## In Situ Measurements of the Clumped Water Isotopologue HD<sup>18</sup>O Using Infrared Spectroscopy

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Stable water isotopes provide unique information into the condensation history of atmospheric water vapor. Singly-substituted isotopologues (e.g., HDO and  $\mathrm{H2^{18}O}$ ) have been used to study mixed phase clouds, probe ice growth under supersaturated conditions, and diagnose the effects of convectively lofted ice into the upper troposphere / lower stratosphere Doubly-substituted ("clumped") (UTLS). isotopologues of water (e.g., HD<sup>18</sup>O) may potentially offer new tools with which to understand the atmosphere, especially if they can be measured spectroscopically. The Chicago Water Isotope Spectrometer, built for use in the dry, isotopically depleted UTLS, has the sensitivity to measure vapor phase HD<sup>18</sup>O in near-surface air. We present here ground-based measurements in the city of Chicago made from January through March of 2023. We show relationships between the isotopic ratios of HDO/H<sub>2</sub>O, H<sub>2</sub><sup>18</sup>O/H<sub>2</sub>O, and HD<sup>18</sup>O/H<sub>2</sub>O, discuss their utility in an isotopically complex urban environment, and discuss difficulties associated with measurement and calibration. Lastly, we explore the expected isotopic evolution of HD<sup>18</sup>O in mixed-phase clouds using an isotopically enabled, bin-resolved microphysical model.