

Interactive comment on “Updated world map of the Köppen-Geiger climate classification” by M. C. Peel et al.

M. C. Peel et al.

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The original comment is in *italics* and the response is in **bold**.

Interactive comment on “Updated world map of the Köppen-Geiger climate classification” by M. C. Peel et al.

Anonymous Referee 1

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This is another recent update of the Köppen climate classification scheme. The paper should be published as it presents a station-based approach in contrast to a grid-based approach of data analysis.

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We thank the reviewer for their positive recommendation.

Three specific comments suffice:

1. Although the authors have set their theme, I like to note time/space inhomogeneities. I guess, not everybody is really convinced that

(i) one can break up the monthly precipitation-temperature pairs at a station allowing for stations with one variable only, and that

The precise meaning of the above comment is not exactly clear to the authors. However, since the next comment is about temporal inhomogeneity, we have assumed that the above comment is about spatial inhomogeneity.

The decision to split the precipitation and temperature records at a site was taken in order to increase the number of stations (spatial distribution) with data for each variable by including the locations with data for only a single variable (mainly precipitation). Ideally, if precipitation and temperature data were available at all locations, for a concurrent period, then there would be no need to split the pairs. However, we took the decision that "some" information for a variable (based on 30+ values for each month) was better than "no" information. In the case of precipitation this decision allowed us to use data from 12,396 stations rather than 4279 stations (with data for both precipitation and temperature).

(ii) one can allow for inconsistency in climate averaging periods.

Following on from the reply above, the decision to use the whole of record for precipitation and temperature stations rather than a time slice (say 1951 — 2000) was again a tradeoff between homogeneity of time and the spatial distribution of stations. This decision would be compromised in the presence of strong trends in either precipitation or temperature with time. However, due to the structure of the Köppen climate classification system, misallocation of a location into a particular climate type due to any trends, will be predominately limited to the bound-

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aries between one climate type and another, as seen in Figure 1 of Fraedrich et al. (2001). Therefore, we suspect that the gain from including more stations outweighs any loss from mixing time periods.

Why? The authors have used many (30) climate type subdivisions and they do not confine themselves to the broader class partitioning (16, see Trewartha 1980). Thus, local inhomogeneities in space and time will affect the boundaries of the highly resolved climate types (as presented in the figures) more than they would for broader class resolutions (in relative terms).

The aim of the paper was to provide an updated version of the Köppen climate map, using a classification system closely based on that finally used by Köppen, rather than a later modified version, like that of Trewartha (1980). This aim therefore requires us to use 30 climate types, rather than 16. The reviewer is correct to note that the inhomogeneities will affect the boundaries between climate types, as discussed above. It is the case that with 30, rather than 16, climate types there are more boundaries to be affected by these inhomogeneities, however, in order to follow the climate classification of Köppen, this is unavoidable.

Much of the above material is already discussed in section 2 (Data & Methodology) of the paper, so the only change made to the paper is to add a reference to Fraedrich et al, (2001) on page 7.

2a. Area coverage of climate types is given in % of the continental area. It is probably useful to know what 100% is in km² for each continent, or did I overlook that?

The area of each continent in km² was not provided in the paper. The percentages are appropriate for the definitions of continents as seen in the Figures and the 0.1 x 0.1 degree pixel resolution as discussed on page 11 of the paper. Since definitions of continents can be disputed (see 2b below) and the area of a continent is dependent on the resolution of the grid used, we chose not to report area in km². No change.

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2b. *And far from Oz, it is at the Bosphorus, where Europe meets Asia - and not as shown in the Figure.*

The continental definitions used in the paper are an artifact of the HYDRO1k DEM that we investigated using as part of a 3D interpolation of climate variables. A comment has been added to page 11 to indicate the source of the continental definitions.

3. *As the authors elaborate extensively on past work about the Koeppen climate classification, which I highly appreciate, some missing references are necessary for the interested readers:*

Trewartha, G.T.: An Introduction to Climate, 5. Edition, New York und London 1980

Rudloff, W.: World Climates, Wiss. Verlagsges mbH, Stuttgart 1981

Plus one, which may be particularly useful and needs to be discussed as (i) tests on stability have been performed, (ii) climate change has been estimated with (iii) dynamical causes being analysed, and all that related to the Koeppen climate classification (even before many of the recently published papers appeared): Fraedrich, K., F.W. Gerstengarbe, and P.C. Werner, 2001: Climate shifts in the last century. Climatic Change, 50, 405-417

The authors thank the reviewer for recommending the reference of Fraedrich et al (2001), of which we were previously unaware. This reference has been added and is now discussed in the Introduction.

Finally, if the authors like to hang up a world map with updated Koeppen climates on the wall of their lecture hall (provided it is sufficiently large and empty) they may look into:

Werner, P.C., Gerstengarbe, F.-W., Oesterle, H., Wodinski, M. (2005): Climate of the Earth, Klett-Perthes Verlag, Gotha,. . . in English, by the way (not the colours).

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We thank the reviewer for this recommendation.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 439, 2007.

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