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ELECTRON PROBE MICROANALYTICAL DATA OF MINERALS AND GLASS FROM ROCK SAMPLES FROM PAVLOF VOLCANO, ALASKA

Jessica F. Larsen¹, Janet. R Schaefer², Cheryl E. Cameron², and Simone Montayne²

INTRODUCTION

This report includes electron microprobe analytical data from minerals from lava samples collected at Pavlof Volcano by Alaska Volcano Observatory (AVO) geologist Jessica Larsen during fieldwork in 2017 and from tephra samples described in Waythomas and others (2017). Samples include those produced during recent eruptions of Pavlof in 1986, 1996, 2007, 2013, 2014, and 2016.

Pavlof Volcano is an undissected stratovolcano located approximately 58 km northeast of Cold Bay, in the southwestern portion of the Alaska Peninsula. There have been 45 confirmed eruptions from Pavlof since 1790 (Miller and others, 1998; Waythomas and others, 2017). Recent activity from Pavlof includes eruptions in 1986, 1996, 2007, 2013, 2014, 2016, and between 2019 and 2022 (www.avo.alaska.edu; Waythomas and others, 2017; Larsen and others, 2021). Pavlof typically erupts basalt to basaltic andesite magma with a restricted compositional range (~52 to 54 wt% SiO₂; Waythomas and others, 2017; Larsen and others, 2021).

Electron probe micro-analysis (EPMA) data are reported from the major mineral phases: orthopyroxene, clinopyroxene, olivine, plagioclase, and magnetite. Glass data from Pavlof tephra are reported in Waythomas and others (2017) and Larsen and others (2021).

The analytical data tables associated with this report are available in digital format as .csv (<https://doi.org/10.14509/30854>) and are also available in .html and .csv from the AVO Geochemical Database (<https://avo.alaska.edu/geochem>). Sample descriptions, locations, and types are included in the metadata associated with the analytical data table. Samples collected during this project, including hand sample material, remaining powder from these whole-rock analyses, and partially crushed sample remains are currently stored at the Alaska Geologic Materials Center in Anchorage.

DOCUMENTATION OF METHODS

Sample Preparation and Analysis Methods

Electron microprobe analyses were collected from polished thin sections that were professionally prepared for AVO. The thin sections were carbon coated using an Edwards System carbon coater in the Advanced Instrumentation Laboratory (AIL) at the University of Alaska, Fairbanks. The electron microprobe analyses were obtained using the AIL JEOL JXA -8530F Electron Probe Microanalyzer, with five wavelength dispersive spectrometers all with large area crystals.

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Metadata, including count times, spectrometers, percent error on each atom, and working standard data from each mineral phase or glass analytical session is reported in the accompanying digital data distribution files. Briefly, analytical conditions were set to 15 keV and 10 or 25 nA, with a focused beam for the mineral phases.

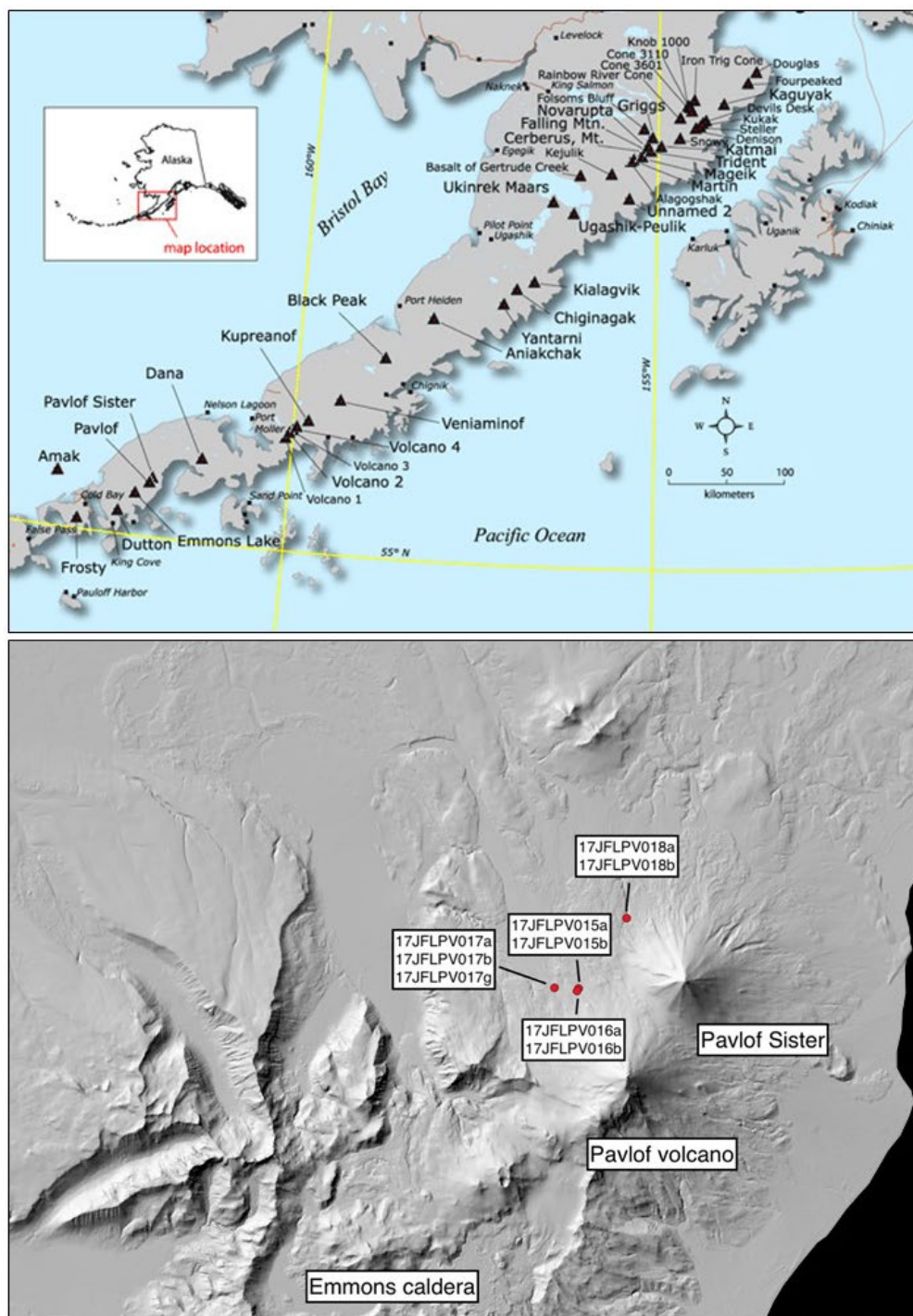


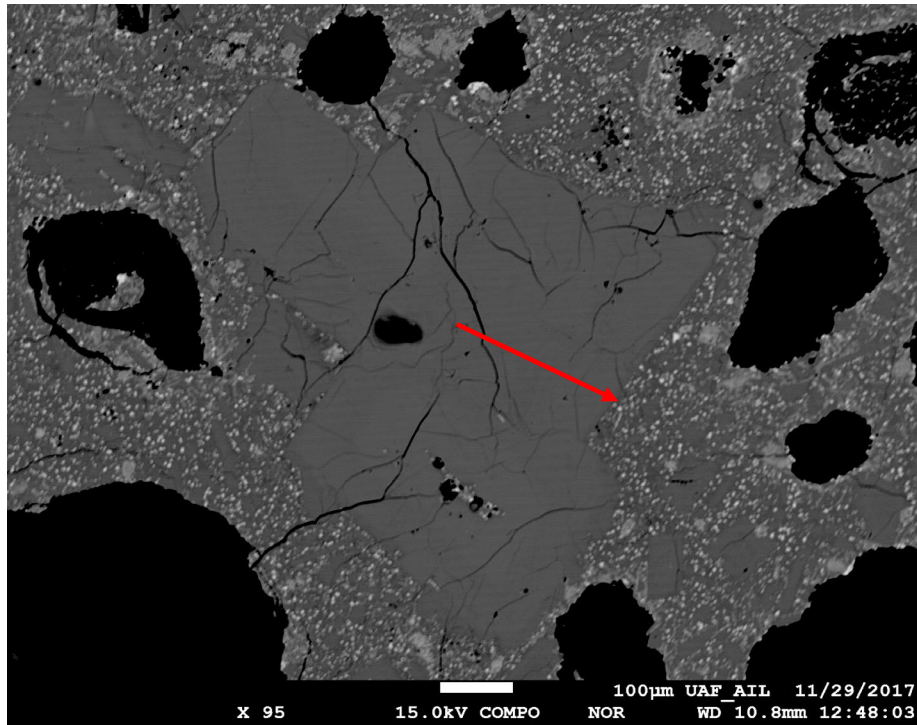
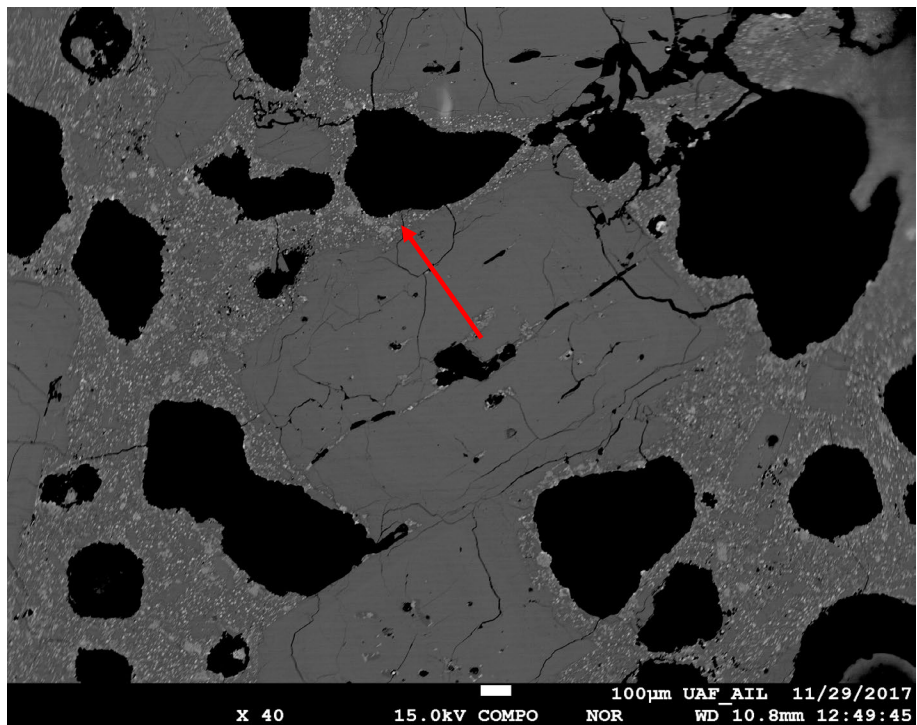
Figure 1. Sample location map from Pavlof Volcano. The digital elevation model is from the Arctic DEM, accessed via the DGGS elevation portal (elevation.alaska.gov/) using IFSAR data. Index map created by Janet Schaefer (DGGS-AVO).

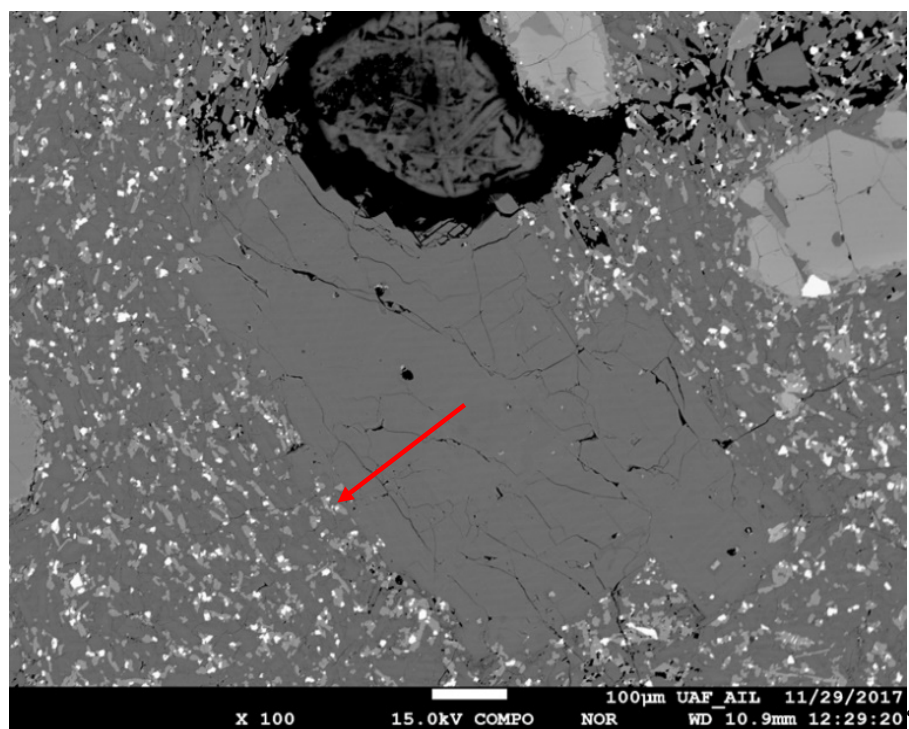
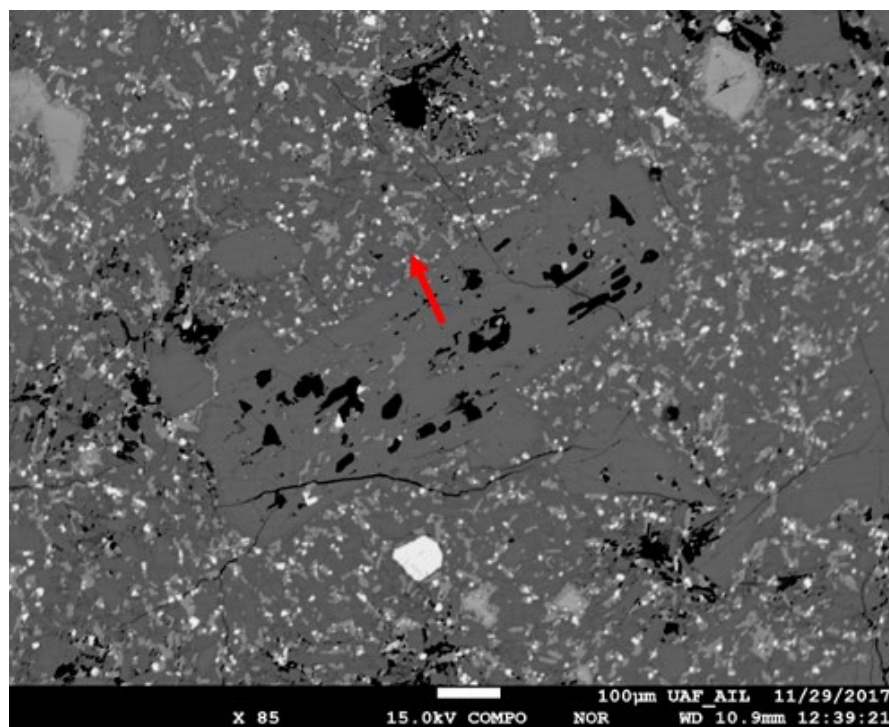
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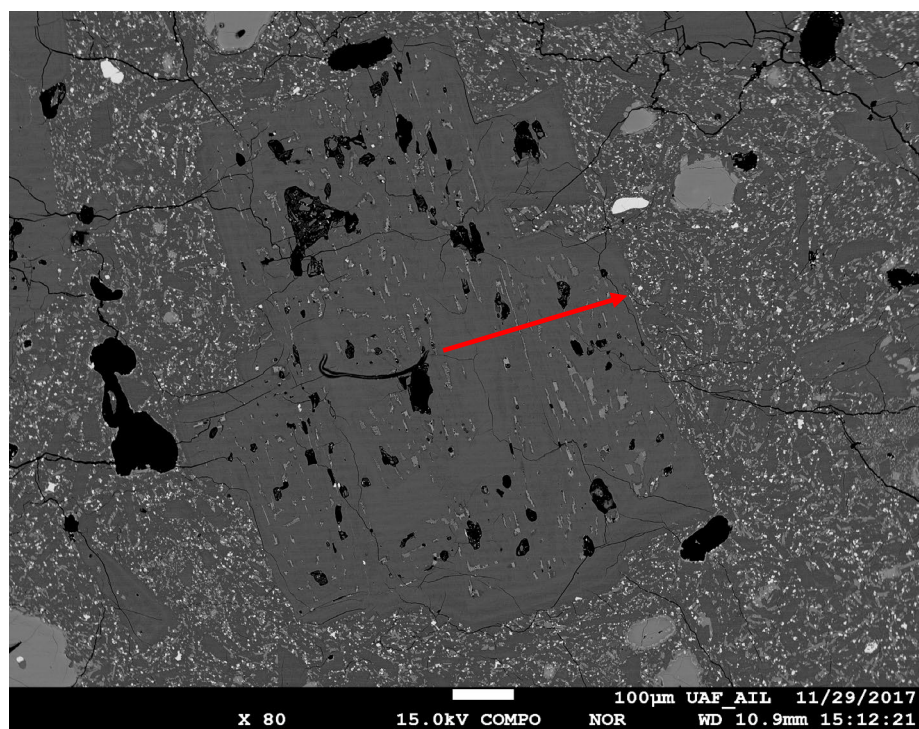
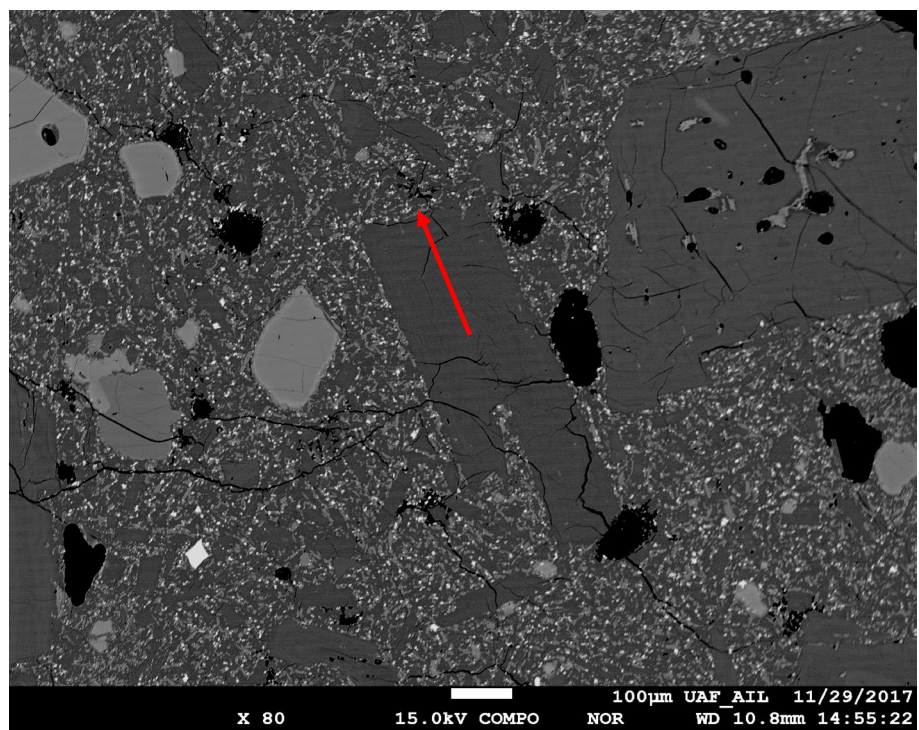
This material is based on work supported by the U.S. Geological Survey in a cooperative agreement with the UAF Geophysical Institute and under Cooperative Agreement No. G22AC00137 to the Alaska State Division of Geological & Geophysical Surveys. Analyses were conducted in the Advanced Instrumentation Laboratory in the College of Natural Sciences and Mathematics at the University of Alaska, Fairbanks. We thank Ken Severin for making the facility available to researchers and assisting with the instrumentation. We thank Christopher Waythomas, Katie Mulliken, and Pavel Izbekov for discussions and collaborations during the Pavlof fieldwork. We thank Kristi Wallace for access to tephra samples described by Waythomas and others (2017). Lodging provided by Mary Martin at the Cold Bay Lodge in Cold Bay was greatly appreciated. Maritime Helicopters and Egli Air Haul and pilots Jared Berman and Sam Egli provided efficient, safe, and professional transportation in the field areas.

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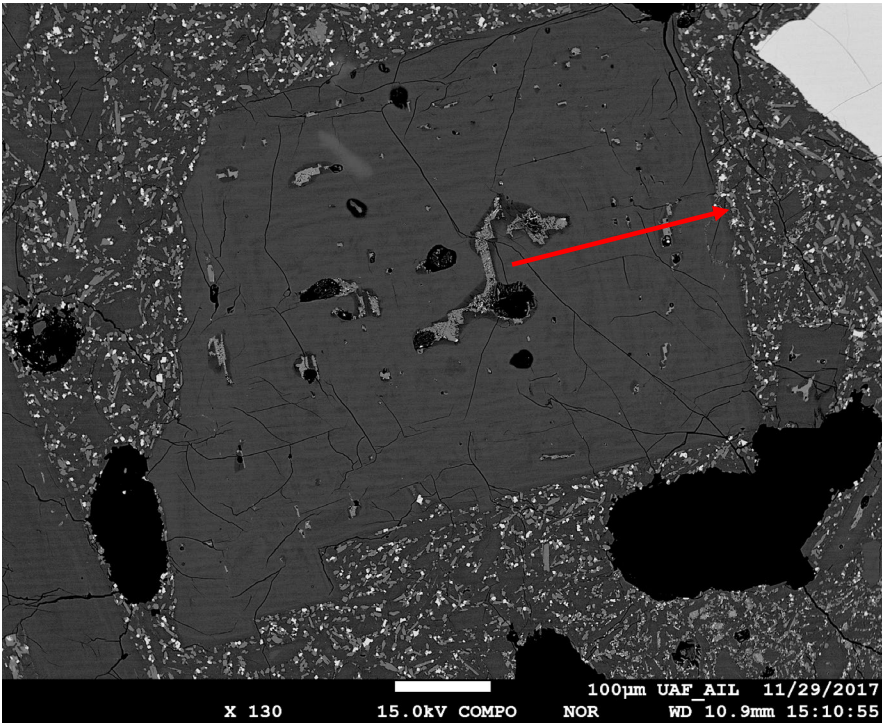
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APPENDIX A: SAMPLE TRANSECT IMAGES**17JFLPV018B Plagioclase transect 1****17JFLPV018B Plagioclase transect 2**

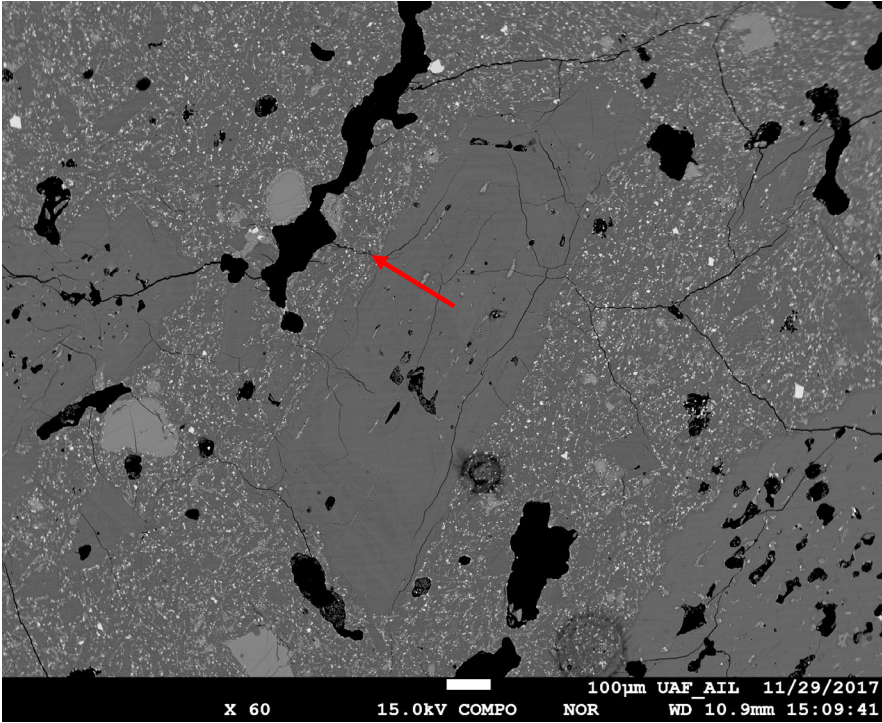
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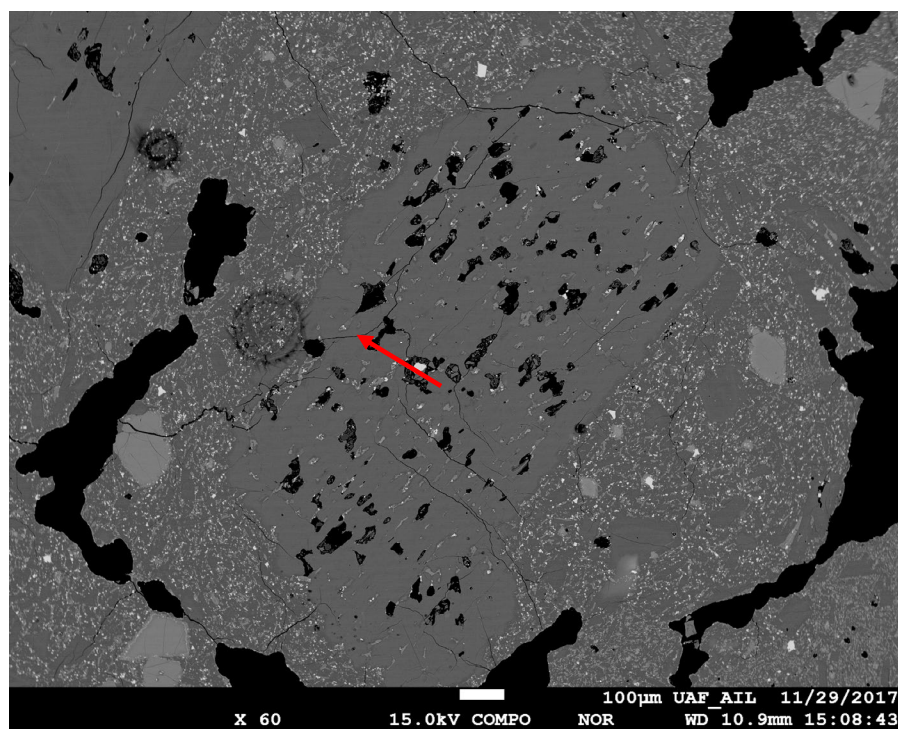
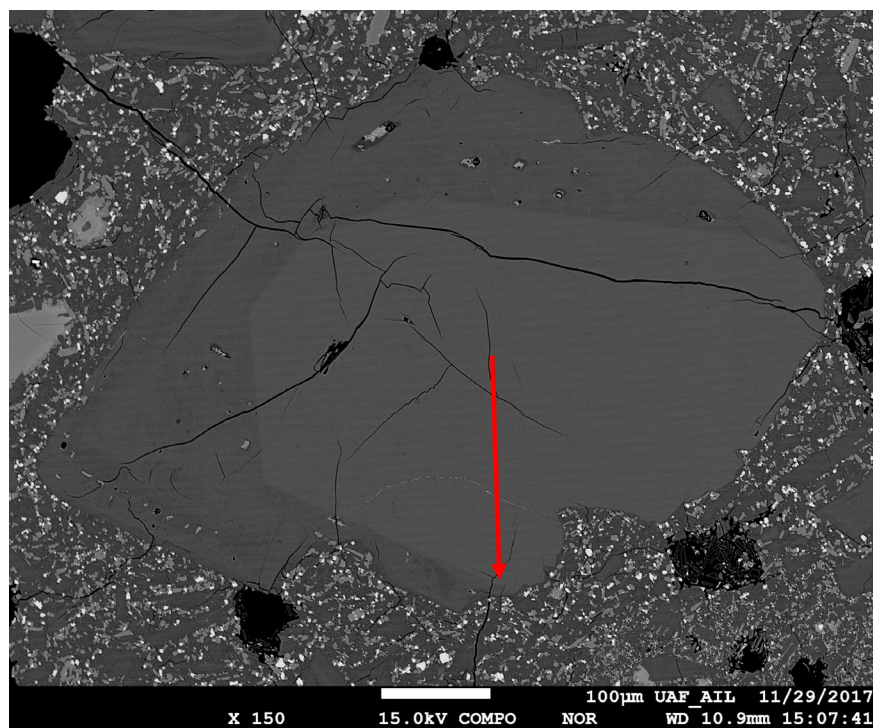
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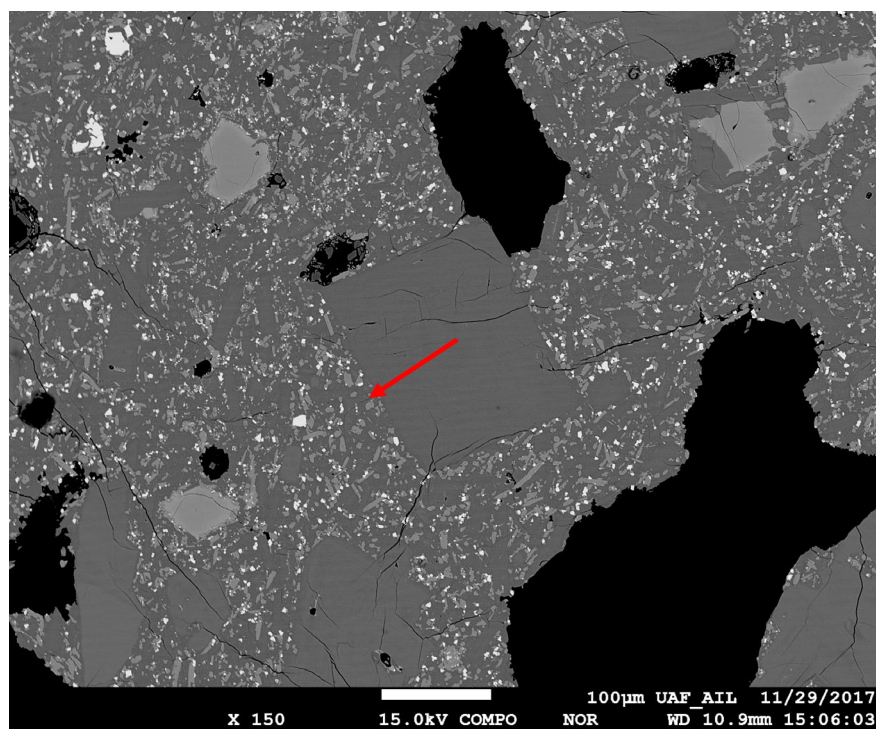
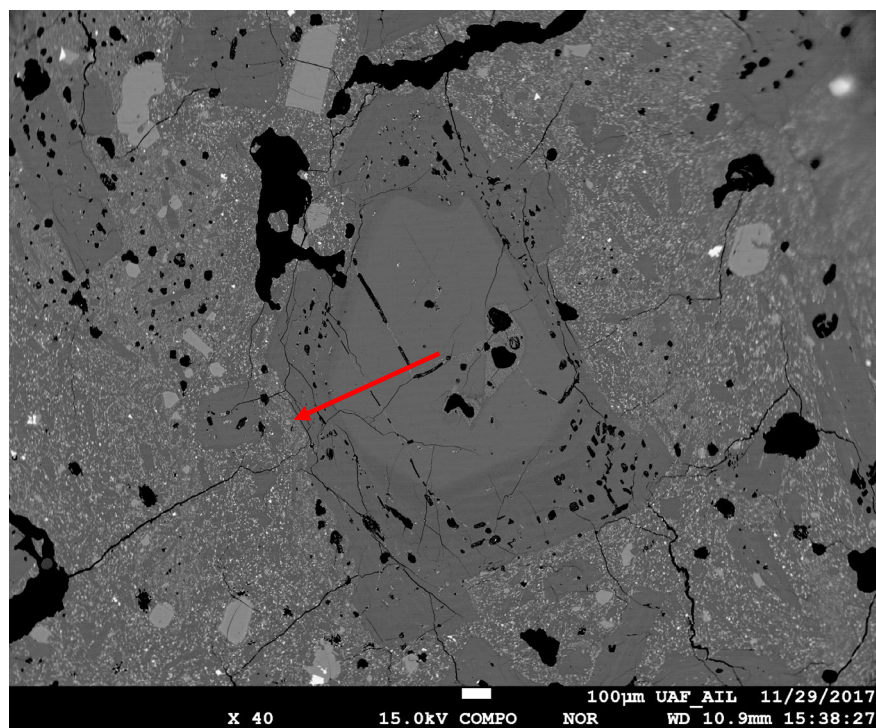
17JFLPV016A Plagioclase transect 3

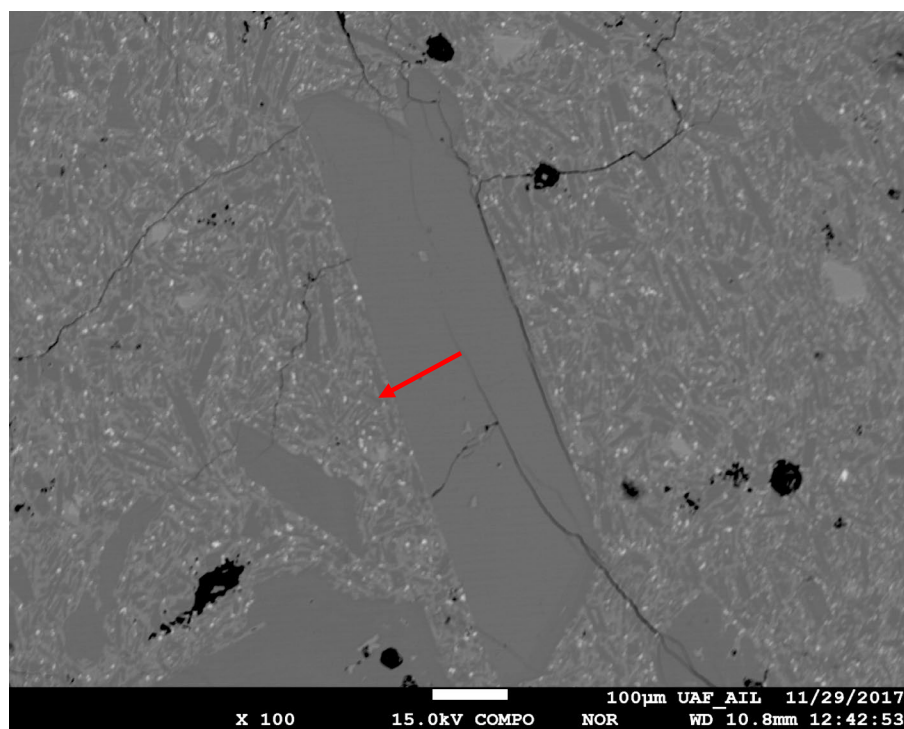
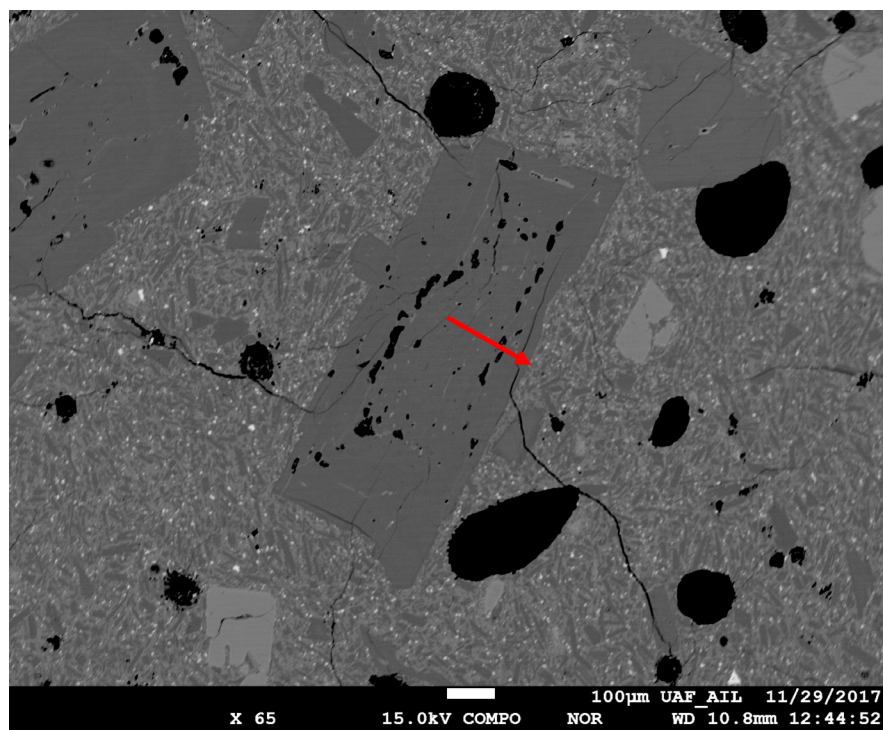


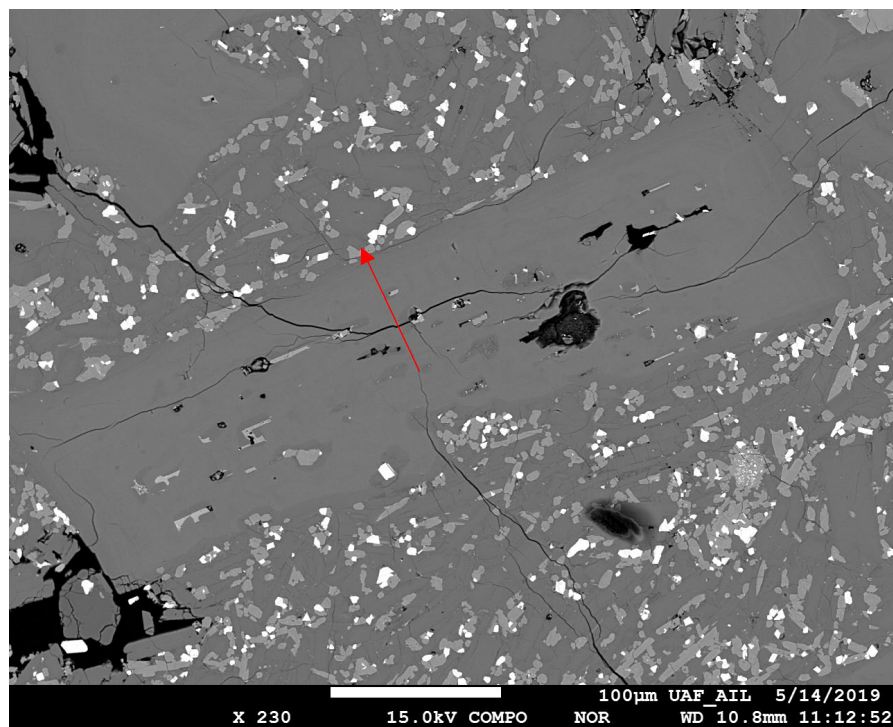
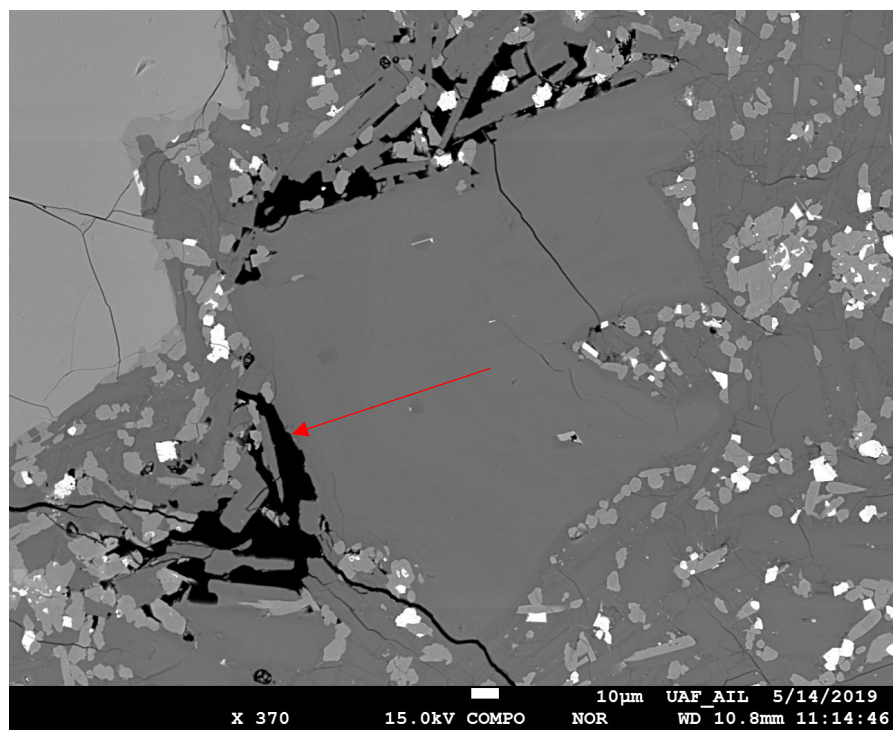
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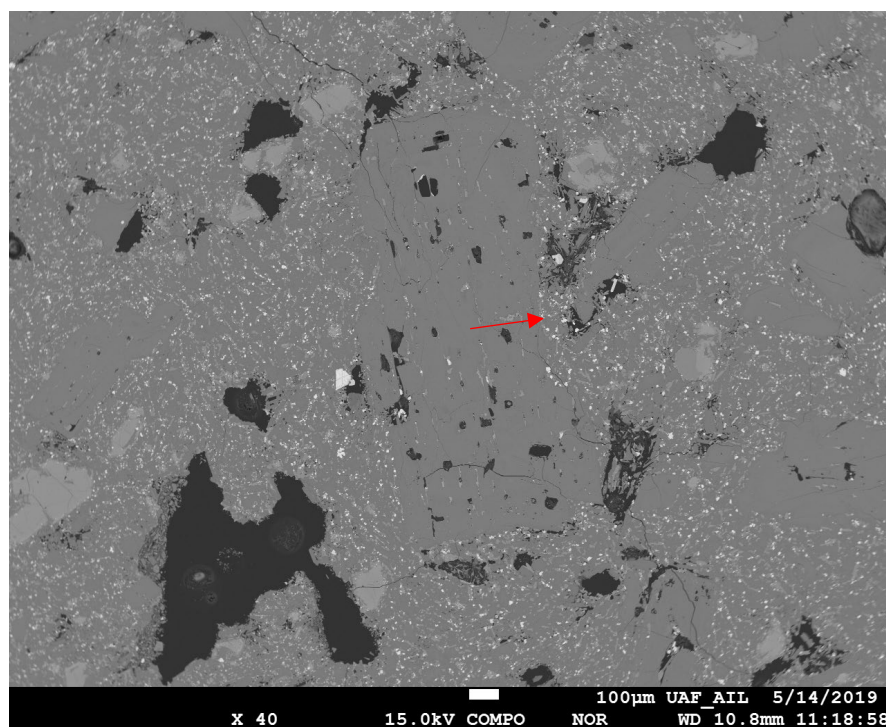
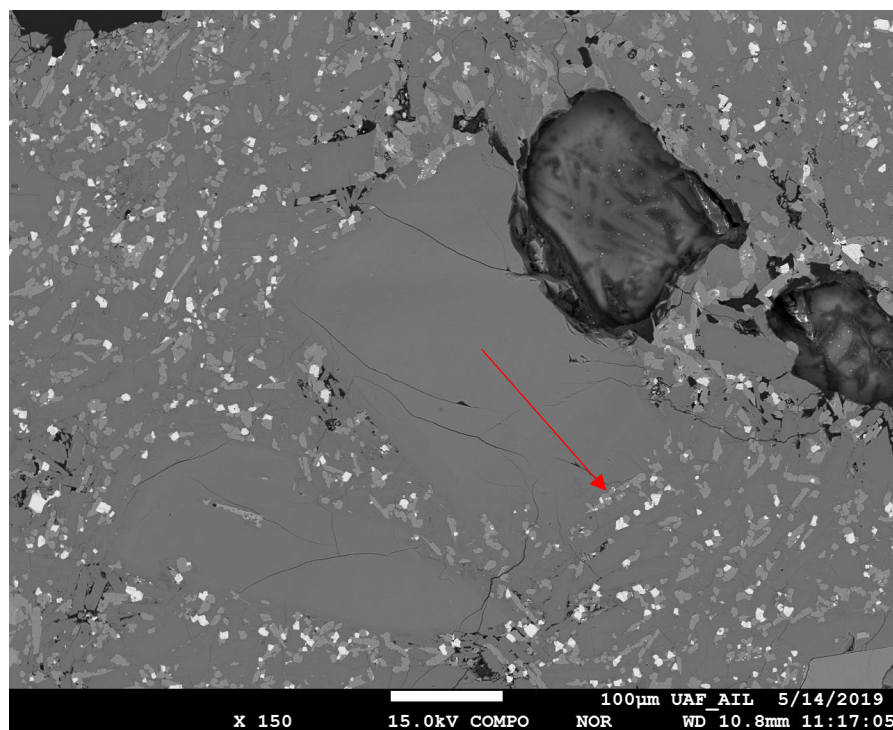


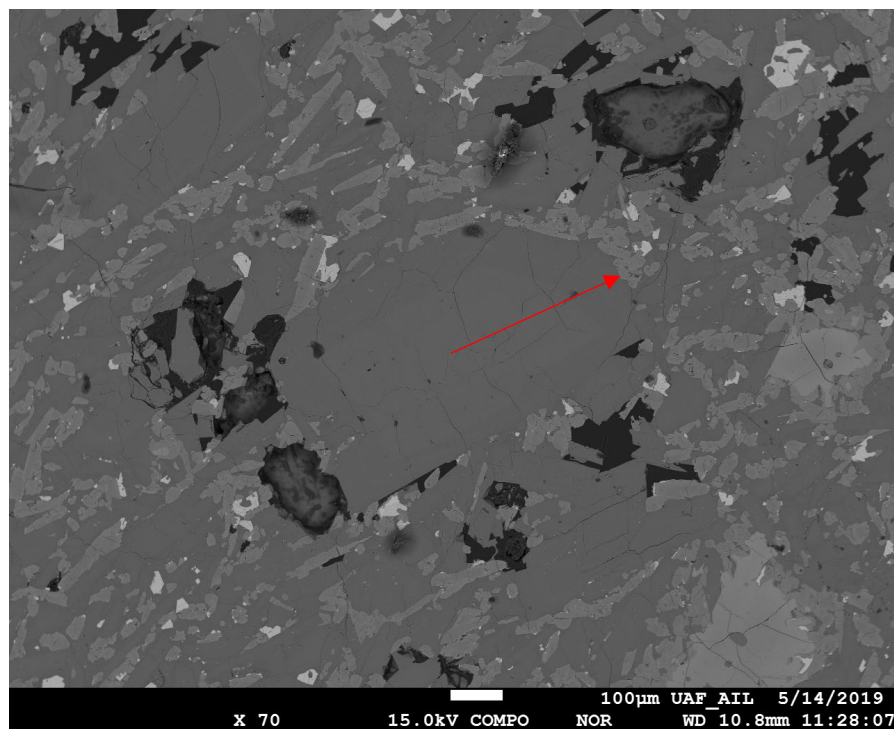
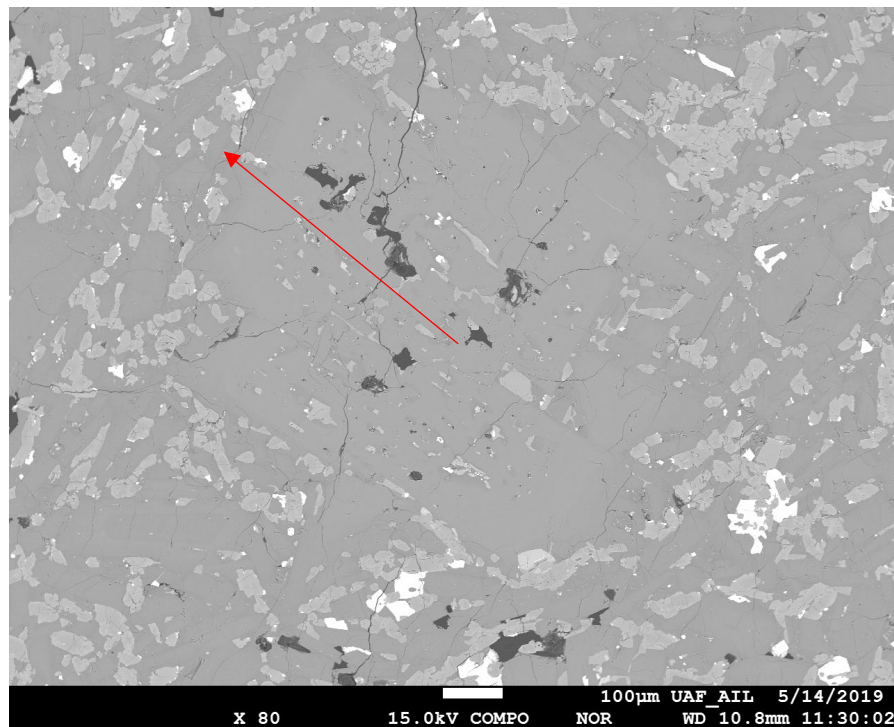
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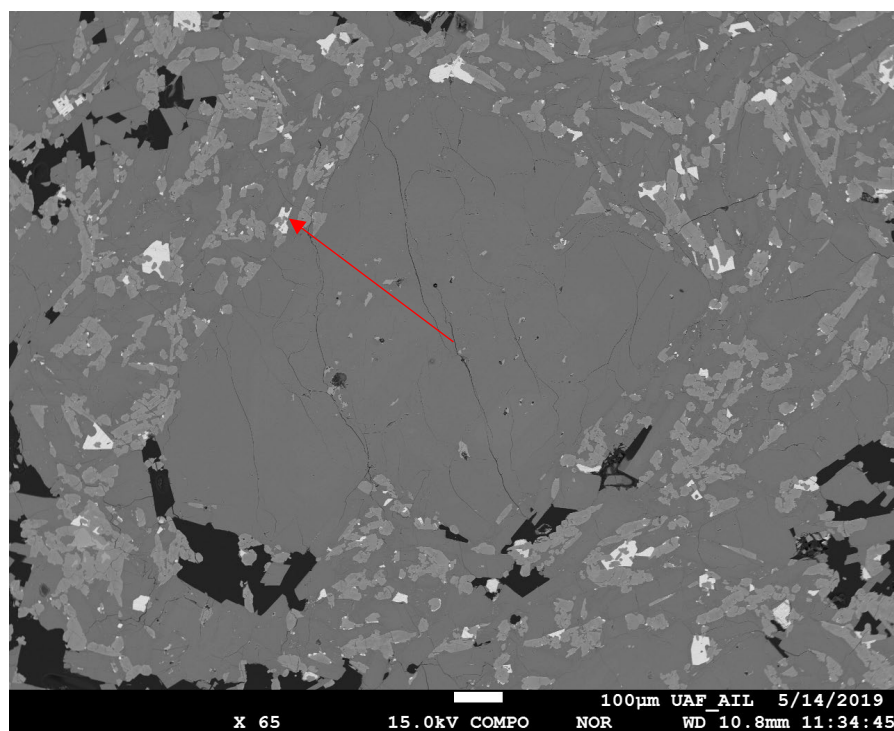
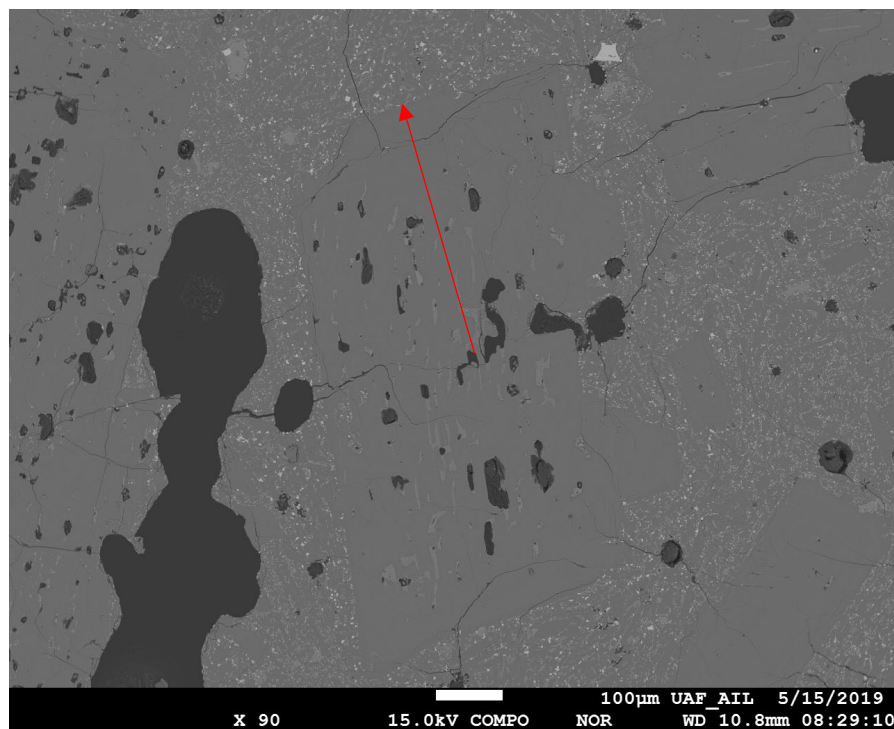
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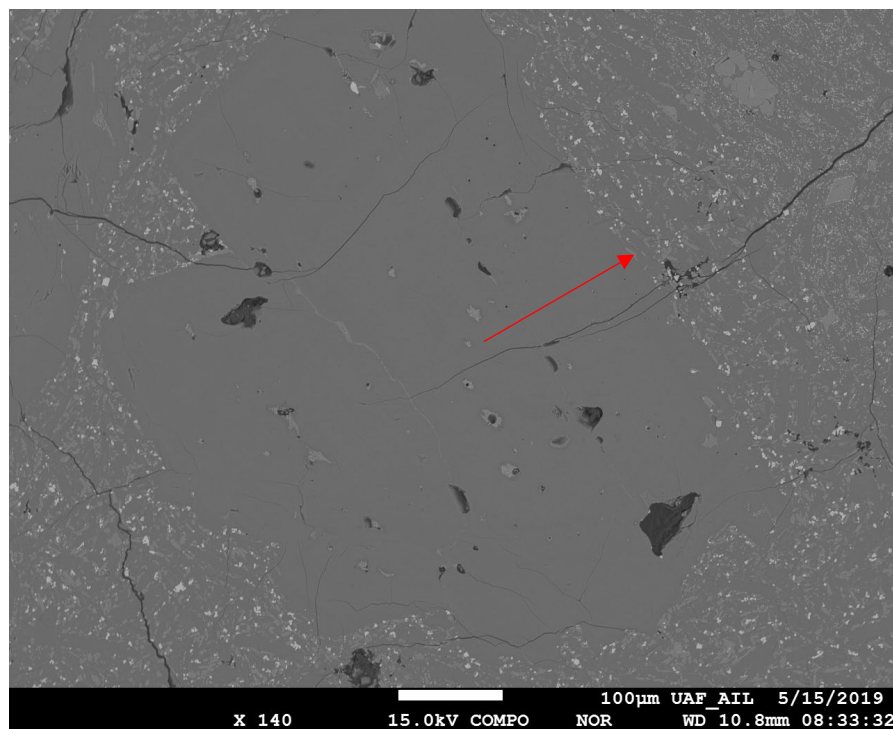
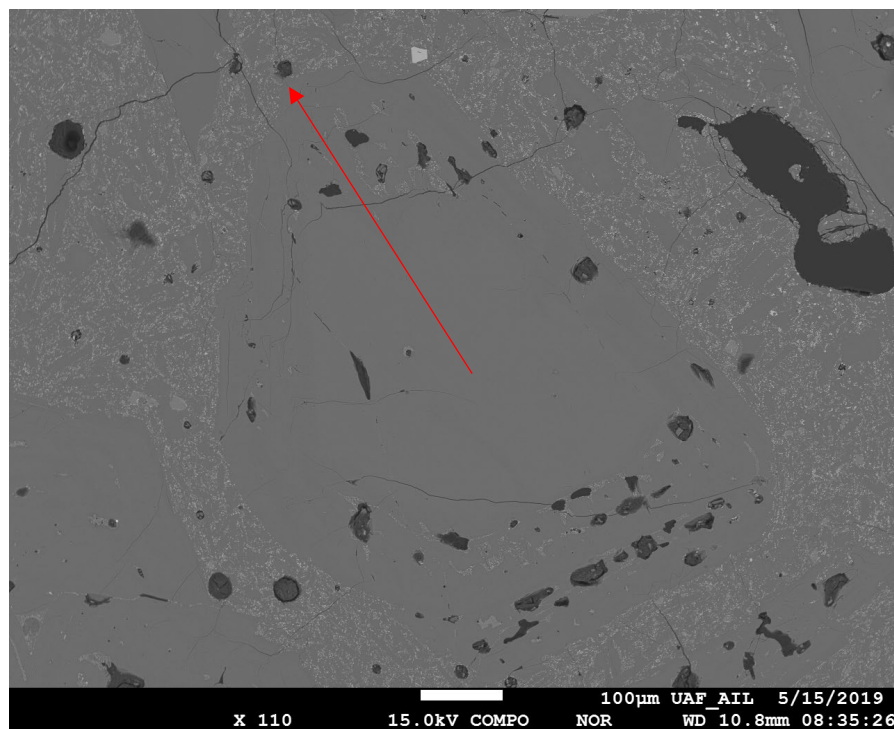
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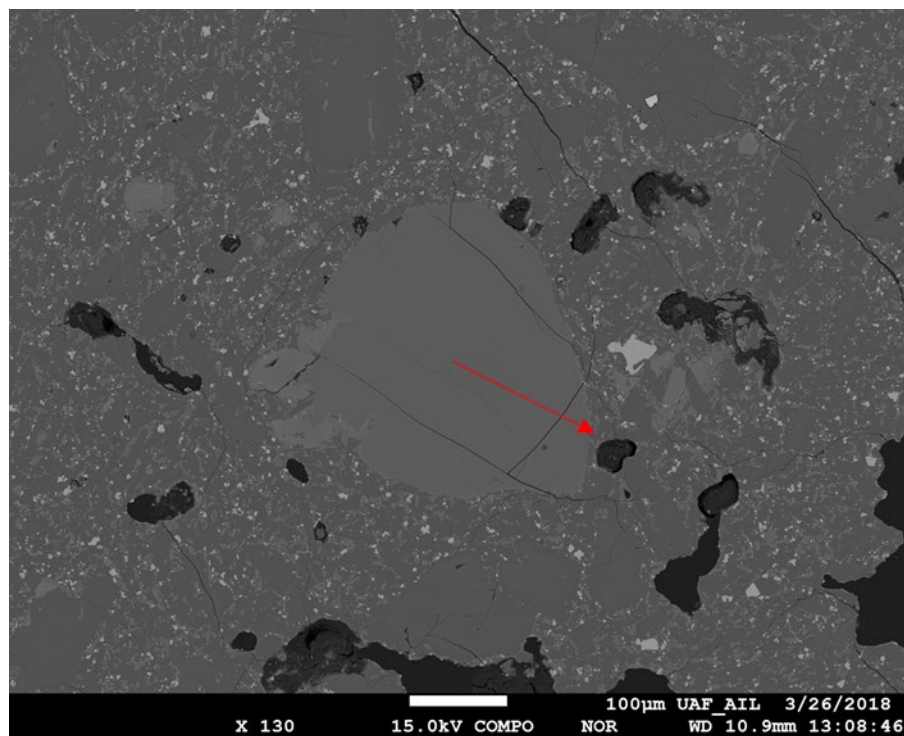
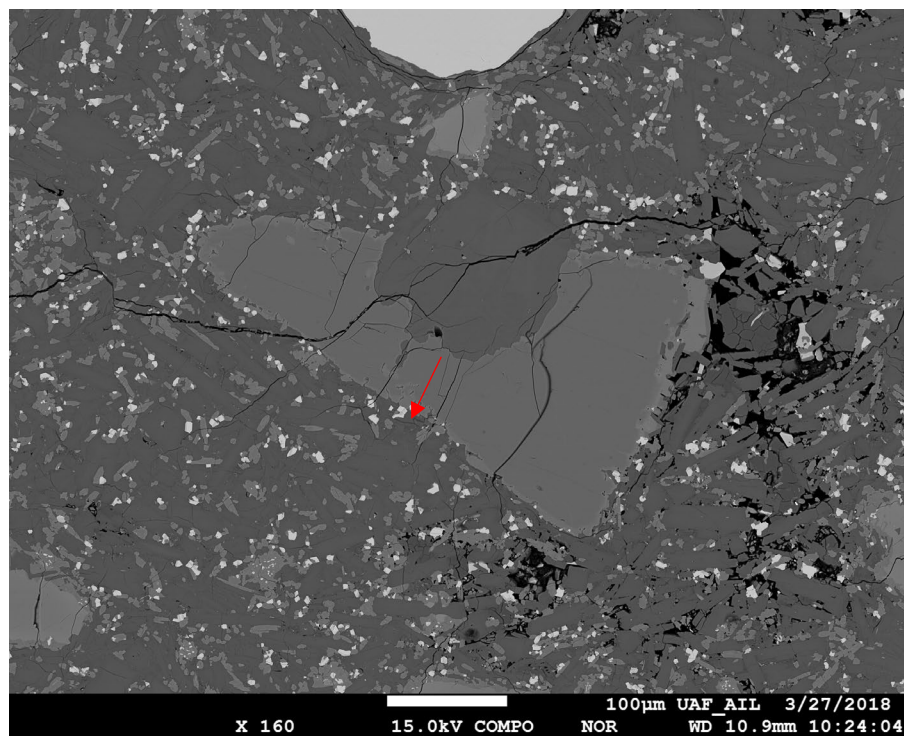
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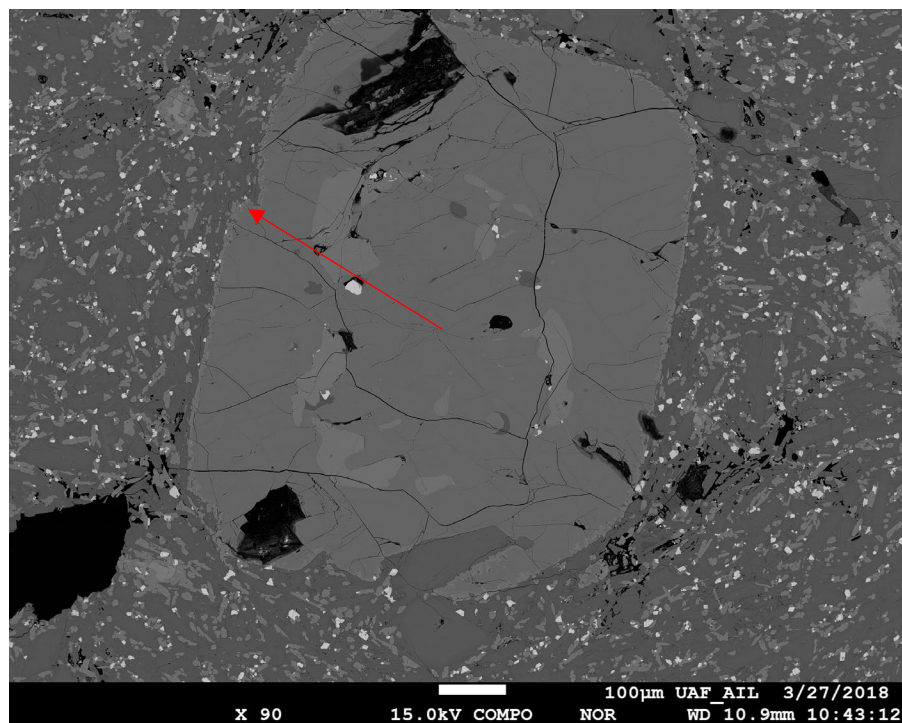
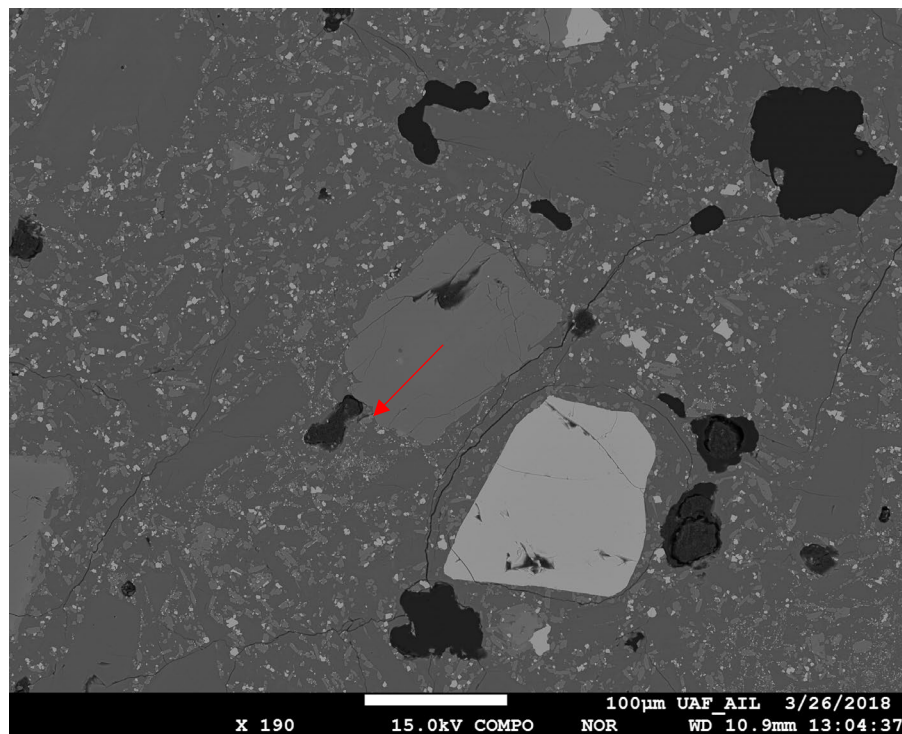
17JFLPV017B Plagioclase transect 4**17JFLPV017B Plagioclase transect 3**

17JFLPV016B Plagioclase transect 1**17JFLPV016B Plagioclase transect 2**

17JFLPV016B Plagioclase transect 3**17JFLPV017G Plagioclase transect 1**

17JFLPV017G Plagioclase transect 2**17JFLPV017G Plagioclase transect 3**

17JFLPV016b Orthopyroxene transect 1**17JFLPV017B Orthopyroxene transect 2**

17JFLPV017B Orthopyroxene transect with olivine and oxide inclusions**17JFLPV016b Clinopyroxene transect 1**

17JFLPV015A Olivine transect 1