**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Interaction of valleys and circulation patterns (CPs) on small-scale spatial precipitation distribution in the complex terrain of southern Germany" *by* M. Liu et al.

Anonymous Referee #2

Received and published: 16 February 2013

General comments:

The paper analyses the special characteristics of valley stations regarding their contribution to spatial precipitation distribution. It is statistically proved that the narrow valley stations behave differently then assumed based purely on their elevation and that the orientation of the valleys relative to the air flow direction of the CPs is relevant. This is a novel and important contribution to precipitation analysis and has implications for spatial interpolation of precipitation in complex terrain. The paper is well written and clear in structure. However, the description of the method to identify the valley stations and

some minor issues should be addressed before publication (see comments below).

Detailed comments:

1. Title: The title is a bit long. I would suggest the following: "Interaction of valleys and circulation patterns (CPs) on spatial precipitation distribution in southern Germany"

2. Page14169, Line 6: Adding reference to Fig. 4 would support the description here.

3. P.14169, L. 16: Adding reference to Fig. 5 would support the description here.

4. P. 14171, L.11: WI higher than "10" (not "1") indicates wet situations if you have scaled with 10.

5. Table 1: I would suggest adding the mean wetness index for all CPs, which is more informative for the reader than the pure verbal characterisation.

6. P. 14172: This trial-and-error procedure is quite hard to understand. Please, provide a graphical sketch for support and/or reformulate the description.

7. P. 14174, L. 11: Reformulate sentence "We do not exclude . . ."

8. Figure 9: Indications a) and b) are missing.

9. P. 14175, L. 26: Reformulate sentence "For CP05 the valley . . ."

10. P. 14176, L. 23: Better quote here a statistical textbook or a paper not a software manual.

11. P. 14177, L.27: Which weights have been used to calculate the surrogate elevation? May providing a formula would better highlight this idea here.

12. Tables 4 and 5: Re-arrange names of stations such that they are located below the correct station type, e.g. "valley vs. mountain" with "Urach vs. Eningen" (not vice versa as it is now). Is it Urach or Urbach? See also Table 3.

13. Figure 12: This figure is quite tiny to read. Consider enlargement.

14. Figure 13. Incomplete units: mm per what time interval? Per day?

15. Line 488: I would suggest to change Bias=Z_hat – Z, so that overestimation is associated with "+" and underestimation with "-".

16. Figure 13: I would suggest to remove the grey background to be consistent with the other figures.