

Interactive comment on “Global Hawk dropsonde observations of the Arctic atmosphere during the Winter Storms and Pacific Atmospheric Rivers (WISPAR) field campaign” by J. M. Intrieri et al.

Anonymous Referee #2

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This paper introduces the Global Hawk unmanned aircraft and dropsonde measurement system, uses a case study from a recent field campaign to demonstrate the capability of the system and illustrates how the measurements can be used for scientific studies. Whilst I found the comparisons between the observations and model reanalysis products a little superficial (i.e. it is very much show and tell, little effort is made to explain any of the biases), I understand that especially given the choice of journal, the main aim of the paper is to demonstrate the measurement capability. There is no doubt that the development of the unmanned aircraft system is a significant and impressive technical achievement that deserves recognition. For these reasons I can recommend

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this article for publication once the following minor points have been addressed.

p4073 lines 1-5 I suggest mentioning here how the dropsonde data is communicated to the operators at the ground control station (via satellite link?). I realise this is stated on lines 2-3 on p4074, but it would help the reader if it was mentioned at earlier.

p4075 lines 19-20 “The wind direction measurements reflect that the vortex centre was to the northeast of the flight trajectory”. This is not immediately obvious. Expand on this briefly by describing the direction of the vortex winds in relation to the flight path.

p4077 lines 12-14 “The Barrow sounding is clearly too humid in the upper troposphere and stratosphere....” How do you know for sure that it is the Barrow sounding that is too humid, rather than the dropsonde measurements not humid enough? I realise it is hard to tell. Removing “clearly” from the above sentence would weaken the statement.

p4079, lines 8-12 State specifically what is meant by “lowest atmospheric levels”. Also state here which figure is being referred to.

Fig 6. Add markers to the lines representing the reanalysis products so it is easy to see the vertical resolution of the model. Markers may already exist but the figure quality makes them hard to see, so perhaps enlarge them. The difference in vertical resolution between the observations and the reanalysis products in relation to apparent model biases should be discussed briefly somewhere in section 4.

Fig 6. Add the times of the reanalysis products (1200 UTC?) to the coloured text at the top of the figure.

p4080, line 7 “... the near-surface stability with R-1 being too stable and with ERA-I not being stable enough” Define what altitude range you define to be near-surface. Also, which part of which figure shows this? A panel showing potential temperature (θ) or better, $d\theta/dz$ would be a useful addition to Figs 6 and/or 7.

Red shading representing MODIS data in Fig 3 and top panel of Fig 5: It is not clear what exactly the shading is supposed to show. A colour bar, units and/or a short

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explanation of what this shading shows is required. Changing the colour scheme of the shading may help.

Fig 7 It is very hard to differentiate between the bars and whiskers. Can the thickness of the bars (and size of the central dots) be increased?

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 4067, 2014.

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