



An introduction of the QPESUMS system and its application on flash flood and debris flow warnings in Taiwan

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Torrential rainfall and the ensuing flash floods and debris flows are the major natural disasters in Taiwan. Not only human lives and personal property are severely demolished, but also the societal stability and sustainability are greatly threatened. The QPESUMS (Quantitative Precipitation Estimation-Segregation Using Multiple Sensor) system is operational in late 2002 and has been under functional improvement with the goals of making reasonable quantitative precipitation estimation and forecasting (QPE/QPF) applicable to flash flood and debris flow warnings. The QPESUMS system incorporates data from multiple sensors, such as rain gauges, multiple radars, satellite, numerical models, and lightning detection. Products of QPESUMS are shown in web-page format for easy access. Presently, real-time products of QPESUMS system include: (1) raingauge-adjusted radar QPE, lightning frequency and satellite QPE for past 1, 3, 6, 24, 72hr, (2) semi-automated typhoon center positioning and tracking information, (3) convective storm cell detection and 1hr projection, (4) 0-1hr QPF with 10 min update cycle, (5) vertical cross-section of radar echo, and etc. The QPESUMS is able to monitor and analyze severe weather systems in real time with 0-1hr QPF product. Systematic verification method is designed to serve as the basis for further improvement of the QPESUMS system. A series of tasks is undertaken to advance the usefulness of the QPESUMS on severe weather monitoring and risk mitigation: (1) high-resolution geographical information and real-time hydrological data will be included for aerial QPE/QPF product based on the needs from hazard mitigation agencies, (2) on-line severe weather data archiving and retrieving system for case studies, (3) hazardous weather warning products, (4) dual-polarization radar

technique adoption, (5) continuing QPESUMS system outreach to hazard mitigation agencies.