



Is the surface of ice smooth in snow?

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Physical properties, like reflectivity, as well as the chemical properties of snow are determined by the scale of the finest ice structures. All modeling efforts depend on the existence of microstructures on the ice surface. A simple estimation shows that under alpine conditions the ice-air interface within snow should be smooth on a scale of several micrometers. In addition, a mobile surface layer is necessary to prevent the highly dynamic surface from roughening on a molecular scale. To prove this hypothesis experimentally, we measured the specific surface area (SSA) of different snow types using two methods with very different spatial resolutions: computed X-ray tomography and gas adsorption, with resolutions of about 30 μm and molecular resolution, respectively. The excellent agreement proves the smoothness of the ice surface at this length scale.