



Floods and low flows prediction in ungauged basins – a comparative assessment of studies

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The objective of this study is to assess the performance of methods that predict low flows and flood runoff in ungauged catchments. The aim is to learn from the similarities and differences between catchments in different places, and to interpret the differences in performance in terms of the underlying climate-landscape controls. The assessment is performed at two levels. The Level 1 assessment is a meta-analysis of 14 low flow prediction studies reported in the literature involving 3112 catchments, and 20 flood prediction studies involving 3023 catchments. The Level 2 assessment consists of a more focused and detailed analysis of individual basins from selected studies from Level 1 in terms of how the leave-one-out cross-validation performance depends on climate and catchment characteristics as well as on the regionalisation method. The results indicate that both flood and low flow predictions in ungauged catchments tend to be less accurate in arid than in humid climates and more accurate in large than in small catchments. There is also a tendency towards a somewhat lower performance of regressions than other methods in those studies that apply different methods in the same region, while geostatistical methods tend to perform better than other methods. Of the various flood regionalisation approaches, index methods show significantly lower performances in arid catchments than regression methods or geostatistical methods. For low flow regionalisation, regional regressions are generally better than global regressions.