

Accepted Manuscript

Climate Change induced by Southern Hemisphere Desertification

Ye Wang, Xiaodong Yan

PII: S1474-7065(16)30004-3

DOI: [10.1016/j.pce.2016.03.009](https://doi.org/10.1016/j.pce.2016.03.009)

Reference: JPCE 2476

To appear in: *Physics and Chemistry of the Earth*

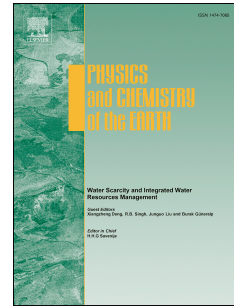
Received Date: 20 April 2015

Revised Date: 16 February 2016

Accepted Date: 9 March 2016

Please cite this article as: Wang, Y., Yan, X., Climate Change induced by Southern Hemisphere Desertification, *Physics and Chemistry of the Earth* (2016), doi: 10.1016/j.pce.2016.03.009.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1 **Climate Change induced by Southern Hemisphere Desertification**

2 Ye Wang^{a*} Xiaodong Yan^b

3 [a]{College of Civil Aviation, Nanjing University of Aeronautics and Astronautics,
4 Nanjing 210016, People's Republic of China}

5 [3]{State Key Laboratory of Earth Surface Processes and Resource Ecology (ESPRE),
6 College of Global Change and Earth System Science, Beijing Normal University, 19
7 Xijiekouwai Street, Haidian District, Beijing 100875, People's Republic of China}

8 *E-mail: wytea@126.com

9 **Abstract.**

10 Some 10 to 20% of global dry-lands are already degraded, and the ongoing
11 desertification threatens the world's poorest populations. Studies on desertification
12 effects are essential for humans to adapt to the environmental challenges posed by
13 desertification. Given the importance of the much larger southern ocean to the global
14 climate and the Southern Hemisphere (SH) climate changes in phase with those in the
15 north, the biogeophysical effects of the SH desertification on climate are assessed
16 using an Earth system model of intermediate complexity, MPM-2. This analysis
17 focuses on differences in climate among the averages of simulations with desert
18 expansion in different latitude bands by year 2000. The localized desertification
19 causes significant global changes in temperature and precipitation as well as surface
20 albedo. On the global scale, cooling dominates the SH desertification effects.
21 However, the biogeophysical effects are most significant in regions with
22 desertification, and the cooling is also prominent in northern mid-latitudes. Desert
23 expansion in 15°-30°S reveals statistically most significant cooling and increased
24 precipitation over the forcing regions during spring. The global and regional scale
25 responses from desertification imply the climate teleconnection and address the
26 importance of the effects from the SH which are contingent on the location of the
27 forcing. Our study indicates that biogeophysical mechanisms of land cover changes in
28 the SH need to be accounted for in the assessment of land management options
29 especially for latitude band over 15°-30°S.

30 *Keywords:* Desertification, Modeling, Climate change

Download English Version:

<https://daneshyari.com/en/article/8912419>

Download Persian Version:

<https://daneshyari.com/article/8912419>

[Daneshyari.com](https://daneshyari.com)