Brito et al., 2017, ACP, Assessing the role of anthropogenic and biogenic sources on PM1 over Southern West Africa using aircraft measurements

General Description of manuscript:

The authors use aerosol measurements obtained during the DACCIWA campaign to provide new insight into aerosol composition in Southwest Africa over large and rapidly growing coastal cities. The authors show that relative contributions of aerosol components (sulfate, nitrate, OA etc.) are similar for fresh and aged air, evaluate the effect of anthropogenic activity on biogenic organic aerosol, and provide suggestions for future work in a severely understudied part of the world. The content of the manuscript is appropriate for publication in ACP and should be considered after addressing the comments provided below.

General Comments:

This is the first time that IEPOX-SOA measurements and the relationship with anthropogenic tracers is presented for Southwest Africa. This warrants a more detailed comparison with other field experiments, beyond just comparing to Amazonia (page 11, lines 23-28). Please expand on this discussion by also evaluating the results with information from Southeast US field campaigns (for example, but not limited to, Budisulistiorini et al., 2013; 2015; Xu et al., 2015; Marais et al., 2016).

There are a number of inconsistencies that can be eliminated with a careful read-through of the text, e.g. CO is used, other times it's carbon monoxide; OA is defined, but then sometimes OA is used, other times it's organic aerosol, should it be ATR-42 or ATR42, as both are included in the text.

Specific Comments:

Page 1:

Line 5: Hugh Coe affiliation is not correct.

Line 29: Space between "15" and "nm"

Line 30: black carbon shouldn't be capitalized.

Line 34: Fix cm-3.

Line 25: In-text citation style for Flamant is not correct.

Page 3:

Line 3: How about including references from the AMMA study that measured and modelled these compounds in West Africa, e.g., Reeves et al. (2010), Murphy et al. (2010), Ferreira et al. (2010).

Line 4: Hu et al. (2015) is not the most appropriate reference for formation of aerosols from BVOCs. Consider instead referencing the review paper by Hallquist et al. (2009).

Lines 28-30: There is also the non-IEPOX ISOPOOH pathway that leads to SOA formation first reported in Krechmer et al. (2015).

Page 4:
Line 15: Grammar: “that the both the formation”

Page 7:
Line 1: Grammar: “taking in account” should be “taking into account” or “accounting for”

Page 8:
Line 4: “sheds light into” should be “sheds light on”

Line 7: Consider also referencing the OA health effects study by Verma et al. (2015) that showed biomass burning OA to be more toxic than other sources of OA.

Page 10:
Line 30: Better to show composition as 56% OA, 23% SO_4 etc.

Figure 1:
- Label countries shown, for readers not familiar with the region. Why not show the Gulf of Guinea in blue and the non-forested regions as brown or orange? Include a label for Cotonou.

Figure 5:
- The caption is misleading, as a map is presented at top. More helpful to readers to distinguish the map and the time series in the caption.
- Rectangle/partition 3 looks white, not grey.
- Add “on” in “Processing time is calculated based **on** integrated...”
- Grey arrows for wind direction are hard to see.
- Include units in the left axis of the bottom time series panel for f43 and f44.

Figure 6:
- Top right axis should be labelled “Aerosol number concentration”.

Figure 7:
- In the caption the black line is the mean, but in the figure legend it is the median. Which is it? If it’s the median, then why is the mean shown for the other measurements?
- What is the strength of the linear relationship between individual collocated measurements of sulfate and IEPOX SOA? How does this compare to the relationships obtained in other studies in the Southeast US and Amazonia?

References:

Budisulistiorini et al., Real-time Continuous Characterization of Secondary Organic Aerosol Derived from Isoprene Epoxydiols (IEPOX) in Downtown Atlanta, Georgia, using the Aerodyne Aerosol Chemical Speciation Monitor (ASCM), Environ. Sci. Technol., doi:10.1021/es400023n, 2013.

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and Aerosol Study (SOAS) at the Look Rock, Tennessee, Ground Site, ACP, doi: :10.5194/acp-15-8871-2015, 2015.
Ferreira et al., Isoprene emissions modelling for West Africa: MEGAN model evaluation and sensitivity analysis, ACP, doi:10.5194/acp-10-8453-2010, 2010.
Hallquist et al., The formation, properties and impact of secondary organic aerosol: current and emerging issues, ACP, doi:10.5194/acp-9-5155-2009, 2009.
Krechmer et al., Formation of Low Volatility Organic Compounds and Secondary Organic Aerosol from Isoprene Hydroxyhydroperoxide Low-NO Oxidation, Environ. Sci. Technol., doi:10.1021/acs.est.5b02031, 2015.
Murphy et al., Measurements of volatile organic compounds over West Africa, ACP, doi:10.5194/acp-10-5281-2010, 2010.
Marais et al., Aqueous-phase mechanism for secondary organic aerosol formation from isoprene: application to the southeast United States and co-benefit of SO_2 emission controls, ACP, doi: 10.5194/acp-16-1603-2016, 2016.
Reeves et al., Chemical and aerosol characterisation of the troposphere over West Africa during the monsoon period as part of AMMA, ACP, doi: 10.5194/acp-10-7575-2010, 2010.
Verma et al., Organic Aerosols Associated with the Generation of Reactive Oxygen Species (ROS) by Water-Soluble $PM_{2.5}$, Environ. Sci. Technol., doi:10.1021/es505577w, 2015.
Xu et al., Effects of anthropogenic emissions on aerosol formation from isoprene and monoterpenes in the southeastern United States, PNAS, doi:10.1073/pnas.1417609112, 2015.