RESEARCH INTERESTS AND EXPERIENCE

Research Interests & Expertise:

- Cloud dynamics and microphysics
- Mesoscale modeling and model development
- Microphysics parameterization in atmospheric models
- Air pollutant transport

Brief Research Experience:

My academic activities are devoted to the numerical model development and simulation of cloud and mesoscale weather systems. With over 10 years numerical modelling experience in cloud dynamics and microphysics, mesoscale meteorology, and transportation of air pollutants, about eighteen papers have been published or presented in international scientific conferences in these fields.

From 1989 to 1991 during my doctoral degree work, I designed and developed a 3D numerical cloud model with fully elastic, nonhydrostatic dynamics, parameterized PBL, and detail microphysics processes. A large number of simulations based on the model had been made to investigate the influences of ice-phase processes, different underlying surfaces, and ambient wind shear on the evolution, propagation, and precipitation of various types of convective storms. The most important achievement from these research works is to reveal numerically that the ice phase microphysics in clouds tends to produce more intensive modeling storms and, under some favorate condition, even alters their dynamic structures and life cycle, with the implication of the significant importance of the inclusion of ice phase processes in cloud and mesoscale models.

In 1992 and 1993, the cloud model has been modified to contain prognostic equations of different solubility air pollutants, and used to simulate the vertical transport of gases pollutants by convective clouds. The simulations show that deep convective storms play a key role in quick transport of high concentrated pollutant gas from PBL upward to the mid and upper troposphere in half hour time scale, and in dilution of the low level concentration, suggesting the necessity of parameterizing the convective transport process in long-range transport models.

From 1994 to 1996, being a research associate (post-doctoral fellowship) at the Dept. of Atmospheric and Oceanic Sciences, McGill University, my research, extending into mesoscale area, focus on the effects of deep convections on the explosive deepening of the Atlantic marine cyclones, by using the Canadian Mesoscale Compressible Community (MC2) Model. During this work, a highly efficient explicit microphysics scheme has been developed for the national mesoscale model's mainframe, with very encouraging performance on simulations of both the mesoscale structures of extratropical cyclones and the evolution and precipitation of continental mesoscale convection systems (MCS).

From 1997 to 2001, joined the CMRP (Coastal Meteorology Research Program) group at the University of Oklahoma as a Research Scientist. The major task is to improve the coastal weather prediction with Navy COAMPS model. Since 2002, join CAPS (Center for Analysis and Prediction of Storms) working on storm scale ensemble forecast study and QPF verification study.

Strong computer background include experience on various workstations (such as IBM, SGI, and DEC Alpha), and high performace computing platforms such as Linux clusters, and PCs as well, and skillful use of FORTRAN language and UNIX/Linux system, MSDOS and Windows 2000/XP, and working knowledge of C/C++ language.