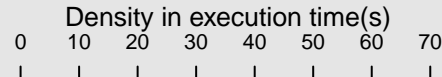


./scripts/04.R



```
1 generatePatchySpecies <-
2 function(nb.sim = 1, nb.sp = 20)
3 {
4   richness <- stack()
5   richness.patch <- stack()
6   for (j in 1:nb.sim)
7   {
8     sp.traits <- data.frame(T.optimum = sample(temperature.gradient,
9       nb.sp, replace = T),
10       T.tolerance = sample(seq(50, 100,
11         length = 1000),
12         nb.sp, replace = T))
13     species <- list() # All the species will be stored in this list
14     range.stack <- stack() # Species ranges will be stored in this stack
15     range.patch.stack <- stack() # Species ranges with patched distributions will be stored in this stack
16
17     for (i in 1:nb.sp)
18     {
19       # Step 1: generating the species environmental suitability
20       # (i.e., transforming from E-space to G-space)
21       species[[i]] <- generateSpFromFun(bio1,
22         list(bio1 = list(fun = "gauss.resp",
23           args = list(mean. = sp.traits[i, "T.optimum"],
24             diff. = sp.traits[i, "T.tolerance"],
25             prob. = 0.99))),
26         rescale.each.response = FALSE,
27         rescale = FALSE)
28       # Step 2: converting environmental suitability to presence-absence,
29       # using the probabilistic conversion
30       species[[i]] <- convertToPA(species[[i]], # PA.method = "threshold",
31         beta = 0.7, alpha = -0.05,
32         plot = FALSE)
33
34       # Step 2.5: generate habitat patches
35       patches <- generate.patches(bio1, n.patches = 50, patch.size = 10)
36       species[[i]]$patched.pa.raster <- overlay(species[[i]]$pa.raster,
37         patches,
38         fun = function(x, y){return(x * y)})
39
40
41       # Step 3: we store ranges to calculate richness par cell
42       range.stack <- addLayer(range.stack,
43         species[[i]]$pa.raster)
44       range.patch.stack <- addLayer(range.patch.stack,
45         species[[i]]$patched.pa.raster)
46     }
47
48
49     # Richness calculation
50     richness <- addLayer(richness,
51       sum(range.stack))
52     richness.patch <- addLayer(richness.patch,
53       sum(range.patch.stack))
54
55     # Saving the files
56     save(species, file = paste0("./data/S1_sim", j, "_species"))
57     save(sp.traits, file = paste0("./data/S1_sim", j, "_traits"))
58     writeRaster(range.stack, paste0("./data/S1_sim", j, "_rangestacks"),
59       overwrite = T)
60     writeRaster(richness, paste0("./data/S1_sim", j, "_richness"),
61       overwrite = T)
62     writeRaster(range.patch.stack, paste0("./data/S1_sim", j, "_rangestacks_patch"),
63       overwrite = T)
64     writeRaster(richness.patch, paste0("./data/S1_sim", j, "_richness_patch"),
65       overwrite = T)
66   }
67 }
```