Reviewer #1,

The authors greatly appreciate the reviewer's critical reading of our manuscript and constructive comments. We have revised the manuscript as much as possible following the reviewer's comments.
  Our response to each comment is described in the following.

Response to comments:

1. **On Page 7, the discussion starting at line 10 should include reference to the paper by Reid and Vincent 1987 doi:10.1016/0021-9169(87)90110-3. This reference considers the sensitivity of the radar system to waves of varying horizontal wavelengths for the velocity extraction method they use, and so is relevant here.**

The reference (Reid and Vincent, 1987) has been added to Page 8, line 1-3.

2. **There are aspects of the "manual wave packet tracing" that are not clear. The description of how the position of the packet is determined (P17, L18-21) and should be expanded.**

A detailed description about the determination of the wave packet has been added to Page 18, lines 11-22.

3. **In addition, the envelope function does not seem to be extracting an envelope as I would expect. In Figure 11, where both the zonal velocity and the envelope function are displayed, the envelope seems to mostly be the absolute value of the velocity. This is not the case in Sato et al. (2013). Is it possible that the direction in which the envelope function is applied is not optimal? At present, the function is not convincing.**

The envelop function is calculated in the time direction in this study. Since the extended Hilbert transform can be made in a direction that the wave is distinguished from mean field (Sato et al., 2013), the direction in which the envelop function is calculated should be optimal.
  A possible reason why the envelop function does not seem appropriate is that a

spectral range of a bandpass filter is too broad to extract a clear wave packet of quasi 12 h inertia-gravity waves (with cutoff wave periods of 6 h and 24 h). To explore this possibility, we have applied a narrower bandpass filter with cutoff wave periods of 8 h and 15 h to the large-scale inertia-gravity wave fields (Fig. A in this reply). Compared with Figs. 11a and b in the main text, Figure A shows that the horizontal maps of the envelop function does not change by the use of the narrower bandpass filter, although the peak values of fluctuations are slightly reduced. Thus, it is suggested that the width of the bandpass filter used in this study is proper enough to extract a wave packet. The reason why the envelope seems to mostly be the absolute value of the velocity is likely because the dominant wavelength of the fluctuations is close to the spatial scale of the wave packet. The sentence about the validity of the width of the bandpass filter has been added (Page 18, lines 2-3).

4. **The use of "manual wave packet tracing" is novel and seems to have merit but some comments on why it is used and what advantages it brings would be valuable. The comment on line 13 of Page 18 that the manual and idealized ray tracing agree is contested because in Fig 13d, the idealised ray travels at right angles to the manual ray. This should be noted and commented on.**

The advantage of the manual wave packet tracing is that a specific location of a possible wave source can be directly examined. The sentence about this advantage has been added to Page 18, lines 9-10. The difference in the idealized and the manual rays for the packet (i) has been described in Page 19, line 17.

5. **The description of the compositing that leads to Fig 10 is unclear. What is being composited? Can the maps being composited be moved N-S or just E-W in the process of forming the composite.**

We calculated the composite of the zonal wind components. As a reference for the composite, the location with local maxima of zonal wind components near Syowa Station along a latitude of 69°S is determined. In other words, the horizontal maps of zonal wind components are moved in the zonal direction and are then averaged. Thus, this composite procedure makes an averaged phase structure of zonal wind components near Syowa Station. The description about the composite (Page 16, lines 19-24 and Page 17, lines 1-7) and Fig. 10 have been revised to clarify this point.
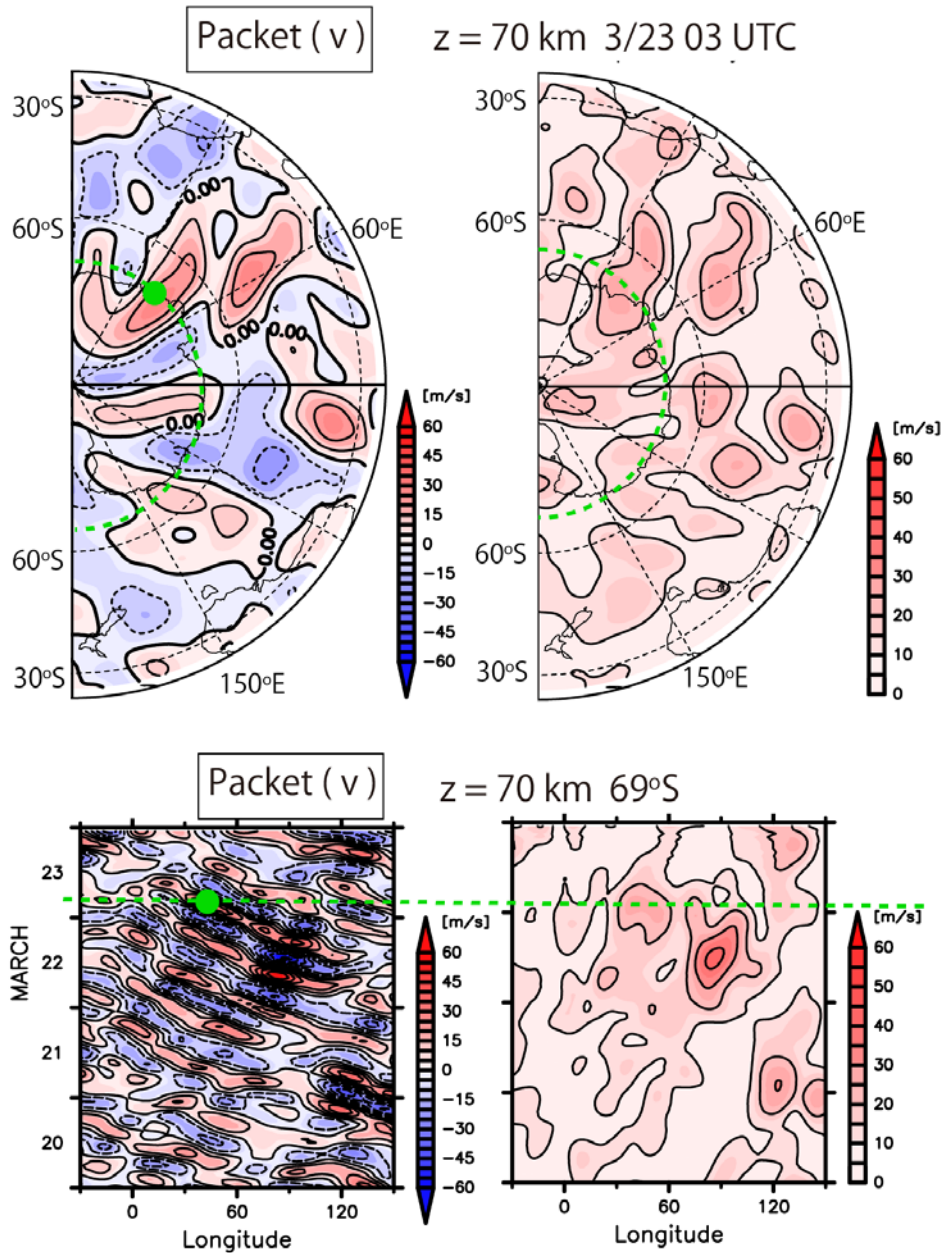
Figure A: Snapshots of the zonal wind components and their envelope function of the large-scale inertia-gravity waves at the height of 70 km at 03 UTC 23 March 2015 with a narrow bandpass filter, corresponding to the packet (v). Hovmöller diagrams of the zonal wind components and their envelope function of the large-scale inertia-gravity waves at the height of 70 km at 69°S for the period from 20 to 23 March. The green dashed curves denote the cross section taken in each figure. The green circles are locations of traced wave packets determined by the method discussed in the text. The contour intervals are 10 m s^{-1}.