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Multiple geochemical and morphological instrumental approaches to improve the supereruption Young Toba Tuff knowledge.

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The facilities of the ALIPP6 geochemical analytical laboratory are used for several geological applications, from halogens to Mars2020 targets calibrations to Rb-Sr or U-Th datings.

The recent developments of ICP-MS/MS (Agilent 8800 and 8900) technique coupled with a laser ablation (here Photon Machine Excimer 193 nm) allows in situ analyses of the majority of elements of Mendeleev's periodic table. The LA-ICP-MS/MS technique has many advantages compared to classical LA-ICP-MS for analyzing trace elements in geological material, as it can resolve many important isobaric interferences.

We propose here to present how we have coupled the high-resolution tephrostratigraphic marine sedimentary record study with the morphological characteristic using both numerical microscope and SEM, and the geochemical major and trace elements composition using both EPMA and LA-ICP-MS/MS facilities to improve our knowledge of supereruption history.

To illustrate our new methodology, we will present a study on the well-known Indonesian Young Toba Tuff eruption commonly accepted age of ~74 ka. Using a marine sedimentary core record 600 km far from Sumatra Island, we challenge the short-lived explosive supereruption of YTT, arguing that YTT is not a single event but composed of a multiple event volcanic activity period. Seventeen distinct tephra and cryptotephra layers were identified in three main successive volcanic activity phases over a period of 50 ka.