

Figure F1. Topographic and bathymetric map of Gibraltar Strait region, showing locations of Site U1385 on southwest Iberian margin, other Expedition 401 sites, and sites from previous expeditions in Atlantic and Alborán Sea. ODP = Ocean Drilling Program, DSDP = Deep Sea Drilling Project. From Flecker et al. (2025a).

Figure F2. MS, NGR, and XRF counts of selected elements (Al, Si, Ti, Fe, Rb, Zr, Ca, Sr, Mn, and Ba), Hole U1385K. Age model used in this figure was generated on the ship (Flecker et al., 2025a). Gaps in data set correspond to incomplete drilling recovery. Dots = raw measurements. Solid lines = moving average with window set to 3 measurements. IU = instrument units, cps = counts per second, MSC= Messinian Salinity Crisis.

Figure F3. MS, NGR, and XRF counts of selected elements (Al, Si, Ti, Fe, Rb, Zr, Ca, Sr, Mn, and Ba), Hole U1385L. Age model used in this figure was generated on the ship (Flecker et al., 2025a). Gaps in data set correspond to incomplete drilling recovery. Dots = raw measurements. Solid lines = moving average with window set to 3 measurements. IU = instrument units, cps = counts per second, MSC= Messinian Salinity Crisis.

Figure F4. Close-up of MS, NGR, and XRF counts of selected elements (Al, Si, Ti, Fe, Rb, Zr, Ca, Sr, Mn, and Ba), Cores 401-U1385K-11X through 15X (see red square in Figure F2 for position). Red and blue lines are traced to show correlations between peaks and troughs for the measurements. Age model used in this figure was generated on the ship (Flecker et al., 2025a). Gaps in data set correspond to incomplete drilling recovery. Dots = raw measurements. Solid lines = moving average with window set to 3 measurements. IU = instrument units, cps = counts per second, MSC= Messinian Salinity Crisis.

Figure F5. Lower left: crossplot matrix of selected XRF elements, Holes U1385K and U1385L. Matrix displays pairwise relationships between seven elements (Al, Si, Ti, Ca, Sr, Mn, and Ba). Diagonal panels show kernel density estimates for distribution of each element. Below the diagonal, scatter plots depict bivariate relationships,

where each dot represents a measurement point and is semitransparent to reveal data density. Black lines = best-fit linear regressions for visualizing correlation trends. All data are filtered to exclude measurements influenced by residual argon signal contamination, yielding a total of 8833 quality controlled measurements. Upper left: Spearman rank correlation matrix of same elements. Heat map shows pairwise correlation coefficients between seven selected elements, with coefficients annotated in each cell. Correlations were computed using nonparametric Spearman method to account for potential nonlinear relationships and nonnormal data distributions. Color shading follows red–blue diverging color map centered at zero (red tones = positive correlations, blue tones = negative correlations). Strong positive associations are observed between several major elements, suggesting shared geochemical behavior or common sediment sources.

Figure F6. Lower left: close-up crossplot matrix of selected XRF elements at 450–490 m CSF-A shown in Figure F4, Hole U1385K. Matrix displays pairwise relationships between seven elements (Al, Si, Ti, Ca, Sr, Mn, and Ba). Diagonal panels show kernel density estimates for distribution of each element. Below the diagonal, scatter plots depict bivariate relationships, where each dot represents a measurement point and is semitransparent to reveal data density. Black lines = best-fit linear regressions for visualizing correlation trends. All data are filtered to exclude measurements influenced by residual argon signal contamination. Upper left: Spearman rank correlation matrix of same elements. Heat map shows pairwise correlation coefficients between seven selected elements, with coefficients annotated in each cell. Correlations were computed using the nonparametric Spearman method to account for potential nonlinear relationships and nonnormal data distributions. Color shading follows red–blue diverging color map centered at zero (red tones = positive correlations, blue tones = negative correlations). Strong positive associations are observed between several major elements, suggesting shared geochemical behavior or common sediment sources.