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Analysis of some properties of the Intense Cold Conditions in Havana

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Materials and Methods

The study period comprised a series of 38 years, from 1980 to 2018. The climatological data used included the following parameters: air temperature, relative humidity and wind speed, measured at 0700 and 1300 hours of the 75º W meridian in the months of the winter period in Cuba.

Meteorological stations in the province of Havana.

Materials and Methods

The Intense Cold Condition (ICC) was enunciated by Velázquez (2019) who defined it as "that condition where, subjectively, thermal sensations due to excessive cold prevail throughout the day or in a considerable part of it, either due to its intensity, duration or by a combination of both characteristics".

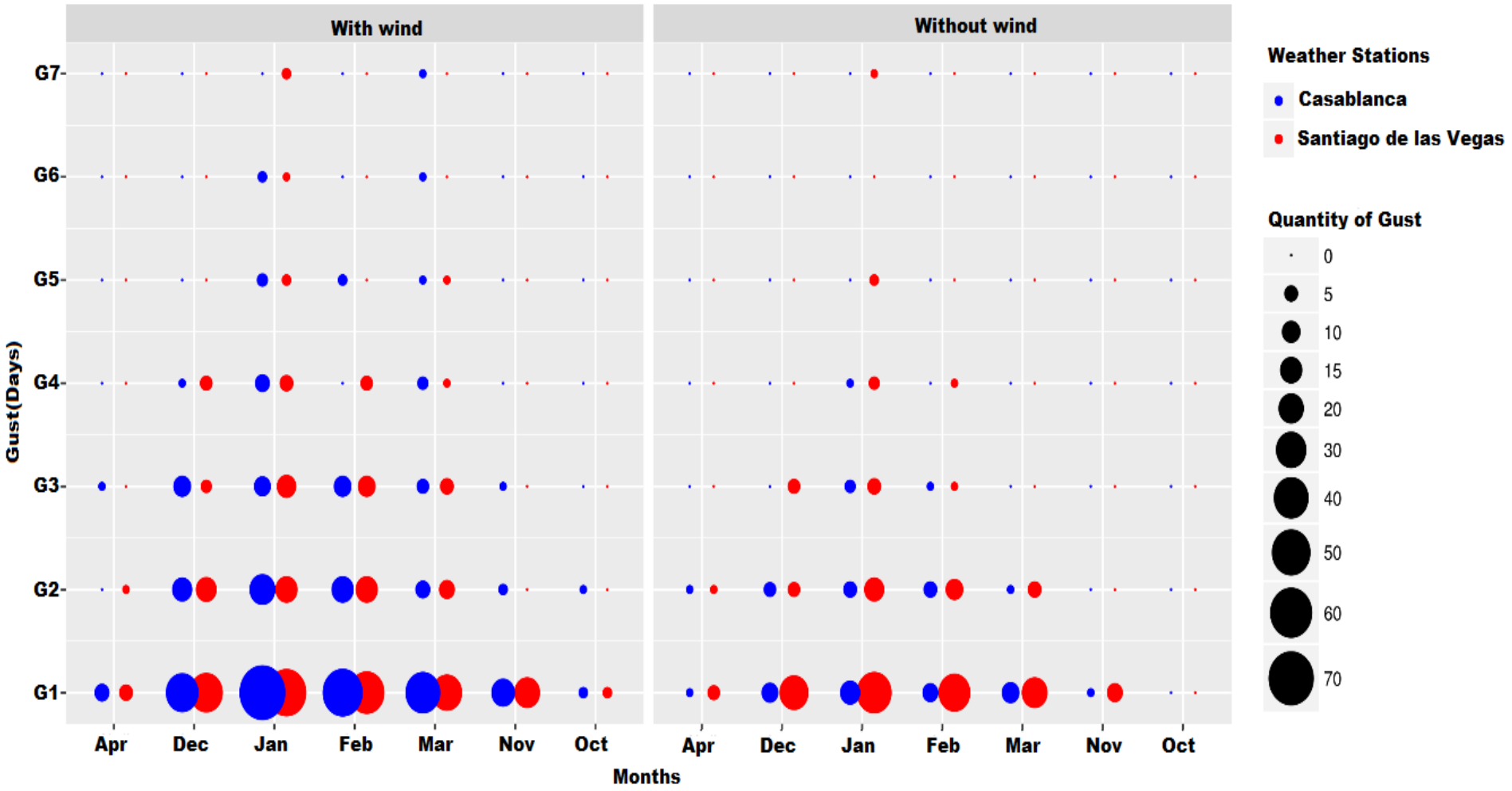
The ICC without wind illustrates the presence of thermal sensations from Very Cold to Comfortable, based on the TE values at 7 and 13 hours, which take into account only the combined effect of relative humidity and air temperature.

The ICC with wind represent the occurrence of Very Cold to Comfortable sensations, starting from the EET values at 7 and 13 hours, based on air temperature, relative humidity and wind intensity.

ET/EET 1:00 pm / ET/EET 7:00 am	Comfortable	Slightly cold	Cold	Very Cold
Comfortable				ICC_1
Slightly cold				ICC_2
Cold			ICC_3	ICC_4
Very Cold	ICC_1	ICC_2	ICC_4	ICC_5

Classification of the CFIs (without wind and with wind) by categories.

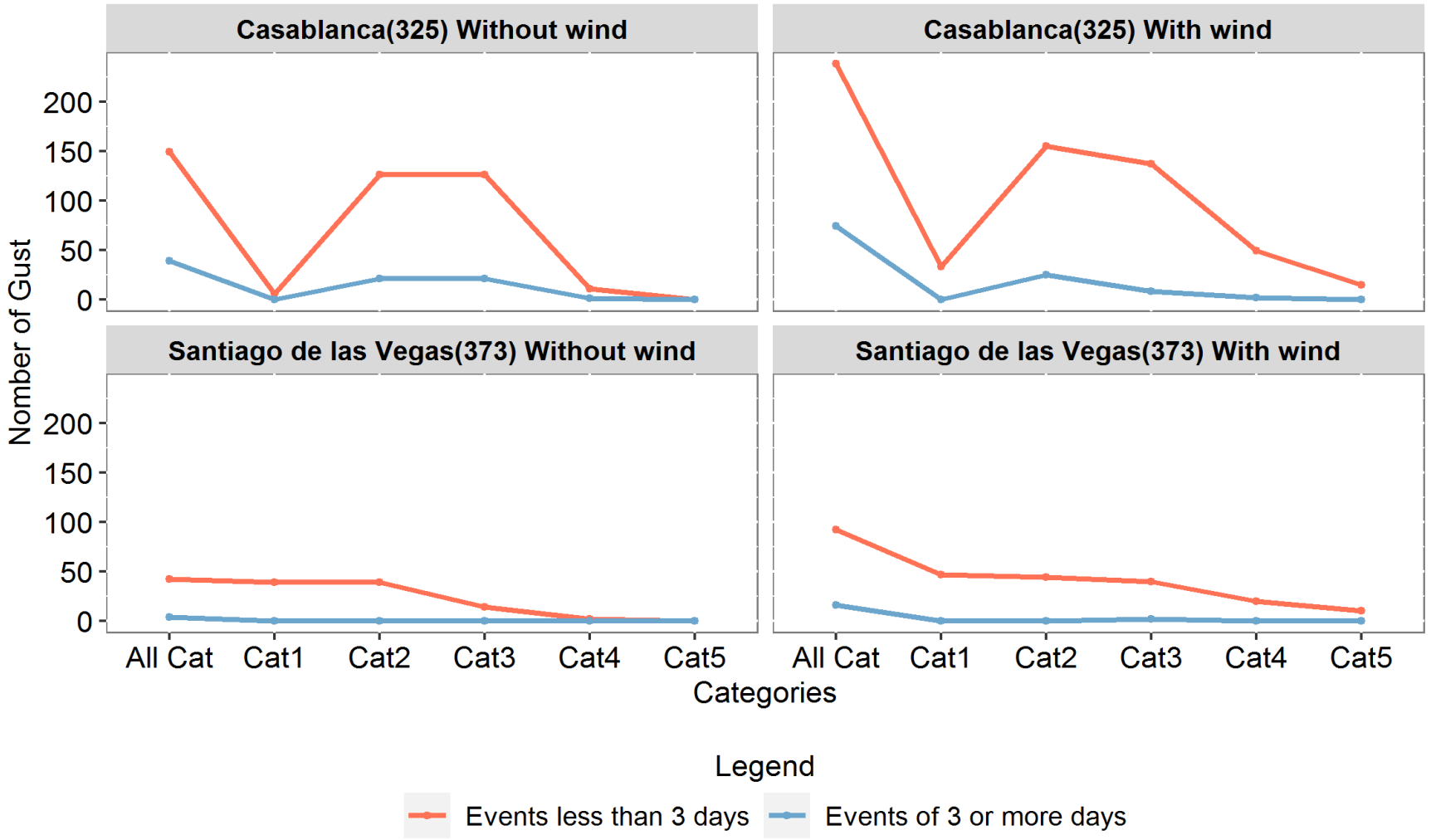
Results and Discussion



Gusts of days with ICC in the two study stations.

The highest number of gusts of days with ICC occurred in the months of January and February, both for ICC without wind and ICC with wind. Values of up to 7 consecutive days (G7) were reached with the presence of IFC, although gusts of 1 day (G1) predominated, that is, the manifestation of the event in isolation over time

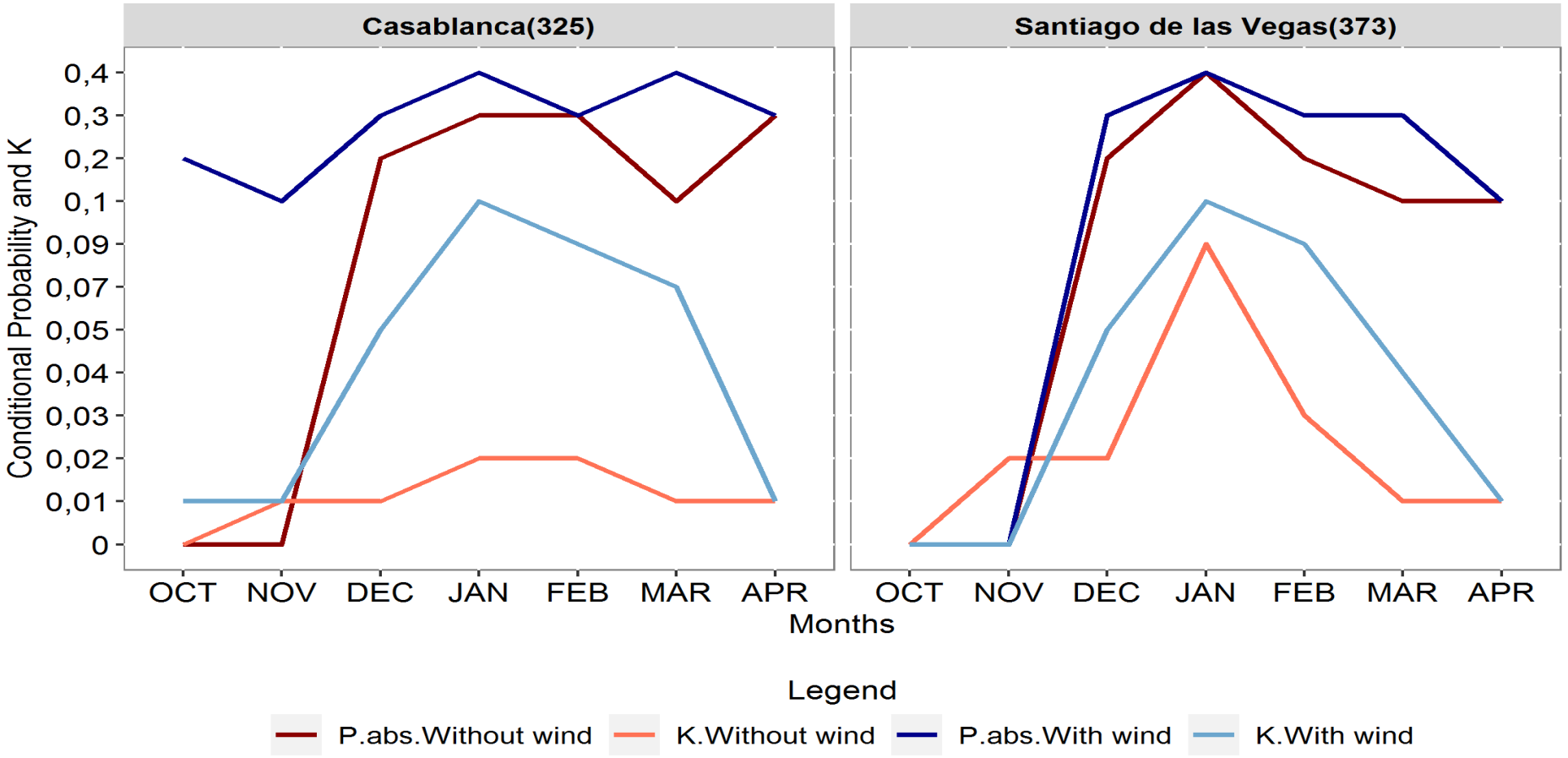
Results and Discussion



On the other hand, the gust that most prevailed in both seasons and variants was that of 1 day, which shows that isolated and non-consecutive events occurred in most cases, while those greater than 3 days are fewer cases. It also highlights that category 5 only presented gusts of 1 day in the windy variant, while categories 2 and 3 are the ones that presented the highest number of events both with and without wind

Number of gusts of more than 3 days or not: without wind (left), with wind (right).

Results and Discussion



The difference between the two variants (with and without wind) is notorious, reaffirming how decisive the role of the wind was when it came to increasing the probability of occurrence of storms. days with ICC, in addition to being evident the greater persistence of the phenomenon in the January-February two-month period.

Persistence and probabilities in the variant without wind and with it, for the two study stations.

Conclusions

- Through the selected statistical characteristics, it was possible to obtain additional information on the behavior and manifestations of the Intense Cold Condition in the province of Havana, laying the foundations for later research to extend its use to other provinces of the country.

- The persistence values of the phenomenon become less appreciable as the gusts increase, which shows that these events are generally circumscribed to periods of a few days.

- There are high values of persistence of the phenomenon in Havana during the months of December to February, being more likely in the windy ICC, representative of the worst bioclimatic conditions, although this phenomenon is characteristic of occurring in isolation.

THANKS A LOT