

IAC colloquium abstract – March 30, 2020

Title:

Cool cloud chemistry: Molecular insights into the ice nucleating ability of organic matter

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Abstract:

The atmosphere is a fascinating place to observe chemical reactions! These chemical reactions are affected by meteorological conditions where they can be warmed by the sun, stirred by the wind and solvated by water. In this talk, I'll present an overview of the field of atmospheric chemistry and ice nucleation and my group's most recent contributions to our chemical understanding of organic matter's ice nucleating ability. I'll present a "bottom-up" approach to compliment atmospheric ice nucleation research of macromolecules. Using our home-built drop Freezing Ice Nuclei Counter (FINC) with automated imaging, a range of macromolecules were investigated, including different organic matter components such as proteins, lignin and fulvic acids as well as diatom whole cells and their exudates. How do changing chemical and physical properties of organic matter affect the formation of water droplets and ice crystals? And how can a chemical understanding help predict mixed phase clouds? We are currently investigating the effect of atmospheric processing on these macromolecules with the goal of understanding how macromolecules' ice activity evolves over their one-week lifetime in the atmosphere.