

Preface to the Special Issue on “Typhoon Morakot (2009): Observation, Modeling, and Forecasting”

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Typhoon Morakot was the deadliest typhoon or tropical cyclone (TC) to strike Taiwan in recorded history. It brought catastrophic damage to Taiwan, leaving 619 people dead, 76 others missing, causing roughly \$16.4 billion NTD (\$547 million USD) in agricultural losses alone. The storm produced a huge amount of rainfall, peaking at 2855 mm in 4 days (nearly the world record for peak accumulated rainfall of a landfall TC), which triggered enormous mudslides and severe flooding throughout southern Taiwan. One mudslide buried the entire village of Shiaolin, killing approximately 500 people in the village alone. This slow moving storm also caused widespread damage in China, leaving nine people dead and causing \$8.9 billion RMB (\$1.3 billion USD) in damage. Nearly 6000 homes were destroyed and 136000 more were reported to have sustained damage in China. The storm also caused severe flooding in the northern Philippines where it killed 26 people. Consequently, the scientific advance and the improvement of forecasting techniques and early warning systems for TCs reaching landfall are among high priority tasks for scientists and governmental agencies in Taiwan and other TC-prone countries.

This special issue includes salient papers presented at “The International Workshop on Typhoon Morakot (2009),” which was held at the National Taiwan University in Taipei, Taiwan, 25 - 26 March 2010. The 10 papers in this special issue hope to promote the advancement of observational, modeling, and forecasting applications related to Typhoon Morakot (2009) and other TCs reaching landfall. This special issue covers the following subjects: (1) observation analyses of circulations and structures, (2) numerical model improvement and data assimilation techniques, and (3) practical forecasting techniques for better track, intensity and rainfall predictions. Herein, it can be seen that a

combination of several factors - slow translation speed, a prevailing southwesterly flow in the monsoon trough, steep terrain in Taiwan, a favorable ocean condition, and the presence of Typhoon Goni - brought about this devastating typhoon event. This special issue provides a comprehensive summary of Morakot and other extreme rainfall events associated with TCs reaching landfall by presenting both scientific analyses and operational guidelines.

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