Interactive comment on "Efficient screening of groundwater head monitoring data for anthropogenic effects and measurement errors" *by* Christian Lehr and Gunnar Lischeid

Anonymous Referee #2

Received and published: 18 September 2019

The paper addresses time series analyses for piezometric heads measured on different wells belonging to a dense network. The topic of the paper is suitable for HESS. The analyses are performed with a known statistical method (Principal Component). The novelty of the paper is the application of this method to piezometric heads chronicle to detect peculiarities in hydrographs of groundwater head. 141 groundwater head time series were selected from 583 wells. The selection criteria are for me unclear. Were they selected because they reach different aquifers? Using a first screening using statistical criteria? Furthermore, piezometric fluctuations with known anthropogenic influences are excluded from the PCA. Does it mean that the method detects only "minor" (not obvious from the visual inspection) peculiarities? Groundwater heads are

usually depending on groundwater recharge, the thickness of the unsaturated zone, exchange with rivers that can have different time characteristics. Under such very different conditions, the computation of the reference hydrograph is not obvious and need some more details (see §3.3). Could you provide some more details for two very different time series and how the PCs included in the calculation are chosen? Mean depth to the ground surface are analyzed. Therefore, systematic errors due to the vertical coordinate of the well reference cannot be detected. Moreover, the provided examples show time limited peculiarities. Is the method suitable to detect long term peculiarities like drifts?

L319 - Reference to Kaiser criterion is 3.2 and not 3.1