A new workflow to measure zircons using high gain current amplifiers on the Thermo Scientific TRITON *Plus* Thermal Ionization Mass Spectrometer

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Modern U-Pb geochronology relies on highly precise and accurate isotope analyses of small samples. Conventional dynamic ion counting protocols imply the accurate calibration of the ion counter for linearity over an extended dynamic range. Faraday cup protocols have proven stability and linearity but are limited by the noise of the current amplifiers. The Thermo Scientific™ TRITON™ *Plus* TIMS incorporates a new high gain amplifier technology, which improves the noise to signal ratio of the 10^{13} ohm current amplifiers by a factor of 5 or more compared to 10^{11} ohm current amplifiers and thus bridges the gap between ion counting and Farady cup capabilities. In a previous study, we measured Pb/Pb and U/Pb ratios in small samples (<1 to 700 pg) by simultaneous acquisition of all natural and tracer Pb isotopes (^{202,204,205,206,207,208}Pb) in static multiple collection mode [1]. All Pb isotopes were measured on Faraday cups equipped with 10^{13} ohm amplifiers, with the exception of ^{204}Pb, which was collected on a SEM ion counter. Likewise, $^{233,235,238}U^{16}O_2$ species were monitored simultaneously in static multiple collection mode on Faraday cups equipped with 10^{13} ohm amplifiers. It was found that these static measurement routines and conventional dynamic ion counting protocols provided consistent U-Pb dates in natural and synthetic standard zircons. Furthermore, repeated analyses of most synthetic U-Pb solution aliquots were more reproducible when Pb isotopes were measured in static mode on Faraday cups than when measured in dynamic ion counting mode [1].

We have adapted the static protocol [1] into a standardized semi-automated workflow for the analysis of zircon U-Pb systematics including on-line correction of on-peak-zero baselines and oxygen fractionation control. Mass $^{238}U^{16}O^{18}O$ is additionally monitored on the central SEM ion counter, simultaneously with $^{233,235,238}U^{16}O_2$ species measured on Faraday cups, in order to characterize oxygen isotopic fractionation and accurately correct the oxide interference from the tracer ^{233}U on mass $^{235}U^{16}O_2$. The results of the analysis of well-characterized U-Pb solutions doped with the ET2535 spike will be presented.

L3	L2	L1	SEM	H1	H2	H3	H4
10^{13}	10^{13}	10^{13}		10^{13}	10^{13}	10^{13}	10^{13}
		^{202}Pb	^{204}Pb	^{205}Pb	^{206}Pb	^{207}Pb	^{208}Pb
$^{233}U^{16}O_2$	$^{235}U^{16}O_2$	$^{238}U^{16}O_2$	$^{238}U^{16}O^{18}O$				

Table 1: U-Pb cup configurations.

[1] von Quadt et al. (2016) *JAAS* **DOI: 10.1039/C5JA00457H**.