

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The objective of this research is to investigate characteristics of the active and break of the summer monsoon under climate change. The singular vector ensemble forecasting technique is used to generate initial perturbations for the preparation of ensemble forecasts of the southwest monsoon over Southeast Asia under climate change scenarios A2 and COMMIT. This method is selected because it is computationally inexpensive and can be applied to the Single Level Primitive Equation (SILEPE) model to generate initial perturbations with less difficulty than other methods. Singular vector ensemble forecasts are performed for 4 cases under A2 and COMMIT scenarios. The singular perturbations (singular vectors) provide reasonable distribution of ensemble members that cover the control run and A2 up to 48-hr forecast. After 48-hr, the ensemble members seem to converge to the control run. This could be due to the over simplification of SILEPE which is a 2-D model and the damping nature of numerical methods in SILEPE.

Nevertheless, the ensemble forecasts with singular vector method reveals that under A2 and COMMIT scenarios, the pattern of active/break monsoon over Southeast Asia can be identified from wind speed and wind direction which is presented by spaghetti plot, directional mean and circular variance of wind. The mean wind direction for active summer monsoon is southwesterly while that of summer monsoon break is westerly. For wind speed, the speeds for the selected monsoon break cases are weaker than the active cases.

5.2 Recommendation

The model used in this research is a 2-D shallow water model without topography. Inclusion of topography should be applied in order to obtain better simulation of the active/break monsoon.

In addition, to be able to extend the range of the summer monsoon simulation beyond 4 days, boundary conditions for the north and south boundaries of the domain should be improved.

Moreover, the singular vector technique in this research uses only wind field of the shallow water model but not the geopotential field. To generate better perturbation, singular vectors for both wind and geopotential fields should be implemented.