DEVELOPMENT OF A SEASONAL OPERATIONAL FORECAST OF EXTREME TEMPERATURES FOR ARGENTINA

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CONICET

Introduction

Several socio-economic sectors are sensitive to the occurrence of extreme climate events.

OBJECTIVE: disseminate to the scientific community an operative probabilistic seasonal forecast of extreme temperature indices in Argentina (north of 40°S)

NEW NEW NEW NEW

Data

The predicted variables are the extreme climate indices:

Cold nights (TN10p)	Percentage of days in a month when daily minimum temperature is below the 10th percentile
Warm days (TX90p)	Percentage of days in a month when daily maximum temperature is above the 90th percentile

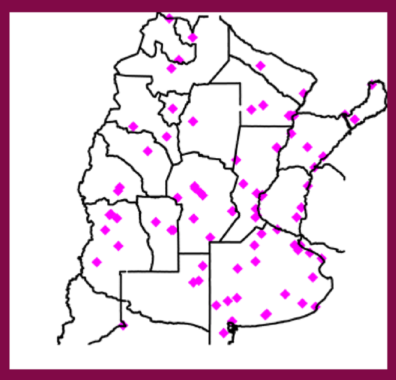


Fig 1 Stations where the forecast is made

The predictors represent the main modes of climate variability, regional atmospheric circulation, soil moisture, among others. These are obtained from NCEP Reanalysis 1 dataset, NOAA climate indices, and Sistema de Información para Sequías para el sur de Sudamérica.

Methodology

Several predictors and statistical techniques were considered for the modeling of extreme temperatures. Some of these methodologies apply variable selection or dimension reduction.

Training 1970-1999 → Testing 2000-2015 → Operative 2018-Present

Climate forecasts are usually represented as categorical events with three possible categories based on climatologically observed terciles since atmospheric predictability at sub-seasonal and seasonal time scales is limited (Karpechko, 2015).

Below normal | Near normal | Above normal

Interpolation of the probabilistic forecast

To have a product comparable with the large seasonal forecast centers, the spatial interpolation of the percentage assigned to the most likely category was carried out. The technique used for interpolation was the Inverse Distance Weighting (Philip & Watson, 1982; Watson & Philip, 1985).

Forecast verification

In the testing period a wide range of score were calculated. These metrics are able to evaluate different attributes of forecasts such as bias, discrimination, resolution, and reliability.

In the operative period

- **Good** — The observed category was the same as the one assigned the highest probability in the forecast
- **Regular** — The observed category was the one assigned the second-highest probability in the forecast
- **Bad** — The observed category was the one assigned the least probability in the forecast.

Conclusions

Especially for the mid-latitudes, users of seasonal forecasts should be aware that the skill of seasonal forecasts is substantially lower than weather forecasts, and this skill varies considerably with the region, season, the variable being forecast, and previous ENSO phases.

The predictability of extreme temperatures in the study region increases with previous La Niña events

This forecast, developed at the University of Buenos Aires, is updated monthly and is freely accessible through the institutional website

The forecast is shared at monthly meetings organized by the Argentine National Meteorological Service and attended by different users.

The accuracy rate obtained with this product exceeds a forecast based on climatology, i.e., despite the uncertainties, our forecasts provide additional information to users for decision-making

Results

Seasonal forecast of extreme temperatures

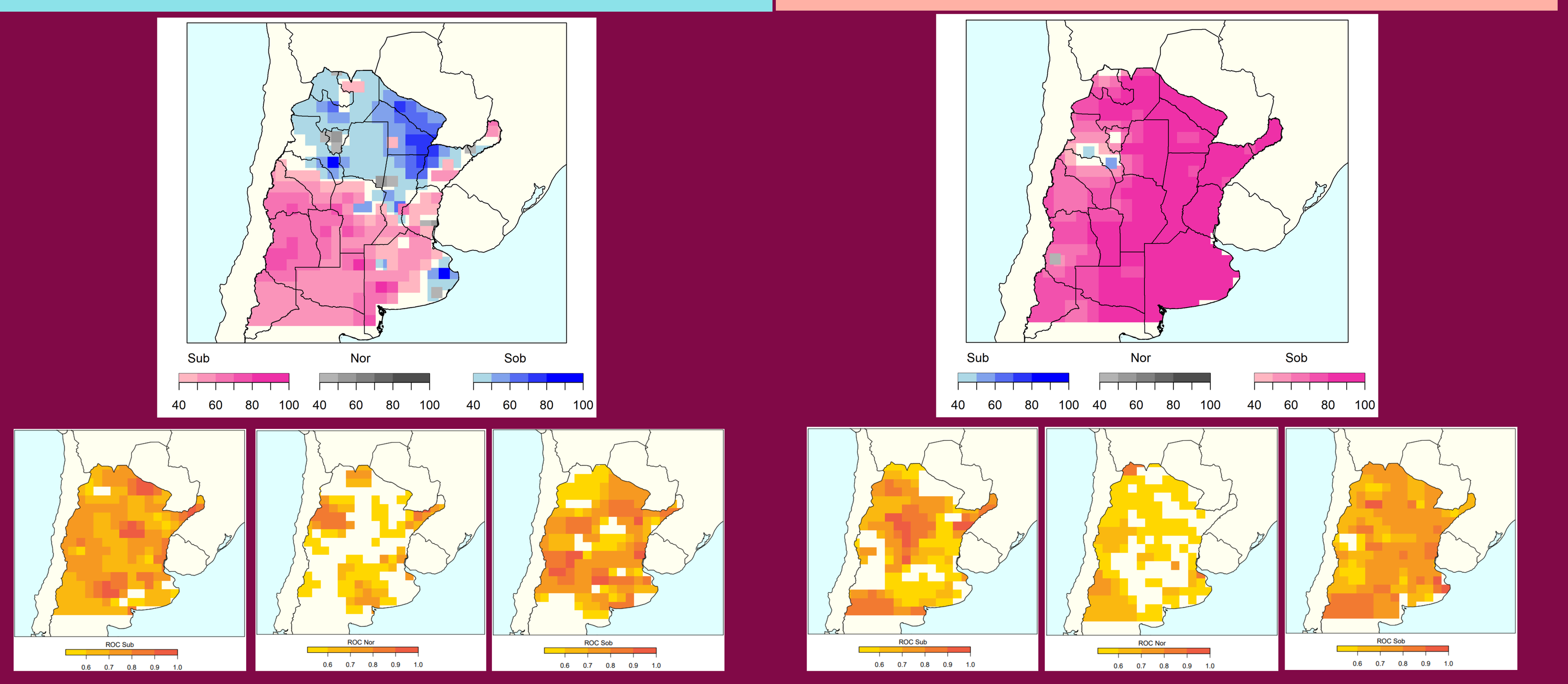
http://pronosticosextremos.at.fcen.uba.ar

- General information
- Seasonal forecast
- Verification
- Contact information

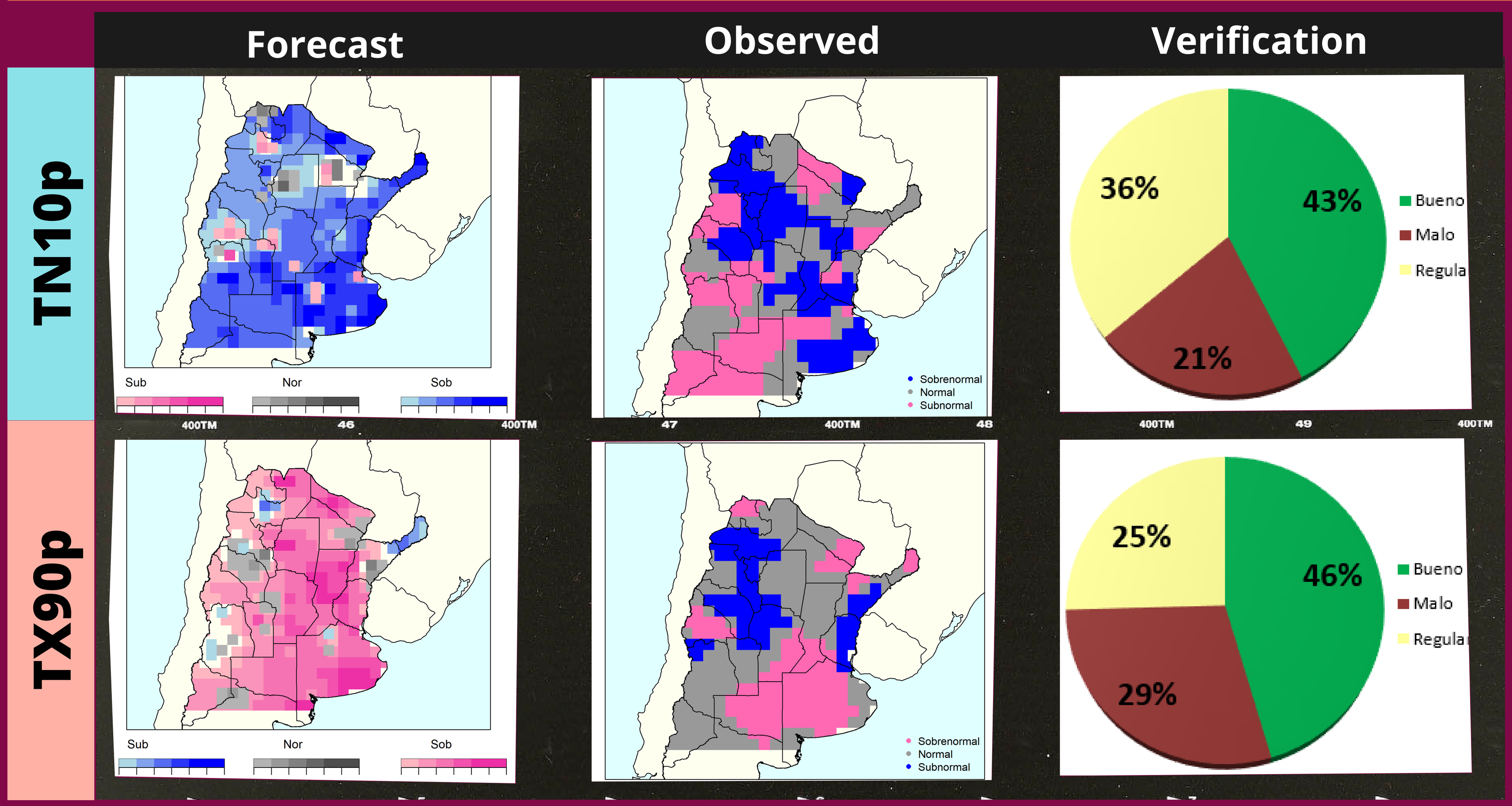
Fig 2 Screenshot of the webpage http://pronosticosextremos.at.fcen.uba.ar

Forecast for NDJ22

TN10p	TX90p



Verification of JAS22



Verification according to the previous ENSO phase

The forecasts for the DJF18-MJ18 seasons (6 seasons) were made under La Niña phase in the previous season, the JJA18-NDJ18 seasons (6 seasons) with previous neutral conditions, and the DJF19-JJA19 seasons (7 seasons) with a previous El Niño phase.

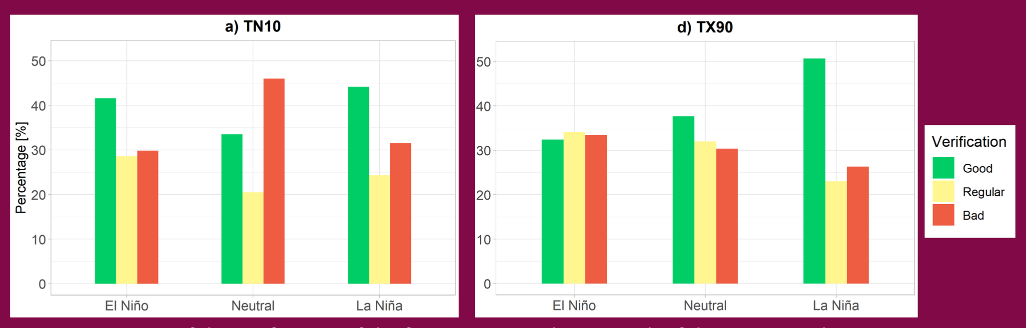


Fig 3 Average of the verification of the forecasts according to each of the previous phases of the ENSO.

COMING SOON

New advances in the seasonal forecast of temperature extremes in southern South America are being made in the framework of the international CLIMAT-AMSUD project

The forecast region is extended to all southern South America

Deep-learning methodologies are being tested

References

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Acknowledgments

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