We thank this referee for reviewing our manuscript and providing us the valuable comments. We reply to the referee's comments as follows and have made appropriate changes to the manuscript.

The manuscript demonstrates that it should be possible to use generalized aurora computed tomography to reconstruction the electron density over an area of the ionosphere using multiple simultaneous optical images, thereby extending the radar observations thereof. The manuscript is generally well-written and comprehensive. The paper is nearly ready for publication with a few minor revisions described below:

Comment 1

L211: "artifact" should be "artefact". More importantly, the non-expert eye cannot know where the artefact in Figure 5 is. Please describe it or point it out clearly.

Reply 1:

We modified "artifact" to "overestimation" in the manuscript. Furthermore, we added the following description to the paragraph from L205.

It appears that Q_0 was reconstructed well; however, there are two points to be noted: one is an underestimation of Q_0 at the peak location of each discrete arc and the other is an overestimation between the two arcs. The energy flux at the center of the reconstructed arcs is slightly smaller than the input flux. On the other hand, the energy flux between the two arcs is greater than the input flux, particularly at $y < 0$. For example, Q_0 at (x, y)=(45km, -20km) is 1.47 mW/m^2 for the input flux and 7.30 mW/m^2 for the reconstructed one by the ACT. The Q_0 at the location was improved to 4.36 mW/m^2 (2.29 mW/m^2) by the G-ACT method with the electron density from 10×10 beams (21×21 beams) of the EISCAT_3D radar.

Comment 2

L215: "significantly improved", L217: "better improved", L269: "greatly improved", L271: "better improved", L288: "much lower" are all subjective statements. "significantly", "better", "greatly" and "much" mean different things to different readers. The authors should quantify what they mean by these subjective descriptors please.

Reply 2:

To quantify the performance of the reconstruction methods used in this paper, we calculated the Mean Absolute Error (MAE) or the Mean Absolute Percentage Error (MAPE). The MAE was used for the total energy flux (Figure 5 and 8) because the total

energy flux includes values close to zero, whereas the MAPE was used for the electron density (Figure 6 and 9) and the differential number flux of the precipitating electrons (Figure 7) because they have a wide scale (e.g., from 10^7 to 10^{10} $s^{-1}m^{-2}eV^{-1}$ for the differential number flux).

The MAE and MAPE are defined by

$$MAE = \frac{1}{N}\sum_{i}^{N}\left|\hat{y}_i - y_i\right|,$$

$$MAPE = \frac{1}{N}\sum_{i}^{N}\left|\frac{\hat{y}_i - y_i}{y_i}\right| \times 100,$$

respectively, where $\hat{y}_i$ is the reconstruction and y_i the true (input) value.

The MAE for the total energy flux was calculated by using all data in the evaluation area (-20 km < x < 80 km, -50 km < y < 50 km). The MAPE for the electron density and the differential number flux was calculated by using data at the points A, B, C, and D. The MAE and MAPE values are summarized in the following table.

Figure	Panel	Reconstruction Method	MAE or MAPE	Value
5	b)	ACT	MAE	2.11 [mW/m^2]
	c)	G-ACT (10x10 beams)		1.87 [mW/m^2]
	d)	G-ACT (21x21beams)		1.68 [mW/m^2]
6	a)	ACT	MAPE	6.3 %
		G-ACT (10x10 beams)		5.4 %
	b)	ACT		9.9 %
		G-ACT (10x10 beams)		3.4 %
	c)	ACT		13.6 %
		G-ACT (10x10 beams)		4.3 %
	d)	ACT		12.9 %
		G-ACT (10x10 beams)		6.4 %
7	a)	ACT	MAPE	38.4 %
		G-ACT (10x10 beams)		30.1 %
	b)	ACT		40.1 %
		G-ACT (10x10 beams)		35.7 %
	c)	ACT		50.5 %
		G-ACT (10x10 beams)		41.2 %
	d)	ACT		55.1 %

		G-ACT (10x10 beams)		50.0 %
8	a)	ACT	MAE	4.46 [mW/m^2]
	b)	G-ACT (10x10 beams)		3.19 [mW/m^2]
	c)	G-ACT (21x21beams)		1.86 [mW/m^2]
	d)	ACT		5.87 [mW/m^2]
	e)	G-ACT (10x10 beams)		3.97 [mW/m^2]
	f)	G-ACT (21x21beams)		1.80 [mW/m^2]
9	a)	ACT	MAPE	25.2 %
		G-ACT (10x10 beams)		9.5 %
	b)	ACT		24.2 %
		G-ACT (10x10 beams)		4.6 %
	c)	ACT		62.6 %
		G-ACT (10x10 beams)		17.6 %
	d)	ACT		66.0 %
		G-ACT (10x10 beams)		13.6 %

All the MAE and MAPE values for the G-ACT reconstruction are smaller than those for the ACT reconstruction. We added these values to Figures 6-9 and the description about the MAE and MAPE to the revised manuscript.