



## Comment on **essd-2021-50**

Anonymous Referee #2

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Referee comment on "Integrated water vapour observations in the Caribbean arc from a network of ground-based GNSS receivers during EUREC<sup>4</sup>A" by Olivier Bock et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-50-RC2>, 2021

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This paper gives a very detailed description of GNSS measurements from 49 stations that were obtained during the EUREC4A campaign in the Caribbean Arc. The authors produced a 5 minute-temporal resolution dataset for each station for the purpose of scientific studies. The data for each station are available online in properly formatted user friendly NetCDF files. The authors compare this data to 4 operational streams of GNSS measurements, as well as to collocated measurements from a microwave radiometer and atmospheric soundings (two different types of sondes), as well as to ERA5. To demonstrate an application of the dataset, they link the profiles of integrated water vapor to different cloud patterns that occurred during EUREC4A. The description of all data and the data inter-comparison is done with great care. The authors report very interesting biases between the different data sets and provide hypotheses that may help explain the biases, even though no final answer is given, which is fine. This work should be highly useful to users, especially as the authors make specific suggestions which of the five GNSS streams might be most suitable for certain applications. In only have very minor comments.

Minor comments:

- The authors suggest that biased GAIA observations caused a bias in ERA5 – a very interesting result. Is it possible to find out if they really were assimilated? BCO soundings were also assimilated in various operational analyses, but they do not have a dry bias. Given that BCO soundings occurred more frequently than GAIA soundings, that suggests ERA5 assimilated only GAIA, but not BCO? It would be really nice to know more about this and therefore I would like to encourage the authors to track the path of the data through the assimilation system of ERA5.
- Already in the abstract, Flowers, Fish and Gravel are mentioned. I doubt that all readers are familiar with what they are. Perhaps keep it more general here and just speak of cloud organization.
- In the data there is geoid height and ellipsoid height. Could the authors please define the meaning in the text?

- A4 in <https://essd.copernicus.org/articles/13/491/2021/> shows that the air over sea is not more moist than that over Barbados. This is in contrast to the hypothesis at line 355.
- Figures often use a combination of green and red. Please ensure that this is color-blind friendly.

Typos:

Line 82: were -> where

Line 633: biases -> biased

Line 666: spatio-spatial ? & general good -> general in good