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# ***Interactive comment on “A global historical Radiosondes and Tracked Balloons Archive on standard pressure levels back to the 1920s” by L. Ramella Pralungo et al.***

**L. Ramella Pralungo et al.**

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Received and published: 13 March 2014

Anonymous Referee #2

Data recovery beyond 1958 is important and valuable effort. In the manuscript, the authors describe the data recovery efforts, and the procedures to create a global long time series dataset of temperature and wind on standard pressure levels at synoptic times. The result is a technically uniform dataset that is published along with the manuscript. The authors claim that the main purpose of the created dataset is to aid climatological studies. It is dubious if the dataset in its current state will be benefi-

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cial for climatological studies, since homogeneity of the observation data is absolutely crucial when looking for climate trends etc. The manuscript describes the merging procedure of different data sources without considering homogenization of the data. In their introduction, the authors state that e.g. IGRA and CHUAN only partly fulfill the needs of climate scientists due to inhomogeneities in the data. At the same time, they merge exactly these data with other data from different stations, sonde types and measurement techniques, introducing even more inhomogeneities. Sensor dependent effects like e.g. different radiation sensitivity or the steadiness of the measurements under stratospheric conditions are not considered. The presented dataset contains global radiosonde data in a format suitable for climatological studies. As such, climate modellers will tend to use the dataset without questioning the quality or homogeneity of the observation data. In the abstract, the authors claim that homogeneity adjustments for both temperature and wind will be provided in a forthcoming paper. The authors intend to use the RAOBCORE technology to create a homogenized temperature and wind dataset, to be published in a separate paper. I strongly recommend to īňAřst continue the work with the planned homogenization procedures, and then publish the complete homogenized dataset together with the intended paper on the homogeneity adjustments. The homogenized uniform radiosonde dataset will be a very useful source for climate studies.

>We fully understand the concerns of reviewer 2 regarding the temporal homogeneity of the data. As outlined above we address these concerns by making this manuscript part I of a two part paper. In the second part the wind data homogenization is described. We have lots of confidence in it and there are much fewer issues regarding pervasive biases than for temperature. Regarding temperature homogenization, we have tried a homogenization for the post-1958 period using the NOAA-20CR data, but results are not quite as good as already published temperature homogenizations after 1958. The homogenization for pre-1958 temperatures is technically working as well but we need more time to check those results. At the current stage we do not want to publish these adjustments exactly because of the concerns of reviewer #2. In the revised

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manuscript we stress that we regard the (not homogenized) temperature dataset compiled here as basis for developing temperature adjustments (as it has been the case with CARDs or IGRA) that needs to be used with the necessary caution. We expect that a rerun of the ERA-20C (Poli et al. 2013) surface data only reanalysis will soon be finished. Then there will be at least 2 references for comparison with the raw temperature observations which should improve the prospects of temperature homogenization for the period before 1958.<

## Comments on the dataset:

The presented dataset is a collection of radiosonde observation data, and the term 'observation' should be accounted for in an appropriate way. In the presented dataset, variables are given with unrealistic precision (e.g. no radiosonde sensor measures temperature with a precision of  $10^{-4}$  K). No information is provided on the measurement's quality or its uncertainty. The merged dataset contains data from various sonde types and different wind finding systems introducing different measurement uncertainties to the data, and according information should be stored in the metadata. The authors are obviously aware of this, as formally the parameter 'sonde type' is envisaged, yet it contains no data even for the more recent soundings. Surely, the theodolite method, omega navigation system, radar or differential GPS differ in their measurement precision and uncertainty, so information on the adapted wind finding system should also be provided.

>We have now characterized the properties of wind and temperature measurements in more detail. Regarding precision it should be noted that e.g. integer wind speed and direction correspond to irrational u and v values. In order not to lose the ability to convert those values back to speed and direction we kept the digits behind the comma although integer values would be more appropriate. We included this reasoning in the text (section 7) and made clear that the number of digits kept does not correspond to the precision of the measurements.<

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