Earlier in paper:

The 10 Hz data was used to identify curtains with the following two criteria: a high spatial correlation, and spiky.

What does spiky mean?

How narrow are curtains?

What is the spatial extent of curtains?

The AC6 dosimeters lack the necessary pitch angle resolution to differentiate between drifting and precipitating electrons to test the Blake and O'Brien (2016) hypothesis. Instead we use AC6's position and Earth's asymmetric magnetic field to differentiate particles that are either nearly-trapped in the drift loss cone, and particles immediately lost in the bounce loss cone (BLC). These concepts are described below.

I don’t think this belongs in your introduction. Should be in instrumentation or methods section.

4.2

Since AC6 lacks pitch angle resolution that allows easy differentiation between drifting and precipitating electrons (see Section 2), we must use other methods of determining which particles are precipitating. One common method of distinguishing between precipitating, drifting, and trapped particles is using particle measurements in conjunction with the location of the South Atlantic Anomaly (SAA).

~~As mentioned in the introduction, AC6 lacks pitch angle resolution that would allow it to easy differentiate between drifting and precipitating curtain electrons.~~ ~~Fortunately 142 we can use the South Atlantic Anomaly (SAA) and AC6's location in LEO to differentiate between the two possibilities~~.

The SAA is a region of relatively weaker magnetic field strength in the South Atlantic Ocean, caused by the tilt and offset of the Earth’s magnetic dipole.

~~Earth's magnetic field is spatially shifted towards Singapore (from where?) which creates a region of weaker magnetic field in the South Atlantic Ocean called the South Atlantic Anomaly~~. Most particles observed in LEO are quasi~~barely~~-trapped: they bounce and drift (&gyrate) around the Earth until they reach the SAA. Within~~In~~ the SAA, the weaker magnetic field strength can lower~~s~~ the electron's mirror point altitude into the atmosphere, where collisions with ~~the atmosphere~~ atmospheric ions are more numerous and the particle is lost.

P: Particles that have pitch angles in the drift loss cone will precipitate within one drift period (often within the SAA)

~~that drift and are lost in the SAA have pitch angles in the drift loss cone.~~ Particles with smaller pitch angles that are lost in the atmosphere within one bounce are in the bounce loss cone. What is a common loss cone size? Traditionally, we define a particle with a mirror point altitude at or below 100 km to be in the BLC. Also define stably trapped. Not relevant, per se, but it is one of these populations.

~~Without pitch angle resolution, AC6 can not easily differentiate between trapped, drift loss cone, and bounce loss cone electrons (You already said this).~~ Within ~~In~~ the SAA, AC6 observes a combination of trapped, drift loss cone, and bounce loss cone electrons (tease out more. You just said in the last paragraph that within the SAA particles are lost. Are they sometimes not?). In the region magnetically conjugate to the SAA in the North Atlantic, AC6 only observes particles in the BLC. Too much hand holding or appropriate? By nature, an electron that is observed by AC6 either precipitates during that bounce or mirrors at or below the spacecraft. If a particle is observed in LEO magnetically conjugate to the SAA, its mirror point will be low in the atmosphere within the SAA and be lost.

~~If an electron makes it to AC6's altitude, it can be in the local loss cone and precipitate in the local hemisphere. Alternatively, the electron will mirror at or below AC6 and gyrate to the conjugate mirror point in the SAA where the mirror point is deep in the atmosphere or below sea level.~~ Therefore, any precipitation observed in the ~~BLC regio~~n call it something else in the North Atlantic must rapidly precipitate.

P: ~~Lastly,~~ outside of the SAA and its conjugate point, AC6 will observe electrons in both the drift and bounce loss cones. We estimated the BLC region for locally-mirroring electrons in the North Atlantic Ocean using the IRBEM-Lib magnetic field library and the Olson-Pfitzer magnetic field model (Boscher et al., 2012; Olson & Pfitzer, 1982). We defined a latitude-longitude grid spanning the North Atlantic~~,~~ at 700 kilometer altitude ~~that is typical for AC6~~ (a typical altitude for AC6), and estimated the local magnetic field strength. For each latitude-longitude point we traced the magnetic field line to the ~~SAA~~ southern hemisphere and found the conjugate mirror point altitude not all mag field lines connect to saa. If the conjugate mirror point is at or below 100 kilometers, the latitude-longitude grid point is in the bounce loss cone and the particle is likely lost. Furthermore, a more rigorous bounce loss cone criterion would be ~~is~~ if the conjugate mirror point altitude is below sea level. In this case, the electron is definitely lost.

Since AC6 can measure locally-mirroring electrons in the North Atlantic, the spacecraft altitude estimates the upper bound mirror point of this population.

~~Since we are considering locally-mirroring electron~~

~~at AC6's altitude in the North Atlantic, this estimate is the upper bound mirror point altitude.~~

The BLC region estimated by this method ~~here~~ closely matches the BLC region shown in Comess et al. (2013, Figure 1) and Dietrich et al. (2010, Figure 3). Furthermore, we repeated the same analysis using the Tsyganenko 1989 model (Tsyganenko, 1989), which yielded similar boundaries.

5.3

Figure 5a shows a map of the northern portion of the BLC region in the North Atlantic. The solid blue line is the northern boundary where an electron that mirrors at 700 km locally will mirror at <100 km in the SAA.

~~locally-mirrorring electron observed at 700 kilometers will mirror at 100 kilometers in the SAA.~~ Immediately south of the solid blue line, the SAA mirror altitude rapidly decreases towards, and below, sea level. The dashed blue line is the boundary where the SAA mirror point altitude is at sea level. For reference, AC6 takes about 30 seconds to move between the solid and dashed blue curves. What is below the dashed blue line? The two dotted black curves in Fig. 5a bound the outer radiation belt, defined as L=4-8.

~~between L shells of 4 and 8.~~

P: We found 36 curtains that were observed inside the BLC region. Figure 5b-e shows 4 examples with time-shifted

~~the shifted time~~ series plots, ~~for 4 examples~~ along with the AC6 in-track lag, L and MLT ~~during the observations annotated~~. The AC6 locations where these curtains were observed are shown in Fig. 5a with red stars and the corresponding panel labels. ~~Move the rest of the P to the discussion?~~ The curtains shown in Fig. 5c and e were observed near the sea level SAA mirror altitude curve thus they were not drifting and were precipitating as much as 6 seconds as shown in Fig. 5e. The curtain precipitation persisted for multiple \_ 1:5 second bounce periods of 30 keV electrons in this region.