



Atmospheric-hydrological modelling of severe precipitation and floods in the Huaihe River Basin, China

L. Wen (1), C. Lin (1), G. Lu (2), Z. Wu (2), J. Zhang (3), Y. Yang (3), Y. Zhu (1), L. Tong (4)

(1) Department of Atmospheric and Oceanic Sciences, McGill University, Canada, (2) Research Academy of Hohai University, Hohai University, China, (3) Bureau of Hydrology, Ministry of Water Resources, China, (4) Canadian Meteorological Centre, MSC, Environmental Canada, Canada

Up to 70% of China's annual natural disasters are due to floods caused by heavy precipitation. An accurate and timely flood warning system can help to minimize flood damage. A numerical weather prediction (NWP) model has the potential to be part of such a system, as it could provide precipitation to the flood forecast model with a significant lead time. Precipitation from NWP models is also important for the areas where surface observations from rain gauges are sparse or even not available. Our study focuses on the simulation of heavy precipitation and floods over the Huaihe River Basin, one of the 7 major river basins in China. The Huaihe River Basin is located between the Yellow and Yangtze Rivers, with an area of 270,000 km². This region has China's highest population density (662 persons per km²) and 17% of the country's cultivated land. Climatologically, it lies in the warm temperature semi-humid monsoon region, in the transition zone between North and South China. The region has suffered from flood disasters for centuries. The Huaihe River Basin is also the study site for the China GEWEX projects HUBEX (Huaihe river Basin Experiment) and MAGE (Monsoon Asian GEWEX Experiment). Data from the Intensive Observation Period of 1998 (May to August) and the great flood of 2003 (June to July) are used in this study for model verification. Precipitation is the single most uncertain atmospheric input to a flood forecast model. Therefore, the first objective of the joint McGill-China project (Application of Coupled Hydrometeorological Modeling System for Precipitation and Flood Forecasts) is to assess the precipitation simula-

tion from the Canadian Mesoscale Compressible Community Model (MC2). We set up MC2 at two horizontal resolutions (20 and 5km). The 20-km runs are initialized and driven laterally by CMC (Canadian Meteorological Centre) analysis without using any extra information from China. We compare MC2 precipitation with available observations from rain gauges over the Huaihe River Basin. We then apply the Chinese Xinanjiang hydrological model with both gauge measured and model precipitation to simulate hydrographs at the outlet of the Shiguanhe sub-basin. The results show a reasonable agreement of flood timing, thus demonstrating the potential of using NWP model precipitation for flood forecast.