In this dataset, invertebrate communities were sampled on 6 sites of 11 watersheds on the Rhône river drainange in France. Invertebrates were sampled using a Hess sampler (40 cm diameter; 1250 cm² surface area; 250 μm mesh size). Samples were preserved in 96% ethanol, then counted and identified mostly to the genus level. Electrical conductivity (S/m), pH, water temperature (°C) and dissolved oxygen concentration (mg/L) were measured with Hach Lange® HQ40d and HQ14d devices at each sampling site for each sampling date. Water presence loggers (Onset Hobo®, Intermountain Environmental, Inc., Logan, Utah) were installed at each site in riffles heads because they are the first habitat affected by drying (Boulton, 2003). They monitored continuously the presence or absence of surface water during the hydroperiod, allowing computing the number of days passed since last rewetting event on the watershed.

Three first letters of the sample name indicate the name of the watershed, following number indicates the site of the watershed and next numbers indicate the sampling date.

mat\_beta\_sor: beta diversity matrix computed with Sorensen index

mat\_beta\_env1: distance matrix of temperature in °C

mat\_beta\_env2: distance matrix of pH

mat\_beta\_env3: distance matrix of conductivity in S/m

mat\_beta\_env4: distance matrix of dissolved oxygen concentration in mg/L

mat\_beta\_env5: distance matrix of the number of days since last rewetting of the watershed

mat\_beta\_geo: log-transformed Euclidean distance matrix

mat\_beta\_t: temporal distance matrix in days

mat\_delta\_alpha: distance matrix of alpha richness

mat\_delta\_J: distance matrix of abundance of individuals