

# CVL Seminar Session 1: 7 September 2022, 4 PM CET

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## Using lake cores to unravel the eruptive history of volcanic regions: the case of Flores Island (Azores)

Lacustrine sequences from active volcanic settings usually hold a rich and continuous record of tephra layers, providing a critical source of information to reconstruct a most complete eruptive history of a region. Lake sedimentary records on volcanic islands are particularly useful as the typical size of the islands and their steep subaerial and submarine slopes lead to a lower preservation of potential erodible pyroclastic deposits. Accordingly, we explored the lacustrine sedimentary record of Lagoa da Lomba, a crater lake strategically located half distance between the two clusters of recent volcanic activity of Flores Island (Azores). Based on a detailed stratigraphic characterization of sediments from a lake transect of three cores, supported by glass shard geochemistry and radiocarbon dating, we recognized four Holocene eruptive events taking place between 6.28 and 2.36 cal kyr BP. Our observations show that Holocene volcanism at Flores Island was vigorous and lasted longer than previously reported. Therefore, contrary to what is assumed, the possibility of future eruptions should be properly considered, and the volcanic hazard at Flores Island should not be underestimated. Moreover, we highlight the importance of tephrostratigraphy in recent lake sediments to reconstruct past volcanic activity, especially in sites where exposures are limited.



# CVL Seminar Session 2: 21 September 2022, 4 PM CET

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## **Rare Earth Elements variations at Poás hyperacid crater lake (Costa Rica) during 2009-2016 phreatic eruption activity**

Major elements and physico-chemical parameters variations at crater lakes have been largely used for volcano monitoring purposes. Here a study focusing on REE behavior at Poás hyperacid crater lake between 2009-2016 is presented. A database consisting of almost 700 phreatic eruptions was compiled and further analyzed. The main objective of this work is to discern if REE variations over time are linked to changes in phreatic activity, major elements, and physico-chemical parameters. The results obtained show that the concentration of REE varies from 950 to 2,773  $\mu\text{g L}^{-1}$  during 2009-2016 and their variations are related to the main changes of the phreatic activity. In particular,  $(\text{La/Pr})_{\text{N-local rock}}$  and  $(\text{LREE/HREE})_{\text{N-local rock}}$  ratios increase and decrease respectively when the activity is more intense. By comparing of the major elements variations with  $(\text{La/Pr})_{\text{N-local rock}}$  and  $(\text{LREE/HREE})_{\text{N-local rock}}$  it can be observed that Ca behaves oppositely from other major elements, decreasing when  $(\text{La/Pr})_{\text{N-local rock}}$  increases and increasing when  $(\text{LREE/HREE})_{\text{N-local rock}}$  increases. These findings, Ca loss and mass balance calculations suggest that gypsum/anhydrite precipitation plays a major role in REE variations over time. These results suggest that REE behavior is sensitive to changes in phreatic activity and could provide additional information on fluid-mineral dynamics.

