Algorithm 5 HACC-SPATIAL

    # input:
    # V ... set of i georeferenced data vectors
    #   k – tessellation resolution, $k \leq i$
    #   cp – contiguity constraint parameter
 5: # $dist_a$, $dist_{\overline{a}}$ – distance matrices holding average distances
    #   between adjacent/non-adjacent clusters
    # output: a dendrogram of the hierarchical clustering

    # split phase, run k-means clustering on spatial locations of data vectors
10: C $\leftarrow$ k-means(V, k)
    return spatial clustering C
    # merging phase, iteratively merge clusters according to cp
    spatialconstraint $\leftarrow$ TRUE
    repeat
15:    # determine and store cluster distances
    for each spatially adjacent cluster pair $(c_i, c_j) \in C$ **do**
      $dist_a$[i,j] $\leftarrow$ dist(c_i, c_j)
    end for
    for each spatially non-adjacent cluster pair $(c_i, c_j) \in C$ **do**
20:    $dist_{\overline{a}}$[i,j] $\leftarrow$ dist(c_i, c_j)
    end for
    # determine minimum/median distances and contiguity
    $mindist_a \leftarrow \min(dist_a)$, $mindist_{\overline{a}} \leftarrow \min(dist_{\overline{a}})$
    contiguity $\leftarrow \frac{\text{mean}(dist_a)}{\text{mean}(dist_{\overline{a}})}$
25:    # switch off constraint when cp is reached
    if contiguity $\geq$ cp **and** spatialconstraint **then**
      spatialconstraint $\leftarrow$ FALSE
    end if
    if spatialconstraint **then**
30:    clusterpair $\leftarrow$ which($dist_a$ == $mindist_a$, arr.ind=TRUE)
    else
      if $mindist_a \leq mindist_{\overline{a}}$ **then**
        clusterpair $\leftarrow$ which($dist_a$ == $mindist_a$, arr.ind=TRUE)
      else
35:      clusterpair $\leftarrow$ which($dist_{\overline{a}}$ == $mindist_{\overline{a}}$, arr.ind=TRUE)
      end if
    end if
    i $\leftarrow$ clusterpair[1], j $\leftarrow$ clusterpair[2]
    $C \leftarrow C \setminus (c_i, c_j)$ # remove most similar cluster pair
40:    $C \leftarrow C \cup (c_i \cup c_j)$ # add newly merged cluster
    update: $dist_a$, $dist_{\overline{a}}$
    until number of clusters = 1
    return dendrogram of management zones C