Dynamics of Atmospheric and Oceanic Circulations and Climate

– Celebration of the 80th Birthday of Prof. ZHU Baozhen

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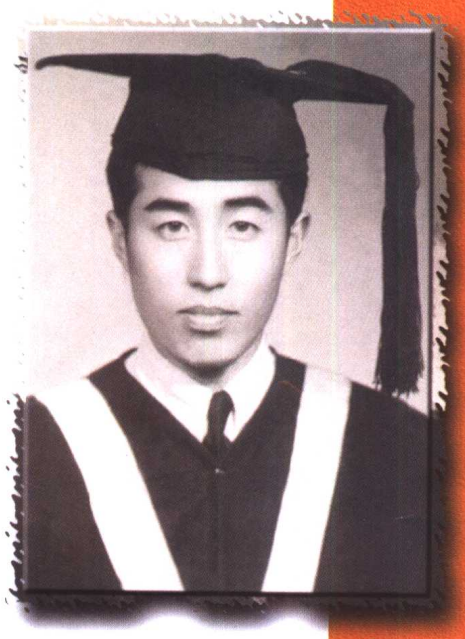
Prof. ZHU Baozhen (CHU Pao-Chen, 朱抱真)



ZHU Pao-Chen graduated from the Department of Meteorology, Tsinghua University in 1949.

Prof. ZHU Baozhen visited the University of Kyoto, Japan in 1981.

Prof. ZHU Baozhen delivered lecture at the Department of Meteorology, University of Wisconsin at Madison, United States in 1985.

Prof. ZHU Baozhen at the opening ceremony of a dynamic meteorology conference in Burghaussen, Germany in 1986. According to the tradition of this city, an elegant beer cup was given by the mayor (4th from right) to Prof. ZHU for his longest travel from Beijing to Munich by train.

Prof. ZHU Baozhen and his wife LIU Jin visited the United States in 1990.

Prof. ZHU Baozhen delivered speech in celebration of the 40th anniversary of the Department of Oceanography, Qingdao Ocean University in 1992.

Dynamics of Atmospheric and Oceanic Circulations and Climate

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Preface

Prof. ZHU Baozhen, well-known atmospheric scientist in China, has made important contributions to the dynamics of atmospheric general circulation and oceanic circulation.

In the beginning of 1950s, as a forecaster, he joined the Joint Center of Weather Analysis and Forecast under Weather Bureau and Academia Sinica to make the daily weather forecast. In these several years he got important practiced experiences in weather forecast which is very helpful in his later research. After this period he joined my research group in the Institute of Geophysics and Meteorology/Academia Sinica. In our group he always liked to ask why, why, why and I did the same. Under why we argued and discussed. The arguement, and discussions were very beneficial to us both and enlightened our ability to see the physical insight of the processes in general circulation. This led us to write the monograph "Some Fundamental Problems of the Atmospheric General Circulation" (1958) which has received high regards and was translated into Russian.

In 1950s, Baozhen also pioneered a quantitative analysis and determination of heat source distribution in the Northern Hemisphere. He then advanced a theory for stationary waves that attributes their origin to a cooperative effect of topographic forcing and thermal forcing arising from continent-ocean thermal contrast. In early 1960s, Prof. ZHU first pointed out the important role of the heat source and sink in maintaining blocking, illuminating the contribution of the thermal and topographic control of the ultra-long waves to the preferred geographic location of the blocking formation (Zhu 1964). He also put forward a theory on interaction between radiative heating and atmospheric motion (Zhu et al. 1961) that elucidates the adjustment process of the quasi-geostrophic motion under imposed heat source.

Tibetan Plateau, the highest topography on the Earth, has a massive influence on global general circulation and climate. Chinese Meteorologists have made tremendous efforts and contributions to Tibetan Plateau Meteorology. Prof. Zhu is one of the major contributors. The well-known 1979 "Qinghai-Xizang (Tibetan) Plateau Scientific Experiment", which was conducted jointly by Administration of Science and Technology, Chinese Academy of Sciences, and State Meteorological Administration, was one of the important meteorological experiments in the 20th century. ZHU Baozhen was one of the scientific advisors and played active roles in the leading theoretical analysis and numerical modeling of the impacts of topography on baroclinic instability and the thermal structure of the surface mixed layer over the Plateau.

While endeavoring theoretical study of the atmospheric general circulation, he also paid attention to applied research in numerical weather forecast. In 1958 when the first primitive computer was put into operation in China, he joined the NWP research group under Prof. KOO Chen-Chao at the Institute of Geophysics and Meteorology that, in collaboration with the Central Weather Service, embarked first Chinese operational numerical weather forecast using

an equivalent barotropic model. In late 1970s, after the so-called Cultural Revolution, he and his group established a three-level primitive equation model (Zhu et al. 1982), which was extensively used to study vital weather forecast problems facing by the East Asian meteorologists. This model was further developed into an Northern Hemisphere NWP model in early 1980s under the joint effort of Beijing Meteorological Center, Institute of Atmospheric Physics, and Geophysics Department of Peking University. Prof. ZHU was one of the leading scientists of the United NWP Lab. This model served as a primary NWP model in Chinese weather service until the beginning of 1990s.

In his later scientific carrier, Prof. ZHU turned his attention to large-scale atmosphere-ocean interaction and low-frequency variability of the climate system. He studied dynamic instability of a coupled quasi-geostrophic atmospheric and oceanic system and the formation mechanism of SST anomalies (1982). He and his students published a volume on "Nonlinear Dynamics of the Atmospheric and Oceanic Motion" (Zhu et al. 1991) and thoroughly documented stationary behavior of the tropical intraseasonal oscillation (Zhu and Wang 1993).

Prof. ZHU, while conducting research, also has been always enthusiastic and patiently making a serious effort in improving and refining students and young co-workers. His physical insight and meticulous scientific attitude has cultivated many scientists of young generation; some of them have become renowned meteorologists worldwide.

YE Duzheng
March 2001

List of Publications of Prof. ZHU Baozhen

Articles

1951 Vertical motions in the development process of jet streams (CHU Pao-Chen). *Acta Meteor. Sinica*, 22: 127 – 136 (in Chinese).

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Contents