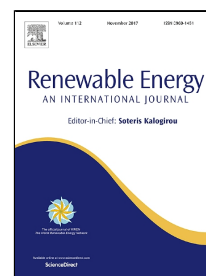


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Large scale climate drivers for wind resource in Southern South America

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

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7 8 Abstract

9
10 The relationship between the wind resource in Southern South America (SSA) and the Antarctic
11 Oscillation (AAO) and El Niño/Southern Oscillation (ENSO) is analyzed in this paper. Daily,
12 monthly, seasonal and annual correlations were calculated between wind speeds at 50 m height
13 derived from MERRA reanalysis and the indices of the mentioned climate drivers. Our results
14 shows that the AAO exerts a significant control over wind speeds on inter annual and seasonal
15 timescales. This relation is stronger during spring and summer, with negative correlations over
16 northern Patagonia, the Argentine and Uruguayan Pampas and Paraguay. ENSO shows weaker
17 relations with wind speeds, mainly on the monthly timescale, with negative correlations over
18 Central Argentina; and during spring, with negative correlations over Southern Patagonia. The
19 relations between AAO and wind speeds are relevant in the context of projected climate changes in
20 the region over the next decades. ENSO might be used as a predictor of wind energy production
21 over monthly and seasonal timescales (mainly during spring) in central Chile and Argentina, and
22 Southern Patagonia.

23
24 Key words: Southern South America, Wind Resource, AAO, ENSO

25 26 Introduction

27
28 Low frequency variability (from months to years) of the wind resource is a conditioning factor of
29 the flows and economical risks, and thus, the viability of a wind farm project [1, 2, 3, 4]. Wind farm
30 developments often assume a stationary pattern in the wind resource when planning the economics.
31 However, climate is highly variable over different time scales, and therefore a more complete
32 analysis of changes in wind speeds over time needs to be performed [5, 6].

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

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