

Interactive
Comment

Interactive comment on “Ice nucleation terminology” by G. Vali et al.

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Dr. Charles Knight (National Center for Atmospheric Research, USA) called my attention a shortcoming of the definition of ice nucleation. It did not distinguish with sufficient clarity ice nucleation as the first formation of ice rather than continued growth. He also pointed to the necessity of including some reference to the three phases of water and how metastable conditions arise.

Our discussion led to the following suggested changes in the definitions. To repeat the caveat made in the initial submission, these definitions are not meant to signify anything new or different from generally accepted uses of the terms; the intention is to write concise definitions that are not often spelled out or gathered in one document.

Phases of water. Within the range of normal atmospheric conditions water can exist

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in three different phases, namely vapor, liquid and ice. The thermodynamically stable phase is defined by the existing vapor pressure and temperature, as usually depicted in a phase diagram. A metastable state (supersaturation, supercooling, superheating, etc.) arises when conditions change from those corresponding to one stable phase to those corresponding to another. The first formation of the new stable phase from the metastable state is a nucleation event.

Ice nucleation: The first appearance of the ice phase exceeding the critical embryo size, either from supersaturated vapor or from supercooled liquid water.

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