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Investigating Brine on Frost Flowers with Absorption Tomography

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Because of the ubiquitous nature of ice, chemistry taking place on ice surfaces can have a substantial effect on the environment, particularly in the polar regions, through processes such as ozone depletion and mercury deposition. Frost flowers are an ice form found on newly formed sea ice that have the potential to play a role in halogen activation due to their high salinity. Current understanding of the role of frost flowers in these processes is inhibited by a lack of knowledge of the impurity distribution in relation to the ice surface. One way of obtaining this information is through the use of X-ray microtomography. This technique allows for visualization and quantitative analysis of the brine distribution. Analysis of the data shows that while brine is concentrated near the surface of the frost flower, it is unevenly distributed over the surface indicating that not all of the surface area is chemically active. The data also show brine pockets in the overall structure that are unavailable to react with the atmosphere, indicating that a knowledge of bulk chemical composition of reactive ice is insufficient to accurately determine the effects of ice surface chemistry on the atmosphere.

Please list some keywords

Brine, Ice Surface, Frost Flower, Tomography

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