

Abstract

This technical report is based on several papers written by the author in a research period of 5 years from April 1993 to March 1998. The research in this period was planned to investigate meso- and small-scale meteorological phenomena, and was carried out in the Forecast Research Department of Meteorological Research Institute.

Of the papers already published, those on "Vertically 2-dimensional Nonlinear Problem" are partially reviewed. "Partially" means that not all are included in this report. Papers not reviewed also appear in References.

Firstly in Part 1, general fundamentals are presented. Most part of these fundamentals are already well-known, and some are newly added by the author.

After the presentation of general fundamentals, secondly in Part 2, applications to particular examples are presented.

The first half of Part 2 deals with "Density Current". Density currents deeply participate in the formation and maintenance of Meso-scale Convective Systems. The second half of Part 2 deals with "Flow over a Mountain". Elucidation of flows over a mountain is indispensable to the understanding of meso-scale phenomena on the lee side of a mountain.

Compared to the detailed description of general fundamentals in Part 1, the particular examples in Part 2 are treated only briefly. See the references for their details.