

## ***Interactive comment on “Retrieval of Eddy Dissipation Rate from Derived Equivalent Vertical Gust included in Aircraft Meteorological Data Relay (AMDAR)” by Soo-Hyun Kim et al.***

**Anonymous Referee #3**

Received and published: 10 January 2020

### General comments:

This paper investigates two methods of converting derived equivalent vertical gust (DEVG) turbulence measurements to the preferred ICAO standard turbulence metric eddy dissipation rate (EDR), using 3 years of archived AMDAR measurements. The two methods explored were proposed in two previous studies. The original DEVG measurements were subjected to a comprehensive quality control process which is described in detail. The accuracy of the resulting converted EDR values were examined by comparing them statistically to in-situ EDR turbulence measurements over two regions: over Europe and over the trans-Pacific Ocean area. The whole process is well described and discussed. The results of this study would enable

C1

a wider range of homogenized aircraft observations of turbulence to be available for development and research work. This would aid the development of turbulence forecasts and enable the construction of an upper-level turbulence climatology over a much larger area of the globe.

In general, the paper is well written and well organised, and the results are of considerable interest. I therefore recommend that this manuscript should be accepted for publication with (very) minor revisions.

### Specific comments:

Pg 8 Line 8: I didn't follow why only one of the equations in the best-fit function was used, rather than the correct equation for the aircraft type recording the DEVG. Is it that the aircraft type was missing from some of the observations in the dataset, so you needed to choose one equation?

### Technical corrections:

Pg 1, line 12: ...in the AMDAR **data** archived. . .

Pg1, line 15: The first method **remaps** the DEVG. . .

Pg 1, line 16: ...while the second one **uses** the best-fit curve. . .

Pg1, line 16: “developed in the previous study”. Which previous study was this (I don't think it's been mentioned yet)? Perhaps this part should be deleted, or written as: ...developed in **a** previous study.”

Pg 3, line 1: some aircraft of **a** Hong-Kong based airline.

Pg 3, line 10: Because **the** two aforementioned turbulence metrics. . .

Actually, I'd re-write this sentence as “As these two turbulence metrics...” which sounds clearer?

Pg3, line 10: different **airlines**

Pg 3, line 14: This may be better worded as “This will lead to improvements in the verification of. . . “ ?

C2

Pg 3, line 14: “as well as global climatology of aviation turbulence”. This would be better as “as well as aid the construction of a global climatology of aviation turbulence”, or similar?

Pg 3, line 19: either “some aircraft of a Hong-Kong based airline” or “some aircraft of **the** Hong-Kong based airline”

Pg 3, line 20: (39 months from February 2011 to April 2014) **of** data.

Pg 3 line 25: delete the hyphen between “(NOAA)” and “archives”

Pg 4, lines 9 -11: I would switch the first two sentences around, so it is something like: “The data before the QC procedures have been applied are referred to as the raw DEVG in the current study. Figure 1 shows the horizontal distribution of the number of raw DEVG data collected over 36 months (from October 2015 to September 2018) above 15kft accumulated within a 1°x1° horizontal box. The raw DEVG covers a large portion of the SH. ...”

Pg 4, line 13: “this raw DEVG can complement the SH turbulence information” I didn’t follow this... the raw DEVG data complements the in-situ data (which mainly covers the NH), as it provides coverage over the SH. I think this line just needs re-wording?

Pg 5, line 11: I would replace “That is, because” with “Since” ?

Pg5, line 23: I would replace “Applying the aforementioned QC procedures” with “Applying these QC procedures”

Pg 7, lines 18 to 20: I got a bit confused with the first half of this sentence. Do you mean that there’s a choice of several values of C1 and C2 for the altitude ranges in this study? And if so, isn’t there a choice of 4 values? Or did I misunderstand something? I would also re-word the part in brackets so it is shorter and simpler – e.g. ... for three altitude ranges (> 0ft, 20-45ft, 10-20ft and 20-45ft)

Pg 10, line 10: “homogenized global turbulence **dataset**” or “homogenized global turbulence **archive**”

References section:

There were several references listed here which I couldn’t find in the contents of the  
C3

paper:

Gultepe et al. (2019)

Tvaryanas (2003)

Warner (2013)

Williams (2017)

---

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-442, 2019.