

## 桃園石門地區夏季陣雨之初步研究(一)

A PRELIMINARY STUDY ON THE SUMMER SHOWER  
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## I. Introduction

For forecasting thunderstorms and showers, many objective schemes have been developed. In these schemes, for example, the recent one of Lin (1975), only those parameters which describe the properties of the middle and low atmosphere have been taken into account. Because of the ignorance of the effects of the lowest atmosphere and surface conditions, and further all these methods are developed from statistical approach, the accuracy of the forecasting so made seems having reached an upper limit. At the present, the importance of sea breeze and convective surface layer in affecting cloud development has been realized, and Cotton, Pielke and Gannon (1976) have attempted to link up their sea breeze model and cloud model; trying to simulate the thunderstorms occurred in Florida as a first attempt toward dynamic forecasting. They were not very successfully, however, because the cloud model they used is inappropriate.

The present work is a preliminary study on the summer showers in Taoyuan Shihmen region. By making a rigorous observational check on the results, we wish to find out the flaws of our model, the influences of the lowest atmosphere and the surface conditions upon cloud development, and the predictability of various precipitation elements such as the rainfall rate, total rainfall, etc., as a probe for the possibility toward dynamic forecasting.

## II. The model

The cloud model used is quasi-one-dimensional, time-dependent and precipitation. The micro-physical processes have been parameterized according to Kessler's concept (1969) by dividing liquid water content into cloud and rain water, the latter is produced through cloud conversion and accretion processes. Also, cloud droplets are considered to evaporate instantly while rain drops are not. This consideration has made the restriction in our old model that no liquid water can exist in an unsaturated environment relaxed.