Applying Genetic Algorithm Combining Operation Tree (GAOT) for Estimating Typhoon Precipitation Using Passive Microwave Satellite

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Abstract

This paper proposes genetic algorithm combining operation tree (GAOT) and applies it to estimate the typhoon rainfall over ocean using multi-variable meteorological satellite data. GAOT is a data mining method, used to automatically discover the relationships among nonlinear systems. The main advantage of GAOT is to optimize appropriate types of function and their associated coefficients simultaneously. In the case study, this GAOT described above combining with SSM/I seven channels was employed. These results are then verified with the data from four offshore rainfall stations located on islands around Taiwan. The results show that the GAOT generates accurate multi-variable equation and the performance of GAOT outperforms three empirical equations developed by Chiu et al. (1990), Ferraro et al. (1994), and Ferraro (1997).

Keyword：Genetic algorithm combining operation tree (GAOT), Meteorological satellite, SSM/I, Data Mining.