



Current status of Precipitation Enhancement Research

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Water is indispensable for human and other lifeforms to survive and for the development and maintenance of socio-economic activities. Weather modification is one of the ways to secure water resources if we could find seedable clouds, clouds suitable for cloud seeding, and apply appropriate and effective methods to increase precipitation. Therefore weather modification research has a long history immediately after the World War II, and recently about 50 nations and regions in the world have been carrying out weather modification projects to secure water resources or mitigate adverse effects of drought. However most of operational projects are conducted with poor scientific basis although ideally, weather modification projects should be implemented on a scientific basis and proceed on a step-by-step manner as follows.

- (1) Pilot study of seedable cloud analysis and feasibility evaluation
- (2) Development and sophistication of critical technologies for evaluation of seeding effects
- (3) Customization in practice of comprehensive weather modification technologies

In this talk, present status of precipitation enhancement research related to steps (1) and (2) for glaciogenic and hygroscopic seeding is reviewed mainly based on the results from the previous Japanese weather modification “research” projects, which consisted of laboratory experiments, field observation and numerical modeling. The present status will be summarized as follows.

- a. Glaciogenic seeding techniques for mixed-phased orographic clouds, using dry-ice or AgI particles, are almost established and effective if the conditions meet. Major question is if AgI particles from ground-based generators are effectively delivered in right places in clouds?
- b. Hygroscopic seeding of warm clouds may be effective under limited conditions although a large amount of seeding material is needed.
- c. Glaciogenic/hygroscopic seeding effects on mixed-phase convective clouds are still under investigation.