaptation plans. However, these policies do not include the need to outline specific adaptive strategies for the public health sector.

We show the application of an objective method that allows the creation of baseline knowledge of climate series in Colombia. This definition of the thermal regime for the country will be contrasted with a social vulnerability analysis and epidemiological data to obtain a wide set of observations to contribute to the planning of climate change adaptation initiatives implemented by governmental institutions in the country at the municipal level.

Methodology
Overall the research plan contemplates 3 defined steps as follows.

1. Climate variability analysis
2. Social vulnerability analysis
3. Statistical analysis

Step 1 (Climate variability analysis) is the subject of this presentation.

Results
1. Weather station selection.
   - Forty-three (43) weather stations were selected for the analysis of types and subtypes of the temperature regime in Colombia over the 2010-2015 period.
   - Observation of multi-annual daily temperature showed little to no tendency overall.
   - As seen in figure 1. A hundred and two (182) weather stations were selected for the analysis of types and subtypes of the temperature regime in Colombia over the 2010-2015 period.

2. Characterization of climate variability
   - Lecha (1994) methodology consist on the analysis of relative frequencies using a contingency table to combine the simultaneous behavior of maximum and minimum temperatures of recorded data over a selected period of time.
   - The table is split in 3°C intervals that serve as subdivisions that generate climatic categories, types and subtypes.

Vertical temperature patterns
As seen in figure 2., costal zones (Caribbean and Pacific regions) and the Orinoco plains (a.k.a “Los llanos”) of Colombia are characterized by very warm days (A5, A6 and B5 categories) with different types and subtypes depending on the local geographic factors. The Andes are characterized by comfortable and fresh days (C3, C4 and D3, D4 categories) in middle altitudes and cold (C2, D1, D2 categories) and very cold (all of E and F categories) days in high altitudes (>2300 m.a.m.s.l).

Conclusions
The method gives a detailed characterization of the variability of temperatures over the territory. Given the flexibility of the tool, it’s possible to make a better analysis for the regions of specific interest.

The general analysis shows a pattern of temperature variability that follows the expected variation of a vertical temperature gradient. However, the results show the areas over the territory where the transition occurs. The Andes region, where more than 60% of the population is located, presents the biggest frequency of comfortable or fresh days. However, the biggest city in the country (Bogotá) is located at 2600 m.a.m.s.l, region of transition between comfortability and cold or too cold days.

References

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