



## Trace metal concentrations and OH defects in quartz from Amazon River sands & and perspectives for application to the marine record

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Trace metal concentrations and associated hydrous lattice point defects (OH defects) in quartz can help reveal its host rock's crystallization history and are easily quantified using electron microprobe and infrared spectroscopy, respectively. These chemical impurities are preserved throughout the sedimentary cycle and thus lend themselves as tracers for sediment provenance analyses, particularly in settings where "traditional" provenance tools, e.g., thermochronology and heavy mineral analysis, are difficult due to factors like low mineral fertility and aggressive tropical weathering.

In this study, we apply this provenance analysis tool to detrital, sand-sized quartz grains from the Amazon River and its major tributaries, draining the Andean orogen as well as the Guiana- and Central Brazil Shields. Trace metal and OH defect concentrations from individual catchments are spread out over wide and mutually overlapping ranges of values. This means that each individual quartz grain cannot be unequivocally attributed to one catchment. However, evaluation of a statistically sound number of grains reveals that Andean quartz is, on average, richer in the trace metal aluminum (and Al-related OH defects) than quartz derived from one of the shield sources.

We evaluate our findings in the context of previous provenance studies on Amazon River sediments and discuss a potential future application of analyzing trace metals and OH defects in quartz in the offshore sediment record. Any past, major rearrangements in the Amazon watershed affecting the ratio of Andean vs. Shield-derived quartz grains should be detectable and our approach may therefore contribute to the reconstruction of Amazon drainage basin evolution.