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BACKGROUND

The Contaminant Assessment and Risk Evaluation (CARE) Project was an extensive study that aimed to assess and inform resource managers about risks to the ecosystems of Everglades National Park, Biscayne National Park, and Big Cypress National Preserve. Previous analyses included organochlorine pesticides, trace metals, and contaminants of emerging concern, such as pharmaceuticals and personal care products. Recently, citizen complaints and public reports of potential contamination from poorly treated wastewater and repeated fish and seagrass die offs near Everglades City and Chokoloskee Bay have renewed the interest in assessing the current conditions in the bay and nearby coastal basins. Due to the lack of certainty of the source of potential contaminants, this area forms an ideal test bed for nontarget mass spectrometric screening methods.

GOALS

- ❖ Development of a sequential extraction method for nontarget mass spectrometric analysis of sediment samples.
- ❖ Analyze surface water samples and sediment extracts from waters near Everglades City FI.

METHODS

- ❖ Sediment and water samples were acquired at six sites from Everglades City.
- ❖ Sediment samples were extracted via sequential extractions with water, methanol, and acetonitrile
- ❖ Surface water samples were analyzed via Online SPE HPLC-HRMS, while sediment extracts were analyzed via direct injection with the same parameters.
- ❖ Sediment extracts were diluted and analyzed via direct injection HPLC-HESI-HRMS.
- ❖ Sediments were digested and analyzed for metals via ICP-QqQ-MS

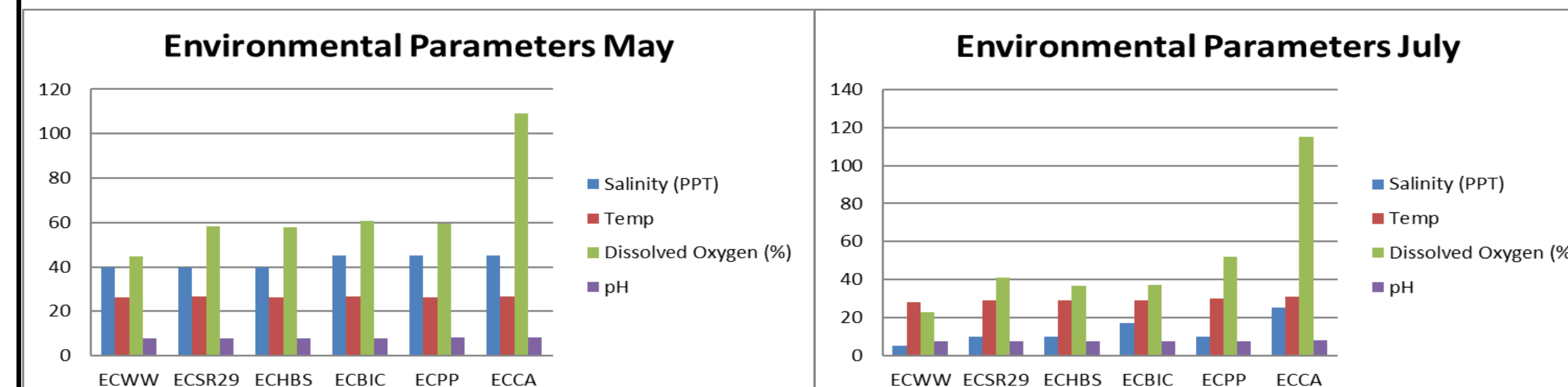
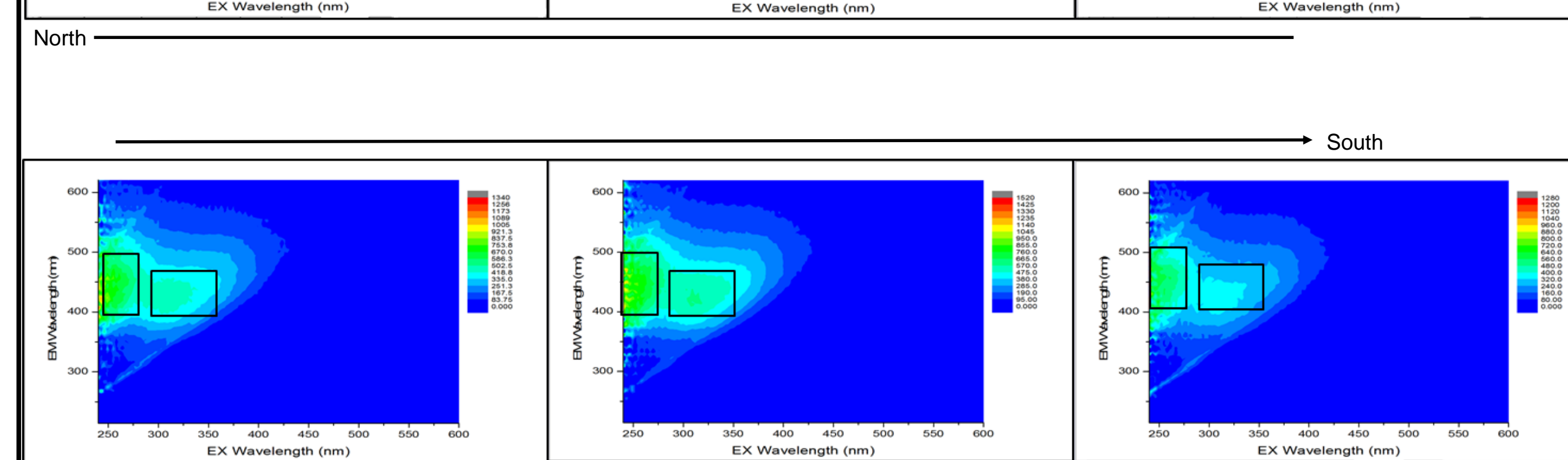
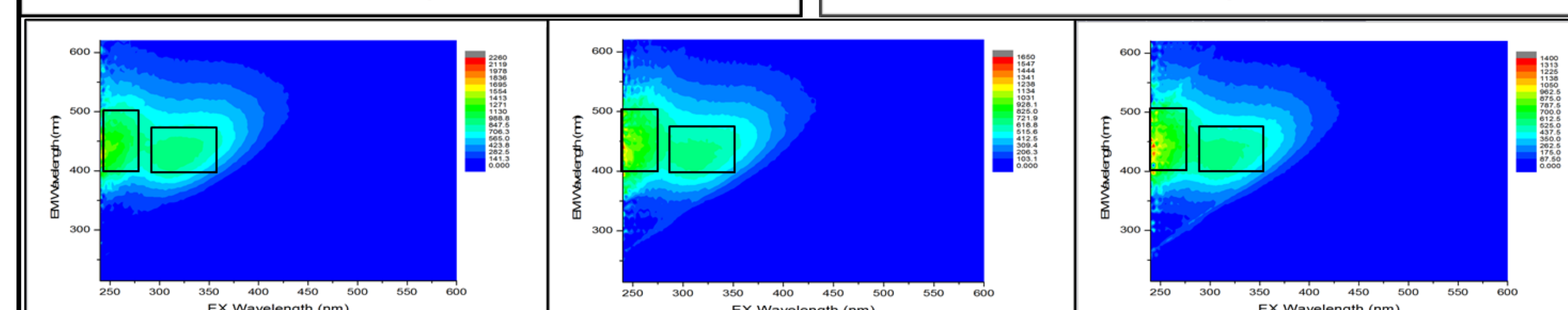
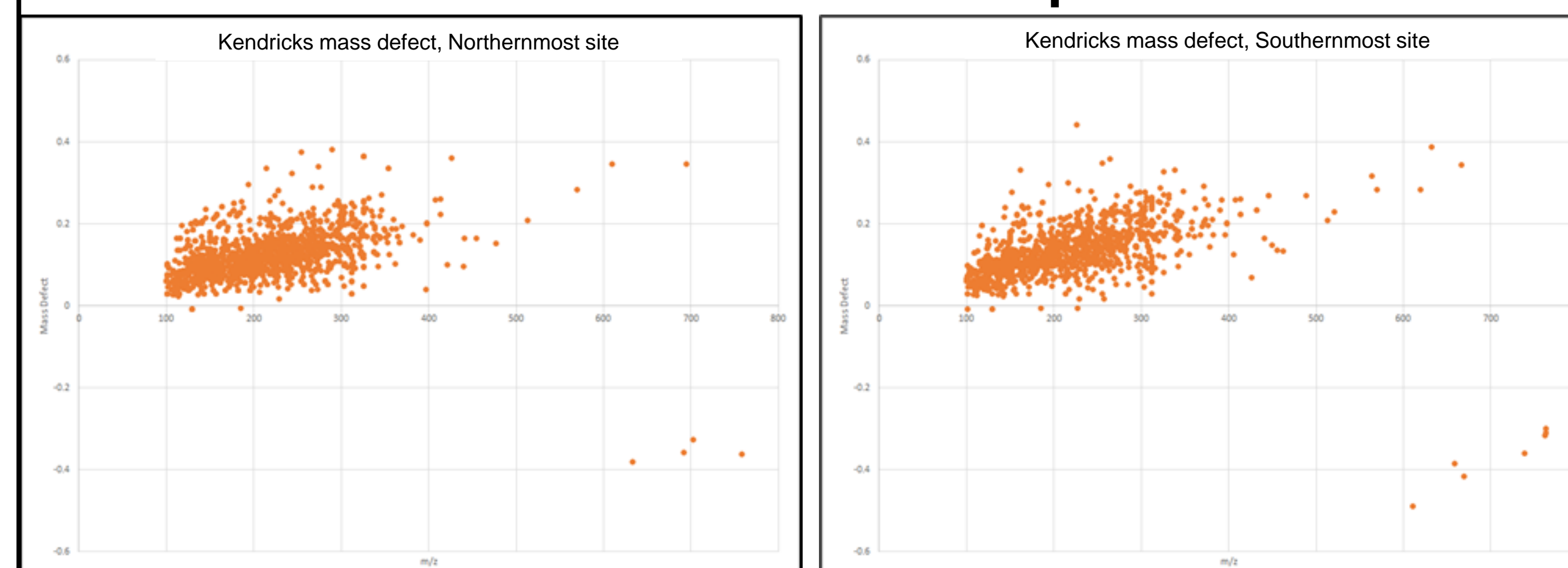
Online SPE HPLC-HRMS parameters:



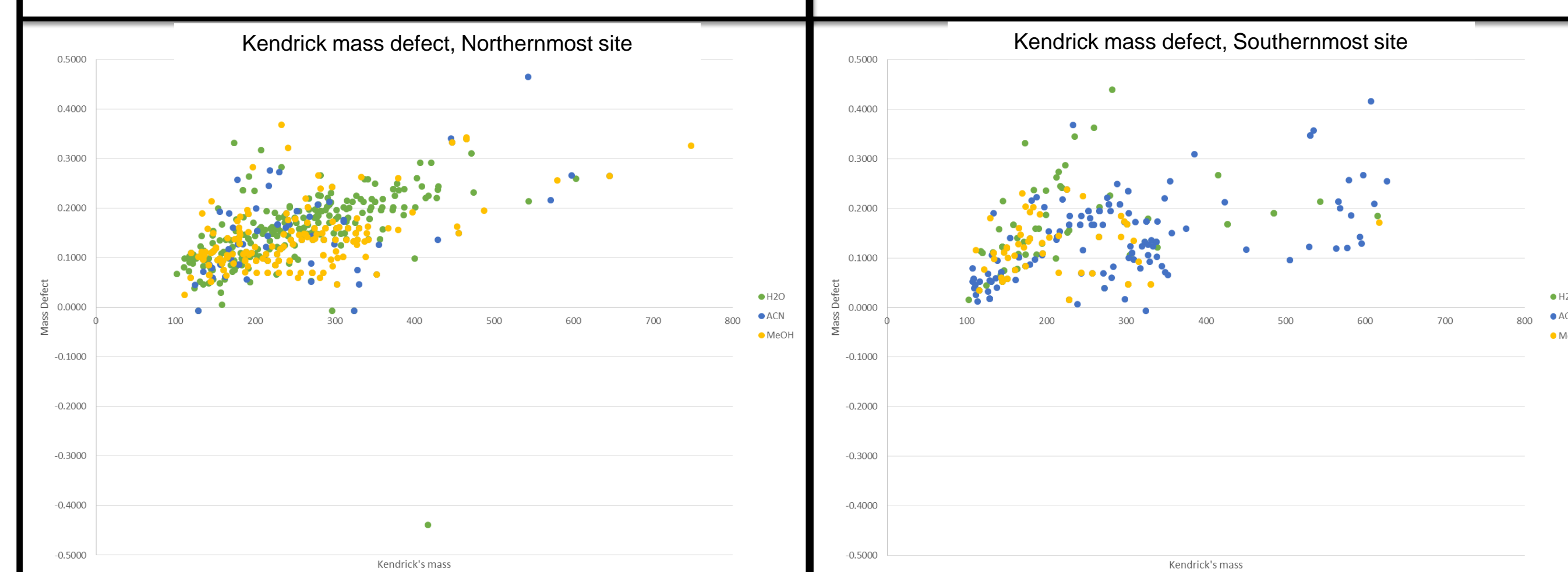
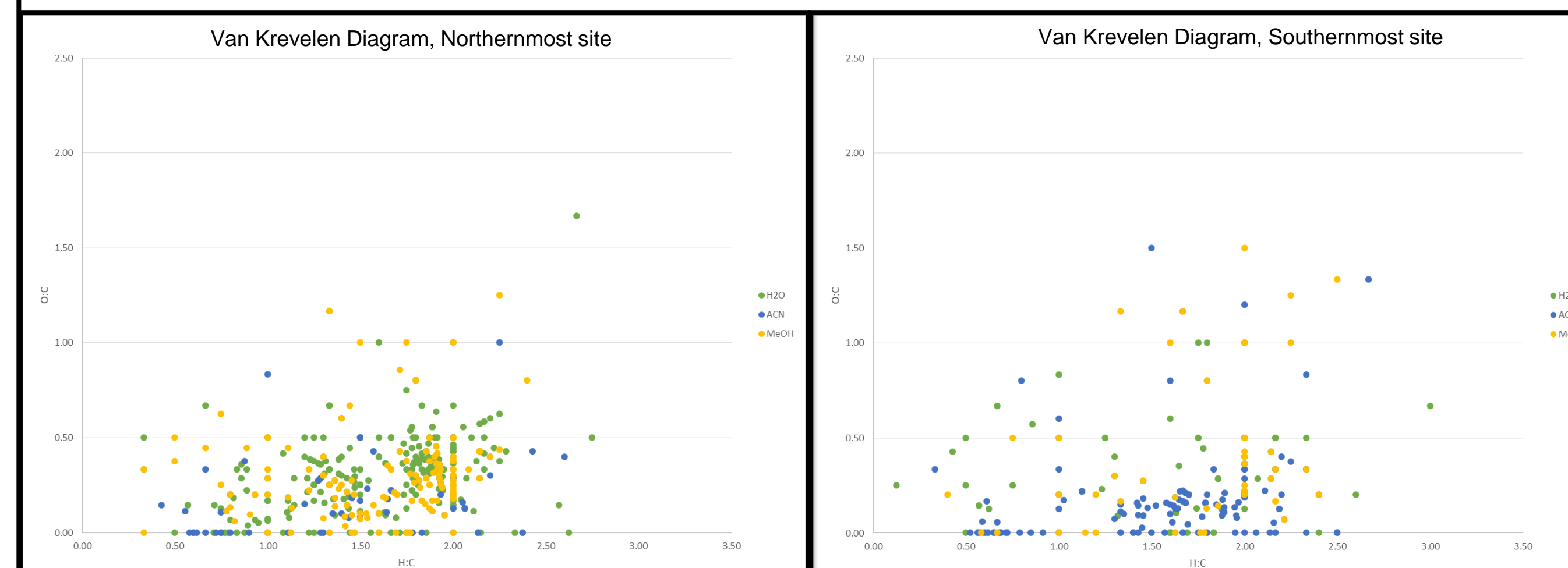
- ❖ Heated Electrospray Ionization source
- ❖ Resolution of 140,000
- ❖ Scan range from 100-800 m/z.
- ❖ Positive and negative scans
- ❖ MS/MS confirmation: 30 NCE
- ❖ Mass tolerance <5ppm

RESULTS

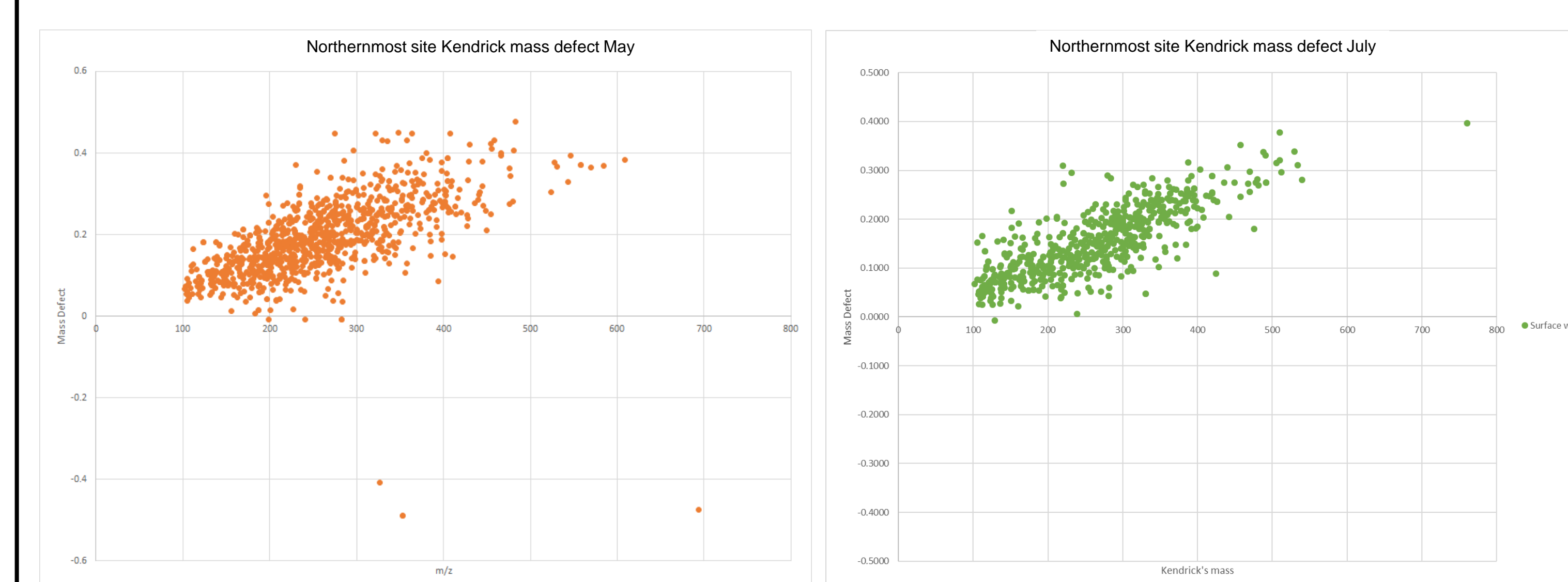
Surface water samples



Sediment extracts



Seasonal variation



CONCLUSIONS and FUTURE WORK

- ❖ Surface water samples show an increasing variety of compounds, with more anthropogenic compounds such as pharmaceuticals and plasticizers appearing in the southern sites.
- ❖ Features in surface water from m/z 300-500 were far more abundant during the peak of the rainy season (July), while features from m/z 500-800 were more abundant in May.
- ❖ Features in sediment extracts from southern sites show far more complexity and contain more anthropogenic compounds than the northern sites, which contain far more natural products.
- ❖ Features in sediments contained far less seasonal variation when compared to surface water samples.
- ❖ Volcano plots:
- ❖ Metal analysis largely revealed concentrations consistent with NOAA's Musselwatch data from nearby stations.
- ❖ Future work will include development of a method for nontarget extraction of biological samples for complete characterization of sites.

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