

## ***Interactive comment on “Evidence for increased expression of the Amundsen Sea Low over the South Atlantic during the late Holocene” by Zoë Thomas et al.***

### **Anonymous Referee #2**

Received and published: 26 September 2018

The authors present a new blanket peat record from Canopus Hill, Falkland Islands, to reconstruct changes in the in the Amundson Sea Low (ASL) and the Southern Annual Mode. The new record from Canopus Hill extend previously published results (Turney et al., 2016) to the mid-Holocene. The new record suggests a major shift of the ASL at around 2.5 kyr BP, as previously stated by Turney et al (2016). The main results presented in this study are therefore not really original and are therefore not a major advancement. The comparison of the Canopus Hill record with other records show some differences in the timing of this major change, which however are not really discussed in the manuscript. Overall, the manuscript require major revisions (see detailed comments below). 1) The current age model and its uncertainties are not very well pre-

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sented and it remains unclear why two radiocarbon ages at the base of the sequence were omitted. These ages are clearly not in stratigraphic order and the authors should provide plausible explanations for this mismatch. The 2-sigma age range should be also given in table 1 to allow readers to evaluate the chronological age uncertainties. 2) It is not entirely clear how the SAL and the Southern Annual Mode (SAM) are dynamically linked! The authors should discuss this in greater detail in their manuscript. 3) Lines: 230-232: Explain the difference to previous publications (e.g., Turney et al., 2016a), in particular in the representation of Cyperaceae and the total accumulation of pollen centred at 2.5 ka BP. The core presented in Turney et al., 2016 was also collected from Canopus Hill. 4) Line 267-269: It would be interesting to see a detailed comparison between the charcoal records from Canopus Hill and Patagonia to support the statement that “The aeolian delivery of the charcoal to the Falkland Islands is supported by the close correspondence between the Canopus Hill and Lago Guanaco, Southwest Patagonia (Moreno et al., 2009) charcoal records”. Such a comparison would strengthen the manuscript, and in particular the statement “ Our results support the notion of pervasive westerly winds throughout the mid- to late-Holocene”. 5) The authors state that “These results compliment other studies from the broader South Atlantic region (Figure 4). “ However, the change in ssNA in Simple Dome are rather smooth, especially when compared to the pollen record. This difference should be explained in more detail, e.g. are the Falkland Islands more sensitive to these changes than Simple Dome. A marked increase in ssNA at around 2.9 ka is hardly visible in the Simple Dome record and pre-dates the vegetation changes at 2.5 ka. What is the reason for the 400 year time lag. Adding the uncertainties of the age estimate of 2.5 kyr in the Canopus Hill record. Furthermore, the increase in the PALM2 record starts even later at around 2kyr BP. The authors should discuss the offsets more carefully and not simply state that a major change in the westerlies occurred at 2.5 kyr as this estimate is not supported by the current evidences. This discrepancy could be either related to dating uncertainties or may hold important information on the spatial-temporal impacts of the ASL/westerlies. 6) I would also suggest to include ENSO reconstructions (e.g.,

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Moy et al., 2002 or Carre et al., 2014) in a separate figure.

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-11>, 2018.

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