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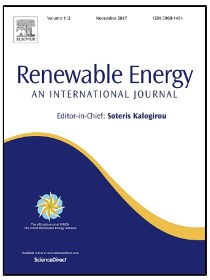


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# Large scale climate drivers for wind resource in Southern South America

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## Abstract

The relationship between the wind resource in Southern South America (SSA) and the Antarctic Oscillation (AAO) and El Niño/Southern Oscillation (ENSO) is analyzed in this paper. Daily, monthly, seasonal and annual correlations were calculated between wind speeds at 50 m height derived from MERRA reanalysis and the indices of the mentioned climate drivers. Our results shows that the AAO exerts a significant control over wind speeds on inter annual and seasonal timescales. This relation is stronger during spring and summer, with negative correlations over northern Patagonia, the Argentine and Uruguayan Pampas and Paraguay. ENSO shows weaker relations with wind speeds, mainly on the monthly timescale, with negative correlations over Central Argentina; and during spring, with negative correlations over Southern Patagonia. The relations between AAO and wind speeds are relevant in the context of projected climate changes in the region over the next decades. ENSO might be used as a predictor of wind energy production over monthly and seasonal timescales (mainly during spring) in central Chile and Argentina, and Southern Patagonia.

Key words: Southern South America, Wind Resource, AAO, ENSO

## Introduction

Low frequency variability (from months to years) of the wind resource is a conditioning factor of the flows and economical risks, and thus, the viability of a wind farm project [1, 2, 3, 4]. Wind farm developments often assume a stationary pattern in the wind resource when planning the economics. However, climate is highly variable over different time scales, and therefore a more complete analysis of changes in wind speeds over time needs to be performed [5, 6].

Climate variability is often associated with a limited number of climatic drivers [7]. On a global scale, climate oscillations exhibit several periodicities on different timescales. These climate drivers might be rooted in tropical zones, and extend their influence to extra-tropical latitudes; or either be restricted to mid and high latitudes in both hemispheres [8]. In SSA, the main drivers of low-