Atmospheric
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Techniques

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Discussions

Interactive comment on "Use of automatic radiosonde launchers to measure temperature and humidity profiles from the GRUAN perspective" *by* Fabio Madonna et al.

Anonymous Referee #1

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I list here my technical corrections as well as suggestions for corrections to improve understanding. I list the corrections in order of manuscript line number, referring to the line numbering of this manuscript version.

30 'Sondakyla'. Please spell the station name the same ('Sodankylä') throughout the manuscript.

173 Last word should be 'RS41-SG' instead of 'RS41-SGP'.

271-272 Trappes station latitude, longitude is listed as '48.46N,0.20E, 168 m asl'. This is inconsistent with the manuscript table A1 entry for 07145: '48.770 , 2.020 ' and with WMO OSCAR/Surface for Trappes reporting '48.774444 N, 2.0097222222 E, 167 m

asl. Please correct or explain clearly if the manual and automated Trappes stations have different positions.

282 A suggestion: I failed to notice the mention of 'how new' the mentioned 'new system' is. In the summary (line 873), Vaisala and MeteoModem are selected as 'the two most mature systems at present'. If you mention the (lack of) maturity of Meisei ARL here in section 2.3, the summary will be easier to read.

297-298 After the '.' something is missing from the sentence to make ' he GC performs before the sonde loading' make sense.

312-450 A suggestion: Insert a table defining the terms 'effective flights', 'successful launches' and 'successful flights' according to MeteoSwiss and MeteoFrance respectively. And be clear in the text when which is referred to.

383 Figure 5: Please replace with a mature figure without confusing red text and red error marks :-)

396 Exchange 'Effective flights' with 'Successful flights'. At least if it is correctly guessed that the '470 successful flights' mentioned in line 395 are 'successful' according to the MeteoSwiss standard mentioned in line 396-397 by 'Effective flights according to MeteoSwiss standards are'?

401 Please rephrase this information after the comma: 'with a limited use of spare sondes due to the failure of scheduled launches (4 %)'. At least, I do not understand the intended message. Unless it is something to do with the ARL having limited access to spares, because somebody needs to be around to refill the ARL for the number of spares to be without limit? But before the comma 'manual launches' are mentioned last, and therefore the sentence after the comma, should refer to those. But according to table 4 'percentage of spare ' is not available for the manual flights at Payerne. In short: I do not understand the intended meaning, please rephrase.

404-407 Please rewrite, to make the sentences easy to understand, unambiguous

and consistent with the rest of the paper. I.e. How should this sentence in line 404-406 be understood: 'the Meteomodem ARL Robotsonde in Trappes has realized 1908 successful flights, out of a total of 1956 successful flights according to MeteoFrance standards'? Who 'realized' the remaining 48 'flights' out of the 'total of 1956 successful flights'? Manned personnel? If so, please mention in the text the existence of 'some flights after manual launch' at Trappes during the 2016-2018, automated period. Or, should the sentence rather be understood as the '1908 successful flights' being successful according to MeteoSwiss standards? If so, please write it out, to avoid confusion like mine :-)

421 Please clear up this apparent inconsistency regarding the number of scheduled and/or successful flights at Trappes in 2018: After the period the text reads: 'For the 578 flights performed during 2018'. But the reader expects Trappes to have made at least 723 successful launches in 2018 (99,1% of 'two launches per day (line 394) for 365 days') and at least 716 successful flights (99% of 723). Why was only 578 flights performed in 2018?

428 Table 4 caption: Please add text clarifying if 'percentage of successful flights' is defined as 'percentage of successful flights out of scheduled flights' or 'percentage of successful flights out of successful launches' or if it is not necessarily specified precisely how the respondents defined this.

431 After the komma, please replace 'sondes' with 'balloons' in the text 'the sondes bursting'.

477-479 The sentence starting after the period in line 477: Please rephrase to make this important and educational author assumption clearer, e.g. write 'The results are shown in Figure 7 assuming' instead of 'The results shown in Figure 7 assume'.

498 delete either the second or third word ('by' or 'for') in the sentence 'collected by for GRUAN station launching'

524 Replace reference to 'Figure 4' with reference to 'Figure 9' (!)

530-531 Delete text '; from left to the right, the time period increases from 1 to more than 5 days' as it is not consistent with figure 9.

534 Suggestion for clarity: Replace text 'a similar study to' with something like 'another kind of GC study than'.

544-553 Delete text (it is the repeated text of lines 534-543)

632 I suggest adding the word 'eventual' (or 'potential') in front of the words 'positive influence' so that the sentence starts as 'A more interesting comparison to show the eventual positive influence of automation on the burst altitude'. 'Eventual' (or 'potential') because the Trappes analysis apparently shows an immediate set back in availability after automation (>99% percentage of successful manual flights in 2012 drops to ~95,5% successful automated flights (figure 6) in 2016). But a very important message of the Trappes example is how the performance improved over time and especially after the provider in November 2016 made the improvement of (line 411-415) 'a flexible cover which assures that during the storage the balloon is less exposed to contact with the air-conditioned environment. This seems to reduce the effects of drier air on the balloon and improve its performance in terms of burst altitude (standard deviation of burst altitude is reduced after the installation of the cover – not shown)'.

635-636 Before the word 'respectively' in line 636, please reverse the order of the ascent velocities to be consistent with (according to figure 14) the order 'ARL and manual launches' have in the beginning of line 635.

640 I suggest replacing 'significantly' with 'much' (or something like it) or else mention which test was used to determine significance. The two distributions in figure 14, left panel look different to me :-)

642-643 I suggest for clarity, please repeat/insert here more details on 'the operational organization' as it might not be clear to every reader, that they should recall the

potential beneficial switch to Totex balloons as well as other things mentioned in line 410-415.

648 I suggest to ask MeteoFrance for their own explanation of the apparent difference in burst height distributions (Figure 14 right panel) of the old manned and the new automated station and include it in the analysis.

602-720 Please note the inconsistent section numbering in line 677 and revise it and the rest of the numbering/headers of section 5.

680 Delete misleading words 'the left panel of'.

695 End of sentence is missing. And maybe also a verb is missing.

722 Please correct station position for Faa'a so that it is consistent and easy to identify ('French Polynesia, 28.34S, 16.32E' is inconsistent). Is the stations referred to as 'Faa'a' the same as table A1 entry WMO id 91938 having coordinates -17.55 , -149.6? If so it would be helpful to readers to confirm this in the text by saying so or by mentioning the WMO station name 'TAHITI-FAAA' or the WIGOS station id 0-20000-0-91938 along with the correct position.

732-751 I suggest to move this to 'section 3 Technical performance' to highlight this, because this information on very misleading observations in the lower 50-100 m is very important, interesting and general (e.g. it's not only Faa'a since ECMWF notes 'some reports' from 'stations') including how one of the suppliers recently implemented remedying software at some stations.

762-764 Text inconsistent with the figure 19 it describes. To remedy please e.g. in line 762 replace 'the difference' with 'the mean difference'. In line 764 replace 'corresponding mean difference' with 'corresponding standard deviation'.

792-795 Inconsistent conclusion starting with the words 'Applying the Wilcoxon Rank-Sum Test'. Please rephrase to be consistent so as to EITHER state 'the two distributions of burst altitudes are not significantly different' OR 'ARL does lead to improve-

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ments in the balloon burst altitude'. The text says both, which is inconsistent.

853-855 Please add units in the figure caption text.

902 I strongly suggest completing the picture by mentioning here also the observed mean deviation of 2 K in temperature and 4% in RH in the first 50-100 meters of the Faa'a series.