**Supplementary material 15:** Summary of significant large, medium and fine scale spatial patterns, and significant environmental variables that explain these spatial structures, along the Mayotte and Bassas da India island slopes. These spatial patterns are determined from the analysis of Moran eigenvector maps based on geographic distances (dbMEM). %MIX.RC.S = % mixed substrate 'carbonate rock and sediment'; %MIX.RV.S = % mixed substrate 'volcanic rock and sediment'.

|  | Mayotte West Slope | Mayotte North Slope | Mayotte East Slope | Bassas da India |
| --- | --- | --- | --- | --- |
| Spatial model | Large~6 km | Medium~1 km | Fine0.1-0.2 km | Large~3 km | Medium~1 km | Fine\_ | Large1-2 km | Medium0.8-1 km | Fine0.2 km | Large~2 km | Medium~1-2 km | Fine0.5 km |
| Significance of the RDA model (p-value) | **0.018** | **0.001** | **0.003** | **0.006** | **0.001** | \_ | **0.001** | **0.001** | **0.001** | **0.001** | **0.001** | **0.002** |
| Significant axes | Axe 1 | Axe 1 | Axe 1 | Axe 1 | Axe1/ 2 | \_ | Axe 1/2/3 | Axe1/2/3/4 | Axe 1 | Axe1 /2 | Axe1 | Axe1/2 |
| Adjusted R2 of the multiple regression model(if significant & normality of residuals) | \_ | \_ | 0.09 | 0.69 | 0.43/0.16 | \_ | \_/\_/\_ | 0.78/0.62/0.77/\_ | \_ | \_/\_ | \_ | \_ |
| Explanatory variables |
| Sedimentary geomorphology | \_ | \_ | \_ | \_ | **\*\*/\*\*** | \_ | \_ | **\_/\_/\*\*/\_** | \_ | \_ | \_ | \_ |
| Volcanic geomorphology | \_ | \_ | \_ | \_\*\*\* | \_ | \_ | \_ | **\*\*\*/\*\*/\*\*\*/\_** | \_ | \_ | \_ | \_ |
| Carbonate geomorphology | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\*/\*\*/\*\*\*/\_** | \_ | \_ | \_ | \_ |
| Mixed geomorphology | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| Depth | \_ | \_ | \_ | \_\*\*\* | \_ | \_ | \_ | **\*/\_/\*\*\*/\_** | \_ | \_ | \_ | \_ |
| Slope | \_ | \_ | \_ | \_\*\* | \_ | \_ | \_ | **\*/\_/\*\*/\_** | \_ | \_ | \_ | \_ |
| Longitudinal curvature | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| Transversal curvature | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| BPI 60 m | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| BPI 120 m | \_ | \_ | \_ | \_ | **\*/** | \_ | \_ |  | \_ | \_ | \_ | \_ |
| BPI 500 m | \_ | \_ | \_ | \*\*\* | **\*/\_** | \_ | \_ | **\*\*\*/\_//** | \_ | \_ | \_ | \_ |
| Northness | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\*/\_//** | \_ | \_ | \_ | \_ |
| Eastness | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\*\*\*/\*/\*\*\*/\_** | \_ | \_ | \_ | \_ |
| Rugosity | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| Hardness | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\_/\_/\*\*/\_** | \_ | \_ | \_ | \_ |
| Substrate diversity | \_ | \_ | \*\* | \_ | **\_/\*** | \_ | \_ | **\_/\*/\_/\_** | \_ | \_ | \_ | \_ |
| %MIX.RC.S | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| %MIX.RV.S | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\*\*\*/\*\*\*/\*\*\*/\_** | \_ | \_ | \_ | \_ |
| %Gravels | \_ | \_ | \* | \* | \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |
| %Cabonate rock | \_ | \_ | \* | \_ | \_ | \_ | \_ | **\_** | \_ | \_ | \_ | \_ |
| %Volcanic rock | \_ | \_ | \_ | \_ | \_ | \_ | \_ |  | \_ | \_ | \_ | \_ |
| %Mixed | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\_** | \_ | \_ | \_ | \_ |
| %Mixed rock | \_ | \_ | \_ | \_ | \_ | \_ | \_ | **\_/\*\*/\_/\_** | \_ | \_ | \_ | \_ |
| %Biogenic | \_ | \_ | \_ | \*\*\* | \_ | \_ | \_ | **\_** | \_ | \_ | \_ | \_ |