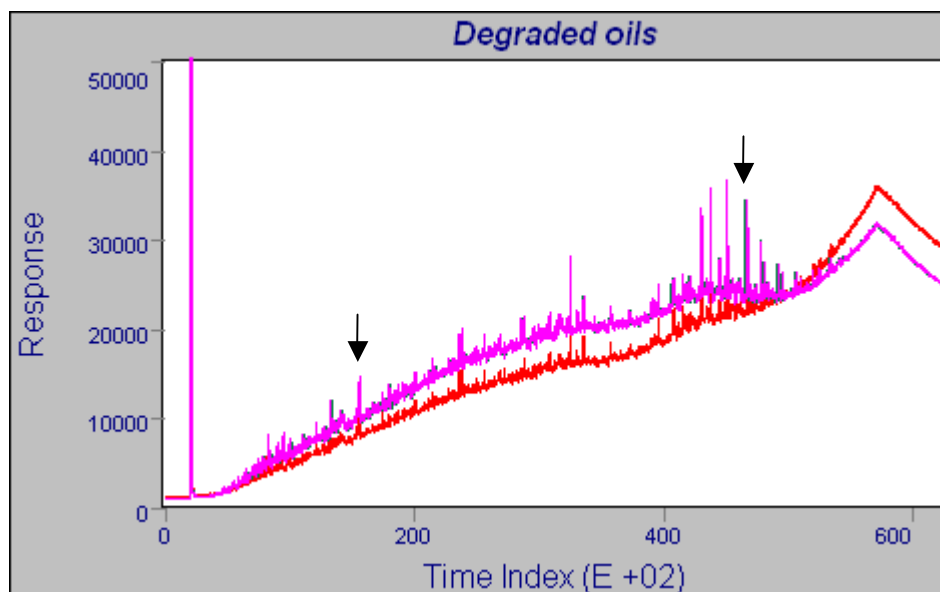




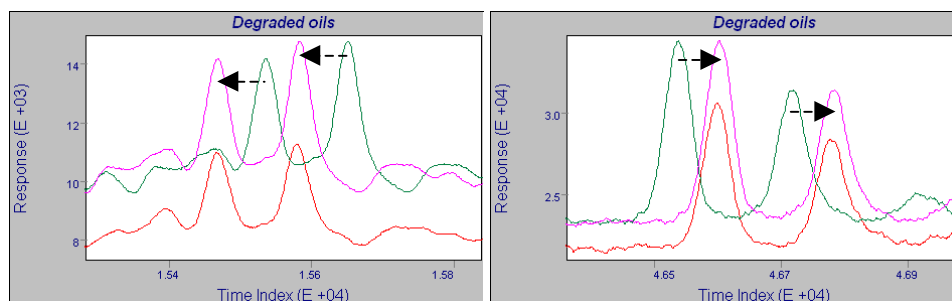
LineUp Application Brief Biodegraded Crude Oils

Several different alignment technologies can be made to work when a chromatogram is populated with a set of consistent marker peaks. Because LineUp relies on a correlation process to adjust for retention time variation, it can succeed even when the peak population is limited. Consider the case of biodegraded crude oils. The degradation process selectively strips the oils of their alkanes and leaves behind the more-resistant components. In the chromatograms below, bacterial action has stripped all but the biomarker compounds.



Biodegraded crude oils showing only the sterane and terpane biomarkers. Arrows point to windows shown below.

Because it works by pattern matching, the *correlation optimized warping* algorithm used by LineUp can accommodate run-to-run variations and correct retention shifts even if none of the peaks are known. The windows below show short regions of a reference chromatogram of a biodegraded crude oil, in red, with before (green) and after alignment (magenta) traces of another degraded oil. Peaks in the aligned trace show good correspondence to the reference, with shifts in either direction corrected, all in the same file.



The green chromatogram is shifted to match the retention of the standard. Note that the adjusted magenta trace was shifted to an earlier time in the beginning of the run (left) and to a later time nearer the end (right).