CHAPTER 4

CONCLUSIONS

PM_{10} samples were collected in the dry season and wet season from February to August 2009 at two different sampling locations in Chiang Mai using mini volume air sampler. Sampling was conducted twice a week on a working day and a weekend day. PM_{10} concentrations obtained at Yupparaj Wittayalai School (YP) site from this work were compared with the values obtained with automatic active samplers of the Pollution Control Department (PCD) at YP site. The PM_{10} concentrations at the YP station varied from 28.7 $\mu g\ m^{-3}$ to 209.0 $\mu g\ m^{-3}$, while those at the Mae Hia Research Center (MH) site varied from 14.9 $\mu g\ m^{-3}$ to 91.5 $\mu g\ m^{-3}$. PM_{10} concentrations in the dry season were significantly different ($p < 0.05$) between the two sampling sites. The average PM_{10} concentrations at YP site were highest in February (147.5±47.3 $\mu g\ m^{-3}$) and lowest in June (38.4±6.9 $\mu g\ m^{-3}$). The results revealed that the PM_{10} concentrations were high in the dry season (February and March) before decreasing in April. Sodium, ammonium and calcium were major cation constituents of PM_{10} at YP and MH sites, while calcium was the greatest contributor to the ionic elements of PM_{10} in both YP and MH sites. The mean concentrations of cations in a descending order were $Ca^{2+} > Na^{+} > NH_4^{+} > K^{+} > Mg^{2+}$. The average of each cation species concentration in the dry season obtained at YP station was found to be higher than that at the MH station. The monthly trends of concentrations of PM_{10}, PM_{10}-bound cations (Na^{+}, NH_4^{+}, K^{+}, Ca^{2+} and Mg^{2+}) were similar. As the concentrations of these

pollutants were significantly different ($p < 0.01$) between seasons, seasonal variation thus existed regarding this work.

The main purpose of this study was to assess the correlation of PM_{10}, PM_{10} – bound ions and forest fire damage area (DA). All parameters including PM_{10}, DA Na^+, NH_4^+, K^+, Ca^{2+} and Mg^{2+} obtained from all measuring techniques were analyzed to find out correlation of each pair. A correlation analysis reveals that these pollutants were positively correlated with each other, especially in the dry season. The DA concentrations obtained in this work was correlated with PM_{10} concentrations in the dry ($r = 0.829$). Noticeably, strong correlation ($r = 0.958$ and $r = 0.964$ respectively) was found between PM_{10} to $NH_4^+$and K^+ concentrations in the dry season at YP site and the correlation at MH site were $r = 0.703$ and $r = 0.860$ respectively. But the correlation of $NH_4^+$and K^+ to PM_{10} in wet season were relatively low ($r = -0.026$ and $r = 0.383$ respectively). Furthermore the correlation of $NH_4^+$and K^+ to DA in dry season are strong ($r = 0.788$ and $r = 0.833$ respectively). It can be concluded that the $NH_4^+$and K^+ concentration are one of the major cation correlated with PM_{10}. Thus K^+ was an important species emitted by biomass burning and therefore it was suited to be used as a tracer for biomass burning.