History

Discovery - early 70s

Major developments - till mid-90s

Consolidation, confirmation and re-evaluation

Recent decade: focus on organic and biological aerosols; elaboration of INA protein expression

Meetings:

197_ Laramie
1975 IUGG, San Francisco

Conferences:

1982	San Francisco, CA	Kozloff, Lindow and Schnell
1984	Flagstaff, AZ	Caple and Layton
1987	Newport, OR	Burke and Lindow
1989	Saskatoon, Canada	Gusta
1991	Madison, WI	Upper
1993	Laramie, WY	Vali

Book:

" *BIOLOGICAL ICE NUCLEATION AND ITS APPLICATIONS*"
Lee, Warren and Gusta editors; APS Press, 1995

Major accomplishments in the field to date:

- **Clarification of many of the basic factors related to the production of ice nucleation active proteins by bacteria and the basis of their activity**

- **The discovery of IN activity by other microorganisms**

- **Demonstration of the dominant role of bacterial IN in frost damage and in the cold survival of a variety of plant and animal species, and the formulation of strategies to reduce frost damage by the elimination of IN**

- **Commercial use of IN+ bacteria in snowmaking**

- **New methodologies in molecular genetics**

Major question:

What is the atmospheric contribution of biological ice nuclei?

- **The importance of the question is underscored by the known potential of biological IN, and the lack of other alternatives.**
- **However, knowledge about ice formation in the atmosphere is tentative.**
- **Hence, the problem must be attacked from both directions.**