

## CHAPTER 4: CONCLUSION

Generally, this study illustrates the physical and chemical behaviour of drip water. This study shows a significant relationship between the volume of water input and the karst hydrology characteristic. The study indicates that the hydraulic pressures play a major role in the karst hydrological system. The study show that the hydraulic pressures increase coincidentally with high rainfall events. Therefore, the drip rates and conductivity increase coincidentally with high rainfall event and vice versa. All drip sites maintain flow throughout the year and classified into seasonal flow and seepages flow. Furthermore, the study also reveals that the filling time of water infiltrates through pores and microfissures is approximately less than 2 to 3 days.

The study shows a wide range of chemical properties due to a variant in karst host rock in Peninsular Malaysia. The pH and TDS value strongly indicates that the water sample originates from bicarbonate environment. The source rock deduction analyses concluded that the water sample originates from limestone-dolomite weathering. The Piper diagram illustrates the significant of ionic exchange processes in the karst system. On the other hand, the elevation of Mg/Ca ratio and  $SI_{calcite}$  during low water input and vice versa provides a great indicator to the climatic respond. Even though major elements of drip water are Ca and Mg, each of drip sites show a unique hydrogeochemistry characteristic related to the host rock properties, flow path characteristic, fracture system behavior and volume of water input.

The conceptual model simplified the hydrogeochemical processes in the karst system. The moist environment in tropical region triggers increasing of weathering process of the karst system. Overall, the processes of dilution, dissolution, ionic exchange and prior calcite precipitation within the fracture would determine the evolution and water chemistry of drip water.

In conclusion, this study proved the significant relationship between drip water and climatic parameters. However, understanding the implication of climatic record is limited by the temporal limitation of monthly sampling. Overall this study points towards the critical importance of high frequency sampling of drip water and continuous monitoring of drip rates. This strategy will provide more details information regarding the processes in karst system. In addition, a combination of elements abundance and isotopic study would be a powerful approach.