

Interactive comment on “Temperature and water vapour measurements in the framework of NDACC” by B. De Rosa et al.

Anonymous Referee #2

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The paper presents a thorough assessment of the performance of the Raman lidar BASIL operated in Potenza, through a series of intercomparison with a variety of sensors (in situ and passive remote) and numerical weather prediction models. This commendable effort is conducted on the BASIL dataset acquired since November 2013, i.e. after BASIL has integrated the NDACC network. The paper focuses on comparisons with q and T profiles from radiosoundings launched from a nearby met station, as well as q and T profiles derived from the IASI and AIRS sensors in the vicinity of Potenza. Comparison with q and T profiles from 2 analyses from the ECMWF NWP model are also included. The results contained in this paper are of interest to the NDACC community. Nevertheless, the paper is tedious to read, which may in part be related to the fact that the authors present several intercomparison periods (4 case studies and

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2 longer periods) for which biases, deviations are discussed at length in both absolute and relative values. My understanding is that the comparison with the radiosounding data from the station nearby Potenza is the key for a proper calibration of the Raman system. I think that the authors should start presenting this aspect thoroughly first before declining the comparison in the framework of 4 case studies. . . However, I am under the impression that radiosoundings may not be the only datasets used to “calibrate” the Raman retrievals (e.g. the work conducted for the case study on 7 November 2013 for which the authors state that there were no radiosounding data available). I would encourage the authors to clarify this in the revised manuscript. Are they using reanalyses products for calibration of BASIL? In spite of the interest of such paper, the paper should be improved with respect to the points below: - Why is the intercomparison limited to the first 2 years of the participation of BASIL to NDACC? - In the abstract and in the summary, it should be mentioned that the bias values for the entire T and q profiles. Also, how do you reconcile the numbers at lines 20-21, 23 and 26 with those at line 12? - Regarding the vertical resolution of the q profiles: in the abstract and summary it is just mentioned 150 m, whereas in the text in Section 6 (Case study 7 Nov 2013, p14) the resolution is stated to be 300 m between 6 and 8 km and 600 m above 8 km. The Same holds for the vertical resolution of the T profiles: in the abstract and summary it is just mentioned 150 m, whereas in the text in Section 6 (p15) the resolution is stated to be 600 m above 6 km. - What is the interest of comparing BASIL products with IASI and AIRS products, especially since they are assimilated in NWP model reanalyses products? - P7: lines 4-5: assessment of $K(z)$ up to 15 km is crucial here to derive the performance of BASIL. You need to say more. How many soundings were used? How do you manage to assess a $K(z)$ up to 15 km with a met sonde that is drifting away from the launch point because of wind? What kind of humidity sound were used for the RDS? Most (if not all) of the commercial sondes are known to have issues with measurement in low humidity conditions. . . . - P8, lines 13-14: a and b are determined from co-located soundings? How do you deal with a met sonde that is drifting away from the launch point because of wind? Up to what altitude 25 km.. how do

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you ensure a and b are not offset by the sounders drifting? Also what is the sensitivity of the T(z) retrievals on a and b retrievals? - P9, line 4: The integration technique is designed to retrieve T profiles above 20 km. . . why do you say below 20 km here? - 7 Nov 2013 Case: What do you use to assess the BASIL calibration if there is no RDS? Line 21: what kind of smoothing filter? How do you achieve 150 m when the resolution of the 2-h profile is 300 or even 600 m above 6/8 km? - P21: Section 6.3, line 23: now the vertical resolution of the profiles is 500 m. . . not 150 m? line 27: what are all sensor/model pairs ? how many pairs for each type of comparisons? What period does this cover? - Section 6.5 p 29: Why only the period 9 October 2014- 7 May 2015? Are 11 comparisons enough? Why not do this for the entire period starting with BASIL entering the NDACC network?

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