

## ***Interactive comment on “CEH-GEAR: 1 km resolution daily and monthly areal rainfall estimates for the UK for hydrological use” by V. D. J. Keller et al.***

### **Anonymous Referee #1**

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#### **# General comments**

The paper is clear, well-written, and it is crystal-clear how the dataset was created.

My main criticism is that the methodology used is not new: known methods are reused. That is not a big problem by itself, but I would expect the authors to explain more their choices and reflect on these (are the resulting grids affected, if yes, how?).

I propose below some improvements to the paper, and perhaps to the methodology to create the grid.

#### **# Methodology and the article**

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I don't think that "for hydrological use" should be in the title. What the dataset is used for is not relevant for the article in my opinion.

(p.85-l.21) what is the methodology used to create the 5km grid? The same as yours? If you chose a different one, why?

(88-7) why were the grid points contoured? I understand the gridded part, but contouring would mean that they were reclassified (eg if value was 11.2 then 10 or 15 would be assigned, if a 5 unit contour step). What this the case?

(90) I think it would be better to swap the 2nd and 3rd categories in the description. All the drawbacks that you mention in l.5+ also apply to the 3rd category too, which is more general. I'd start with global fitting, drawbacks, then introduce local fitting. And mention splines for instance, or at least cite one paper using that method. For instance: @article{Mitasova93, Author = {Mitasova, Helena and Mitas, Lubos}, Journal = {Mathematical Geology}, Pages = {641–655}, Title = {{I}nterpolation by regularized spline with tension: {}}, {T}heory and implementation}, Volume = {25}, Year = {1993} }

(90-17) I think that IDW ought to be mentioned and discussed briefly here. It's in all GIS packages and is ubiquitous. @inproceedings{Shepard68, Author = {Shepard, D.}, Booktitle = {Proceedings 23rd ACM National Conference}, Pages = {517–524}, Title = {A two-dimensional interpolation function for irregularly-spaced data}, Year = {1968} }

(90) I think that [Watson92] should be cited since he has done a lot to promote the use of natural-neighbour interpolation and has provided code even. His comparison of interpolation functions for spatial data is (much) more complete than the one you present, and perhaps you should refer the readers to his book: @book{Watson92, Address = {Oxford, UK}, Author = {Watson, David F.}, Publisher = {Pergamon Press}, Title = {{C}ontouring: {A} guide to the analysis and display of spatial data}, Year = {1992} }

(90-21) I am not sure if I would categorise Kriging as weighted-average method. Tech-

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nically it can be considered as such, but it is so different from TIN interpolation and IDW that it deserves a few lines explaining it.

(91-16) I am not sure if  $\alpha$  is the best variable for the location of a point embedded in the 2D plane. It's usually used for a scalar value. I'd use  $g$  or any lower-case letter in this case. Same for the location of the rain gauges, perhaps  $r$  would be more appropriate than  $i$ ?

(92) I do not understand why the natural neighbour interpolation was implemented on a grid. You have relatively few input points, and you could hard-code the weight for each grid point so that the full interpolation of all grid points doesn't need to be done each time. You should at least discuss the drawbacks of using a grid-based approach, and what errors does that yield (see next point).

(92-17) this is easily solved by returning the value of the input point. In your case, I am curious how your grid-based implementation handles these cases. This should be added to the paper.

(95-20) I understand this statement, but shouldn't your normalisation step compensate for these cases?

#### # The dataset

I could download the dataset and manipulate it. However, downloading it was rather complex. This is perhaps not the fault of the authors, but I had to register forms (with my address and name), wait for different emails, all that to finally obtain a TXT file stating that on that webpage I can download part of the dataset. If it's open and publicly available, why enforcing a registration? As a user, I find that frustrating. Especially since at the end there is a WMS that can be accessed without any user/password.

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