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Climate Predictability at Decadal Scale in Chile

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Abstract

The Chilean economy depends strongly on its climate; about 10% of its gross domestic product comes from natural resources that depend on climate and a third of its electricity supply depends on hydrology. In addition, periods of flood and drought affecting the country have resulted in significant economic losses and have a direct impact on the population.

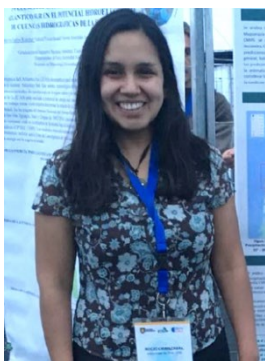
One example is the recent long- period of drought, known as the "Mega drought", that has affected the central part of the country for



the last eight years, a phenomenon that has had a direct impact on Chile's agricultural and wine production. It is for these reasons that the knowledge of the near-future climatic trajectory at decadal time-scales would allow both companies and governmental institutions to formulate public policies and develop strategies to reduce the possible negative impacts of climate variability and change in Chile. The aim of this work is to advance our understanding of decadal climate predictability and improve our tools for the forecast quality assessment, in the framework of a two months internship in BSC.

In this study we will review the main climate circulation patterns over Chile, with the objective to understand the dynamical mechanisms and processes responsible for climate variability and predictability, and we will analyze the predictive capacity of decadal prediction systems to forecast precipitation and temperature in Chile, in comparison with the non-initialized simulations that only contain the external forcing of the climate system. To achieve this goal, probabilistic and deterministic forecast verification scores are used to evaluate the added value of initialization, that is, phasing our models with the observed climate state. To the best of our knowledge, this is the first effort looking into this subject in Chile.

Short bio



Rocío Ormazábal obtained her Geophysical degree in 2016 at the University of Concepcion, where her interest in atmospheric sciences began. During most of her undergraduate studies she participated as research assistant in different projects related surface hydrology and regional numerical modeling (WRF). Rocío currently is in her second year of Master of Meteorology and Climatology at the University of Chile, and doing the master thesis funded by the Center for Climate and Resilience Research (CR2), where she's also participating as research assistant since 2016. Her main research interest is the understanding of climate dynamics using Global Climate Modeling (GCM). Developing this new topic in Chile and in particular the near-term climate predictability has been her main objective during this last time and is also part of her thesis work. In addition, Rocío has investigated statistical methodologies for the management and comparison of observations, reanalysis elds and climate models, as well as the climatic variability that has an influence on the climate of Chile, in particular oscillations of decadal and interdecadal timescales that affect the temperature and precipitation. In parallel with the research and studies carried out, scientific dissemination has been an issue that she has actively developed since my undergraduate

training, teaching students on different topics related to atmospheric sciences. These activities have constantly motivated her to continue in research and thus contribute to the Chilean society with advances that are relevant for the community, as the near-term climate prediction.