CHAPTER 5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Fractal dimension is a measurement of irregularity of shape and surface, which is non-integer. Fractal dimensions with large value means high irregularity. There are many methods for fractal dimension approximation. However, in this research the area-perimeter is used as the starting method for the identification of fractal dimension of severe thunderstorm cloud over Thailand from GMS-5 satellite image. Reports of damages from severe weather from the Thai Meteorological Department and the Ministry of Interior are used to identify severe thunderstorm cases in this study. The severe thunderstorm is defined as thunderstorm with associated gust wind, heavy rain and sometimes hail. The duration of the study period is between 1996 to 2003 which is the operational period of the Geostationary Meteorological Satellite-5 (GMS-5), in which images from this satellite are used to analyze fractal dimension. In the area-perimeter method, there is a problem associated with large reduction factors which cause discontinuity in the perimeter of cloud in the satellite image. Thus, in this research an improved version of the area-perimeter method is proposed. This method is called overlapping area-perimeter method. The approach of this new method is to combine the perimeters associated with cloud area of cloud top temperature $\leq$ -40°C with the perimeter associated of the same cloud but with cloud top temperature $\leq$ -30°C. The results are summarized in Table 5.1 and Table 5.2.

Table 5.1 Fractal dimensions of severe thunderstorm clouds and non-severe thunderstorm clouds.

Case	Average Fractal Dimension					
	1-hr Before		Mature		1-hr After	
	Range	Average	Range	Average	Range	Average
Severe thunderstorm cloud	1.423-1.828	1.668	1.878-1.472	1.769	1.177-1.823	1.662
Non-severe thunderstorm cloud	1.564-1.737	1.674	1.804-1.725	1.768	1.642-1.771	1.688

Table 5.2 Fractal dimension of large severe thunderstorm clouds and small severe thunderstorm clouds at the mature stage.

Case	Average Fractal Dimension
Fractal dimension for large cloud	1.829
Fractal dimension for small cloud	1.687

5.2 Recommendation

1. Infrared 2 channel in Geostationary Meteorological Satellite-5 (GMS-5) should be included in the analysis of severe thunderstorm.
2. Classification of fractal dimension choose be done for winter and summer.