

REGIONAL-SCALE IDENTIFICATION OF SURFACE WATER AND  
GROUNDWATER INTERACTION USING HYDROCHEMISTRY AND  
MULTIVARIATE STATISTICAL METHODS, WAIRARAPA VALLEY, NEW  
ZEALAND.

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**Response to comments from Reviewer 2**

We thank the reviewer for the positive comments on the manuscript. We are pleased that the reviewer considers the manuscript to be of high quality and likely to be of interest to readers of HESS. The reviewer makes five specific comments to which we reply below.

1. The reviewer suggests that our introduction should include a reference to Lautz LK and Fanelli RM (2008) Seasonal biogeochemical hotspots in the streambed around restoration structures, *Biogeochemistry* 91: 85-104.

As the reviewer points out, the paper by Lautz and Fanelli (2008) deals with a much smaller spatial scale compared to our manuscript. However, the application of multivariate statistics, notably PCA, to water chemistry data is common in both studies. We are therefore willing to include this additional reference in the introduction of our revised manuscript.

2. The reviewer recommends clarification of wording in one particular sentence pertaining to land use.

We agree that this sentence is poorly worded. In our revised manuscript it will be rewritten as “Land use in the Wairarapa Valley is dominated by pastoral agriculture, which covers approximately 76% of the valley floor and includes viticulture and market gardening”.

3. The reviewer suggests that we move discussion of the methodology used in PCA from Section 4.2 to Section 3.2, and that Section 3.2 should be renamed “Multivariate statistical methods”.

We agree that this is a good idea and will do so in our revised manuscript.

4. The reviewer suggests that we remove the use of bold highlighting in Table 1.

This is a good suggestion. Table 1 shows median values of chemical parameters at eight sites identified as outliers. In our original manuscript, we used bold values in this table to indicate which parameter results likely led to classification of each site as an outlier. For example, the reported conductivity at site S26/0657 is 183  $\mu\text{S}/\text{cm}$ , which is much too low considering the concentrations of major ions. So while a conductivity of 183  $\mu\text{S}/\text{cm}$  is not unusual for groundwater in the study area it is probably erroneous for this site. There are other sites at which reported concentrations of Ca are very low relative to other ions, and this is the reason why these sites are identified as outliers. We recognise that a description

of all of these details is not necessary for our manuscript, and so we will follow the reviewer's suggestion and remove the bold highlighting from Table 1 in our revised manuscript.

5. The reviewer identifies three typographical errors.

We will correct these in our revised manuscript.