ASHES TO ASHES, DUST TO LUNGS: EXAMINING ELEMENTAL DISSOLUTION IN THE ATMOSPHERIC AGING OF DUST AND COAL FLY ASH USING ICP-MS. **Madison Smith**[1], Arden Oglivie[1], Hind A. Al-Abadleh[2], and Nausheen Sadiq[1]. Mount Royal University, Department of Chemistry and Physics, 4825 Mount Royal Gate SW, Calgary, AB, T3E 6K6, Canada. [2]Wilfrid Laurier University, Department of Chemistry and Biochemistry, 75 University Ave W, Waterloo, ON, N2L 3C5, Canada. (msmit320@mtroyal.ca)

Many unanswered questions remain about the rate at which climate change is impacting our lives. It is important to understand atmospheric chemistry and its role in addressing climate change, air pollution, and environmental impact[1]. This study investigates atmospheric aging in dust and coal fly ash samples from the USA, India, and Europe, to understand the impact over time when exposed to acidic and organic conditions, which are chosen to promote surface-catalyzed reactions. Multi-elemental analysis of dust and coal fly ash samples will be conducted using an Agilent 7850 inductively coupled plasma-mass spectrometry (ICP-MS). This work focuses on arsenic (As), iron (Fe), copper (Cu), manganese (Mn), lead (Pb), zinc (Zn), and nickel (Ni) at pH 1 and 3 as these values show higher concentrations and cover a wider range of atmospheric particles/droplets. Previously, data has been collected for Day 14, focusing on only Fe. By expanding exposure time, data collection, and elements of interest, kinetic models for the rates of dissolution will be created from the initial exposure point, through 14 days. Improving kinetic modelling will allow for an accurate assessment of the atmospheric and environmental impacts of the trace elements.

[1] H. A. Al-Abadleh, Chem. Commun., 2024, 60, 1840-1855.