Geoscientific
Instrumentation
Methods and
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Discussions

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EGU

Interactive comment on "Wind Reconstruction Algorithm for Viking Lander 1" *by* Tuomas Kynkäänniemi et al.

Anonymous Referee #1

Received and published: 27 March 2017

1. General Comments

The authors present a new algorithm to reconstruct Viking Lander 1 (VL1) wind measurements from sol 350 to 2245 (last sol with measurements). Measurements during this period are currently missing from NASA's Planetary Data System (PDS) due to failures in the quadrant sensor and in one of the two hot-film wind sensors. Reconstructed VL1 wind measurements are extremely relevant to the field due to the scarcity of measurements of this kind and their importance to shed light on atmospheric phenomena ranging from turbulent to climatic time-scales. The methodology developed to reconstruct wind measurements is well presented and robust, and its performance reasonable. This reviewer's recommendation is that the paper may be accepted for publication after a few minor issues are addressed (see specific comments) and the use of English language is improved.

2. Specific Comments

Page 1, L3: What is the duration of the initial phase of the mission?

Page 1, L3, L10, L11 and L21: Was sol 45th the last sol of the initial phase? If one of the wind sensors broke down during sol 378, why PDS-available wind data extend only to sol 350?

Page 1, L21: 'Extended' from NASA's PDS?

Page 1, L29: I suggest writing '(Chamberlain et al., 1976)' after 'meteorological experiments' and '(Soffen et al., 1977)' after 'payload'.

Page 1, L33: I suggest deleting the reference to Soffen (1977) from this line.

Page 1, 3rd Paragraph: Please, rewrite or clarify this sentence. I suggest 'The VL1 data set enables the study of various meteorological phenomena ranging from diurnal to seasonal time scales using measurements of temperature, pressure and wind direction'.

Page 1, 5th Paragraph, first sentence: I suggest to replace 'poor' by 'limited'.

Page 1, 5th Paragraph: I suggest mentioning that the MPF wind data is not available in the NASA PDS.

Page 1, 5th Paragraph: Phoenix's "telltale" measurements should be mentioned [Holstein-Rathlou et al., 2010].

Page 1, 5th Paragraph: I suggest mentioning that the MSL wind sensor can still be used to retrieve wind speeds and accurate wind directions when wind comes from the hemisphere in front of the rover Newman et al., (2017).

Page 2, 6th Paragraph: I suggest adding a summary of Section 2 and 4 (instead of just 4.1).

Page, 3, L37: Which algorithm, yours? If so, I suggest deleting these two sentences

from this subsection.

Page 4, L55-57: I suggest rewriting this sentence.

Page 6, L26: Have the authors quantified the impact of a threshold different from one hour on the results?

Page 6, 40: LLT is not defined.

Page 7, Eq. (5): VQS1 and QS1 are used interchangeably across the manuscript. I suggest to stick to one of them.

Page 8: Fig. 16 is not referenced.

Page 9: Fig. 19 is not referenced in the text.

Page 10, Figs. 21 and 22: Why in particular are these sols&LLT chosen? What exactly makes both figures representative of the performed reconstruction?

Page 11, L1-15: The discussion made in these lines seems to remain open as it is not supported by any Figure included in this subsection.

Page 11, L56: Provide solar longitude values (Ls) values for both sols.

3. Technical Corrections

Page 8, L15: Replace 'Fig. 15' by 'Fig. 14'.

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