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FRONTIERS IN LASER ABLATION PETROCHRONOLOGY

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Since the first Laser Ablation ICP-MS U-Th/Pb dates were published ~25 years ago, the field has expanded significantly, becoming a key technique for rapidly measuring spatially resolved in-situ isotopic dates at the micron-scale. LA-ICP-MS geochronology is now integral to a broad range of earth science studies - from determining sedimentary provenance to quantifying the timing and duration of a broad range of geologic processes. Drawing on examples from ongoing research at the University of California Santa Barbara, and elsewhere, this presentation will highlight recent advances and potential future directions in situ U-Th/Pb geochronology.

Specifically, this presentation will focus on four key avenues of progress: 1) there have been significant improvements in both laser and mass spectrometry instrumentation that increase the precision and the spatial resolution at which dates can be measured; 2) development and application of novel data acquisition and reduction methods to interrogate data and produce the best quality dates possible; 3) concomitant analysis of trace elements and/or other isotope systems of petrologic importance along with U-Th/Pb dates in order to integrate ages with structural, pressure-temperature, phase relationships and geochemical data and; 4) development of campaign-style geochronology methods to elucidate the spatial and temporal scale of geologic processes at scales ranging from single crystals to entire mountain belts.