CLOUD SEEDING EXPERIMENTS IN AUSTRALIA

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1. Introduction

Cloud seeding experiments in Australia were commenced in 1947 by the Radiophysics Division of the Commonwealth Scientific and Industrial Research Organization, immediately following the pioneering work of Schaefer. Early tests using dry ice showed (Smith [5], Squires and Smith [13]) that cloud conditions favorable for seeding were relatively common but that the method, though effective, was comparatively costly and therefore of limited use for large areas.

Preliminary experiments in which silver iodide smoke was released from the ground yielded no results that could be detected. Measurements [10], [11] showed that the ice nucleating properties of the silver iodide smoke were rapidly reduced on exposure to daylight. Further, in Australian conditions where (except in winter on isolated mountains) the freezing level is always at least several thousand feet above the ground, the smoke rose only slowly to cloud height. Thus, if the smoke was to be introduced into clouds at levels where it might be effective, it was necessary to release it from aircraft and appropriate equipment was developed and tested (Smith *et al.* [12]).

This paper describes cloud seeding experiments using this method of seeding, leading to suggestions for improvement in the experimental design.

2. Experiments on single clouds

Preliminary experiments (Warner and Twomey [14]) were first performed in which silver iodide smoke was released from an aircraft into single supercooled clouds with the intention of stimulating rain. The results were encouraging, and a fully randomized series of trials was undertaken (Bethwaite *et al.* [2]). Experiments were performed only as cumulus clouds complied to a fixed specification; they had to be supercooled, reasonably isolated, deep, of long duration and without excessive shear, and not within 30 km of any other cloud which was raining or glaciated. The cloud was then either seeded or not seeded according to a random sequence. The subsequent history of the cloud was observed, and any rain which fell from it was measured by means of an impactor mounted on an aircraft, the crew of which did not know whether the cloud had been seeded or not.