

## ***Interactive comment on “Observational evidence of particle condensational growth in the UTLS over Tibetan Plateau” by Qianshan He et al.***

### **Anonymous Referee #1**

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Review of He et al. [2019]

This study focuses on balloon measurements carried out from the Tibetan plateau to understand the microphysical processes involved in aerosol formation and growth in the Upper Troposphere and Lower Stratosphere during the Summer Asian Monsoon. The authors use the COBALD backscatter sonde together with the Cryogenic Frost Point Hygrometer to understand how humidity affects the size of aerosols. In addition, they use Mie calculations to interpret those measurements. Overall, the paper is short, to the point, well written and follow a logical path with clear figures and consistent interpretation. I would recommend the publication of this manuscript in ACP after the following points are corrected :

- P1-L27 replace “a balloon..” by “the balloon..”

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- P1-L28 add "COBALD sensor"
- P2L20: Park et al. [2007] should not be quoted here but rather after "large scale circulation.."
- P3L6. Frey et al. [2011] talk about the West African Monsoon and the Asian Monsoon. Do you think it's relevant here ?
- P7L7. Are you sure that the Kelud eruption did not impact those balloon measurements ?
- Fig.1. I would rather differentiate in this plot: the Junge Layer, the stratospheric aerosol layer peaking in the mid stratosphere and the ATAL which is limited to the Upper Tropospheric and Lower Stratospheric region.
- Fig.2. Here, it's important to define the lower size boundary that cannot be observed by COBALD due to the lack of scattering efficiency of small aerosols. I would say that 30-40 nm is probably the limit.
- Fig.3 was also explored in Vernier et al., 2015 (Fig.3) using the same technique. I think it's important to make sure that data plotted here are not in the stratosphere and should remain below 19 km. The upper pressure limit (50 hPa) includes stratospheric data and I believe that the points in black where CI is between 4-6 and RHi below 40 % could be in the stratosphere. It would be interesting to color the points according to their heights.

More generally, the authors should remain the reader than the conclusions drawn from this paper are only based on 3 balloon flights so that general conclusions should be established with caution.

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