

# DETECTION OF SNOW AND FROST DISASTER IN SOUTHERN CHINA USING AMSR-E SCATTERING AND POLARIZATION INDEXES

*Ya-Qiu Jin\**, *Hao Chen*

Key Laboratory of Wave Scattering and Remote Sensing Information (MoE)  
Fudan University, Shanghai 200433, China

\* Email: [yqjin@fudan.ac.cn](mailto:yqjin@fudan.ac.cn)

## 1. INTRODUCTION

All weather and all time microwave remote sensing is one of most powerful technology to monitor natural disasters. Multi-channel brightness temperature (TB) from satellite-borne passive microwave remote sensing has played important role to retrieve quantitative physical information of global and regional weather and climate, atmospheric precipitation, land hydrology, oceanic surface winds, etc. However, during serious snowing and frost in usually warm southern China, January 2008, the operational algorithm of multi-channel brightness temperature failed to detect the snow (detection correctness is lower than 5%). Local averages of scattering and polarization difference indexes and the anomalous deviations in both spatial and temporal scales should be collected and used for detection of local events.

In this paper, using vector radiative transfer modeling to numerically simulate multi-channel TB of a layer of snowpack (see Figs.1,2), multi-temporal AMSR-E TB data during snow and frost disaster in Hunan Province, southern China are analyzed. Some characteristic indexes are newly defined, and a new detection flow is designed (see Fig. 3). Detection correctness reaches 80% (see Fig. 4).

It is necessary to establish the database of multi-channel TB and the indexes in normal average and anomalous situations to correctly detect and even forecast local anomalous variation.

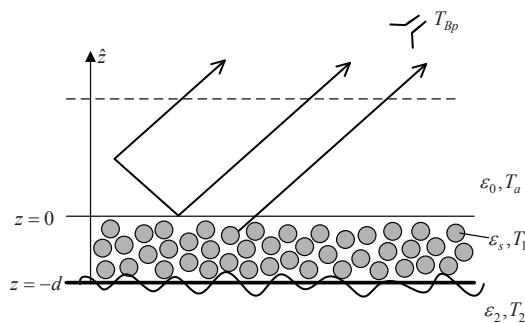


Figure 1. A snowpack model of dense and sticky Mie ice particle

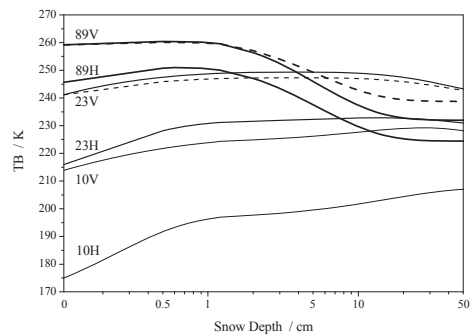


Figure 2. Brightness temperature of snowpack vs snow depth

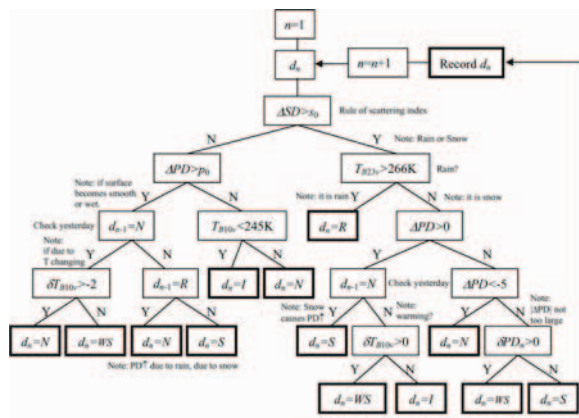


Figure 4. Detection flow of snow and frost

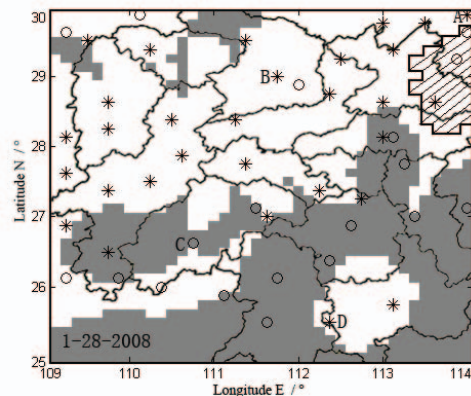


Figure 5. Detection of snow and frost in January 28, 2008 in Hunan Province, China