

## **Catchment classification using community structure concept: application to two large regions**

### **ABSTRACT**

The present study applies the concept of community structure to classify catchments in two large regions: Australia and the United States. Specifically, the edge betweenness method is applied to monthly streamflow data from a network of 218 stations across Australia and from a network of 639 stations across the United States. The influence of streamflow correlation threshold (i.e. spatial correlation in streamflow between streamflow stations) on catchment classification is examined, through use of different thresholds, suitable for each region, as appropriate. The results reveal that, for both regions, a very small number of communities have a large number of catchments within them (for instance, considering both regions as small as 16–18% of the largest communities combine to represent as much as 70–75% of the catchments), and a significantly large number of communities have only a very few catchments within them (for instance, almost 70% of the communities have only one or two stations within them, and thus represent only about 20% and 10% of the catchments in Australia and the US, respectively). An interpretation of the identified catchment communities in terms of catchment characteristics (station drainage area, station stream length, and station elevation) and flow properties (mean and coefficient of variation) is also made. The catchment classification is also explained using the correlation–distance relationship between the stations. © 2021, Springer-Verlag GmbH Germany, part of Springer Nature.