**Category and Session number:** Natural Hazards, Assessment of Natural Hazard in Asia-Pacific Region (NH5)
**Preferred Mode of Presentation**: Oral

# A Climatology Model for Forecasting Typhoon Rainfall in Taiwan

CHENG-SHANG LEE[12], LI-RUNG HUANG[2], HORNG-SYI SHEN[2] and SHI-TING WANG[3]
[1] *Dept. of Atmospheric Sciences, National Taiwan University, Taiwan*
[2] *National S&T Center for Disaster Reduction, Taiwan*
[3] *Central Weather Bureau, Taiwan*

On the average, there were about 80 tropical cyclones formed around the whole globe each year and about 30 of them formed in the western North Pacific (Gray, 1981). Taiwan is located on the main path of western North Pacific tropical cyclones and was affected by at least one system each year according to the official record of the Central Weather Bureau (CWB), Taiwan. The continuous torrential rain associated with typhoon often caused flood, landslide or debris flow, leading to serious damages to Taiwan. Thus, a usable scheme to forecast rainfall amount during typhoon period is highly desired. The analysis using hourly rainfall amounts taken at 371 stations during 1989-2001 showed that the topographical lifting of typhoon circulation played an important role in producing heavier rainfall. A climatology model for typhoon rainfall, which considered the topographical lifting and the variations of rain rate with radius was then developed. The model could provide hourly rainfall at any station or any river basin for a given typhoon center. The cumulative rainfall along the forecasted typhoon track was also available. The results showed that the $R^2$ value between the model estimated and the observed cumulative rainfall during typhoon period for Dan-Shui (DSH) and Kao-Ping River Basins reached 0.70 and 0.81, respectively. The $R^2$ values decreased slightly to 0.69 and 0.73 if individual stations were considered. However, the values decreased significantly to 0.40 and 0.51 for 3-houyly rainfalls, indicating the strong influence of the transient features in producing the heavier rainfall. In addition, the climatology model only can provide the average condition, the characteristic in individual typhoon should be considered in real-time forecast operation when applying the model. For example, the model could give reasonable cumulative rainfall amount at DSH before Nakri (2002) made landfall on Taiwan, but overestimated rainfall after Nakri made landfall and weakened with significant reduction in convection.

## Reference

[1] Gray, W. M., 1981: Recent advances on tropical cyclone research from rawinsonde composite analysis. World Meteorological Organization, Geneva, 407pp.