

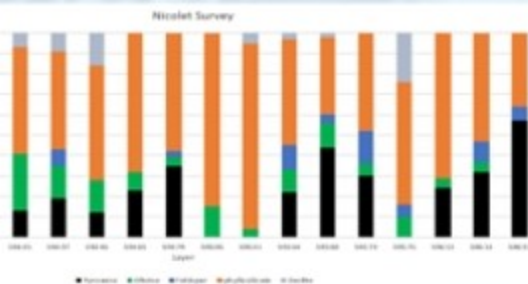
# CHARACTERIZING THE MAFIC MINEROLOGY OF HYDROTHERMALLY ALTERED BASALTIC DRILL CORE FROM THE HUMU'ULA SADDLE, HI

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## Introduction

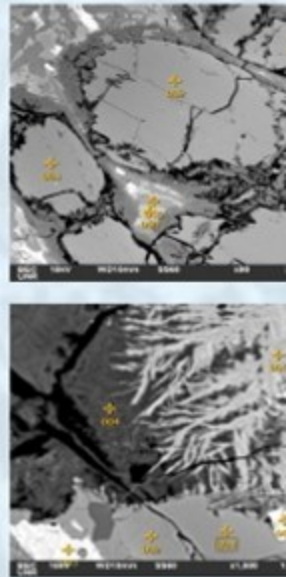
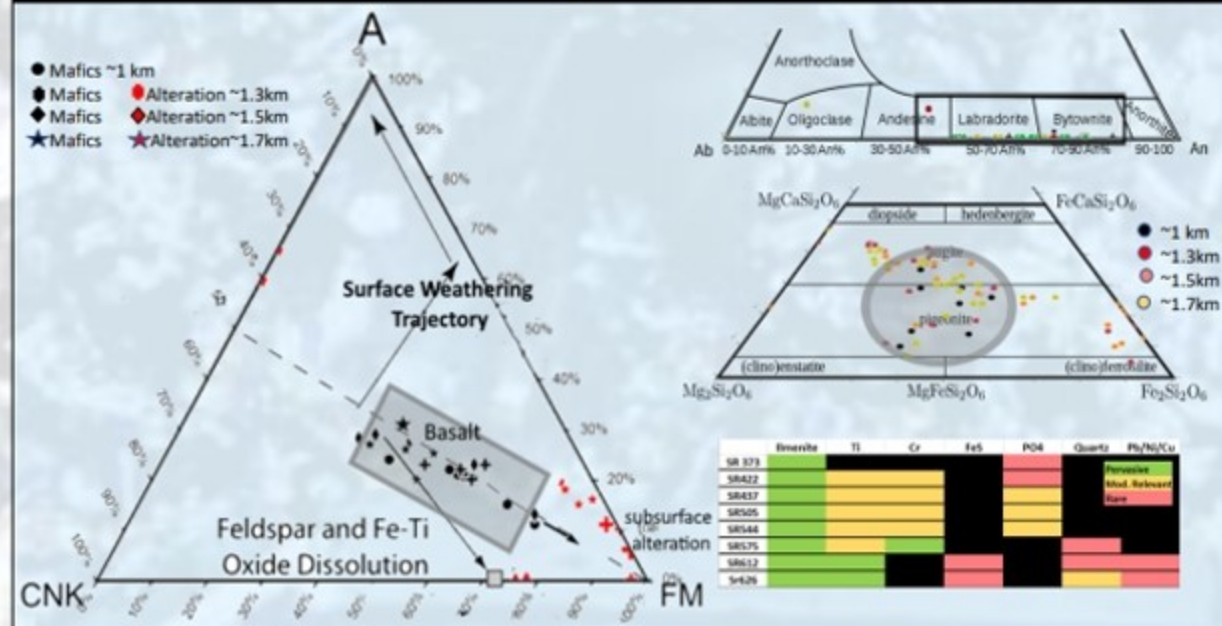
Provides an examination the mafic mineralogy in topographic and petrographic analysis of the PTA2 Drill Core from Humu'ula, HI. The long-wave infrared (LWIR) spectra are used to determine semi-quantitative abundance of minerals in the pyroxene, olivine, feldspar, Fe-Mg silicates, and zeolite groups. SEM EDS work on cut thick sections confirmed the endmembers in the spectral unmixing. Higher resolution data. Olivine phenocrysts, in the upper portions of the drill core, are altered at higher concentrations of pyroxene, spinel, oxide and glass minerals. Most notably, heavier elements like Cr and Ti become more abundant within mafic units in lower units.

## Spectral Unmixing



Abundances of minerals derived using a spectral linear mixing model. Minerals in the field were crushed and measured in reflectance from 2 to 25 micrometers. Spectral libraries taken from JPL, JHU and USGS spectral libraries are as follows: Olivine (Fo92); Blue: Feldspars; Orange: Pyroxene; Grey: Zeolites; Green: Olivine (Fo92); Blue: Feldspars; Orange: Phyllosilicates (Chlorites, Smectite, Illite); Grey: Zeolites (Analcime)

## Bulk Mafics & Basaltic Compositions



## Results and Conclusions

- Spectral unmixing of LWIR provided semi quantitative mineral abundances.
- SEM EDS work confirmed LWIR findings + provided detailed elemental composition.
- Mafic compositions on A-CNK-FM Ternary match with other terrestrial basalts.
- Alteration trends fall mostly within closed systems.
- Both Plagioclase (labradorite and bytownite) and Pyroxene (Fe/Mg dominant) minerals are chemically consistent with Hawaiian basalts with no obvious trend with depth.
- SEM EDS work resolved makeup of fine-grained matrix material, which included minerals that may have affected LWIR results.
- Some variations observed in EDS work may attribute to differences in alteration types.

## Future Work

- Survey other flow units (ie: A'a + Hawaiiite) for definitive characterization of mafic minerals in the PTA-2 drill core.
- Survey other drill core (Ex: KMA-1 and Lanai) for alteration minerals, mafic minerals, and geochemical and textural variations between different lava flows
- Compare and contrast PTA2, KMA1 and Lanai.

## References & Acknowledgments

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