Seasonal Forecast Skill of ENSO Teleconnection Maps

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See Full Paper for More Information

Lenssen, N., L. Goddard, and S. Mason (2020), Seasonal Forecast Skill of ENSO Teleconnection Maps. *Weather and Forecasting*

Code and data available at github.com/nlenssen/ENSOImpacts

La Niña and Rainfall

La Niña conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. The regions and seasons shown on the map below indicate typical but not guaranteed impacts of La Niña. For further information, consult the probabilistic information* that the map is based on.



2. Mason and Goddard, 2001. Probabilistic precipitation anomalies associated with ENSO, Bull, Am, Meteorol, Soc. 82, 619-638

Climate Services



Increasing Forecast Complexity

Increasing Forecast Complexity

No Forecast

No Forecast



Increasing Forecast Complexity



No Forecast

30-Year DJF Precipitation Climatology



DJF climatological precipitation [mm/month]

Increasing Forecast Complexity



Forecast of DJF Seasonal Precipitation







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- (3) How does the historical IRI seasonal forecast compare with the ENSO-based forecasts?
- (4) Is climatology an *optimal* reference forecast for assessing state-of-the-art dynamical forecasts?

Historical DJF Seasonal Precipitation During La Niña



ENSO-Based Forecasts Summary

Deterministic, Known-ENSO

During ENSO conditions:

- Locations with significant anomalies issued 100% forecasts During neutral conditions:

- All locations issued climatological forecasts

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Probabilistic, Known-ENSO

During ENSO conditions:

- Locations with significant anomalies issued the probability of anomaly

During neutral conditions:

- All locations issued climatological forecasts

Mean Tropics Skill



Glossary

Forecast "Usefulness"

Resolution: Does the outcome differ given different forecasts? **Discrimination:** Do the forecasts differ given different outcomes?

Forecast Bias

Reliability: Does the outcome occur as frequently as forecasted?

Comparison of Forecasts

Skill: How does a forecast perform relative to a reference forecast?

Mean Tropics Skill



Aggregated Tropics Verification



Mean Tropics Resolution

Aggregated Tropics Verification

Mean Tropics Reliability



Spatial Patterns of Skill

IRI Forecast RPSS



Spatial Patterns of Skill



Probabilistic Known-ENSO EBF RPSS

Alternative Reference Forecast



IRI Forecast RPSS (EBF reference)

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Is climatology an "optimal" reference forecast for dynamical forecasts?

- To discuss further!

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Bonus Slides

Alternative Reference Forecast



Aggregated Tropics Verification



Probabilistic Known-ENSO EBF Tropics Reliability

Aggregated Tropics Verification

IRI Forecast Tropics Reliability



Probabilistic Known-ENSO EBF Tropics Reliability