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關鍵字(英)	PAHs Typhoon scavenge
摘要(中)	摘要 本研究探討空氣中微粒在不同粒徑上的多環芳香烴碳氫化合物(Polycyclic Aromatic Hydrocarbons, PAHs)受颱風異常天候之影響，因雨水沖刷或強風的吹送所造成 PAHs 濃度變化。本研究利用微孔均勻沉降衝擊器(Microorifice Uniform Deposition Impactor, MOUDI)採集新莊地區輔仁大學不同粒徑之微粒樣本，經化學萃取、濃縮、淨化後以氣相層析質譜儀(CG/MS)分析 33 種 PAH，並配合位於台北縣新莊市運動公園內超級測站之即時粒狀物有機污染物監測器(Realtime PAH Monitor)與環保署空氣品質監測資料以及其他相關氣象資料，以了解颱風影響空氣污染物濃度的分布情況。 在監測空氣中微粒粒徑與 PAH 物種上，微粒質量濃度多集中於 3.2 μm，PAHs 則呈粒徑雙峰分布，分別為 3.2 μm 與 0.17 μm，物種多為中、高分子量之 PAHs，其中不乏致癌性物種，如 Benzo[a]pyrene、Indeno[cd]pyrene、Coronene 等。颱風期間工商業活動停止，加上颱風風雨之影響，31 種 PAHs 之總合濃度為 1.6± 0.6 ng/m3；颱風過後，由於大量人為活動影響，PAHs 濃度隨即上升，PAHs 濃度為 6.9 ± 1.4 ng/m3，是颱風期間的三倍，因而推估台北地區微粒上 PAH 在颱風後之回復時間低於 24 小時。 本研究在颱風影響期間針對降雨量對微粒污染物濃度影響作分析，結果顯示當雨量超過 5 mm/hr 時，PM10 的濃度顯著地降低，而中等雨量(雨量小於 5 mm/hr)對於 PM10 濃度造成之影響不顯著；PAH 在 PM2.5 則未發現雨量有明顯對其濃度造成影響，此結果與降雨影響大多為粗粒徑微粒之沖刷現象相符。風速與 PAHs 濃度相關方面，發現日平均風速與 MOUDI 分析總 PAHs 濃度間有良好的線性相關，相關係數 R 為 0.68，顯示日平均風速較大的情況下，微粒濃度與 PAHs 濃度亦較低。 經由主成分分析結果中，微粒之粒徑分布在夏天與秋天略有差異，MOUDI 的 B5、B6(0.53~1 μm)與 B7~B10(0.053~0.305 μm)之相關性在秋天時有降低的現象，顯示相較於夏天 0.53~1 μm 之微粒 PAHs 組成不同於 0.053~0.305 μm。颱風樣本中，所有的分析結果均顯示颱風過後一天，大氣中微粒上之 PAHs 組成便可回復至一般背景狀態，顯示颱風過後，風雨漸趨平靜，空氣汙染物因人為活動迅速累積，短時間即回復至一般大氣濃度與分布狀況，尤其台北屬於盆地地形，容易聚積污染物，因而較無緩衝之空間。 關鍵詞：PAHs、颱風、風雨沖刷效應
摘	Abstract In this study, we investigated Typhoon effects on the variation of particle

要(英)	size-segregated PAHs concentration in the air, which include rain scavenge and wind blow-off phenomena. The different sized particle samples was collected by Micro orifice Uniform Deposition Impactor(MOUDI) in Fu-Jen Catholic University, Xin Zhuang, Taipei County, Taiwan. The samples were extracted, concentrated, clean-up and finally analyzed by GC/MS for 33PAHs. We correlated the realtime PAH data in the Xin Zhuang aerosol supersite and the air pollutant & meteorology data in EPA monitoring stations to evaluate the Typhoon effects on the PAHs concentration distribution of air borne particles. The particle mass concentration was mostly on 3.2 μm, and the particle-bound PAHs modes was on 3.2 μm & 0.17 μm,which was bi-modal type, and include middle-high molecular weight PAHs, which are regarded as carcinogens, such as Benzo[a]pyrene, Indeno[cd]pyrene etc. Because the industrial and commercial activities were terminated by typhoons wind and rain significantly influence during the typhoon period, 31 PAHs total concentration was 1.6± 0.6 ng/m3. After typhoons, the anthropogenic pollution emission returned immediately, the PAHs concentration was increased to 6.9 ± 1.4 ng/m3, which was triple of that during typhoon period. As the result, the particle-bound PAHs concentrations recovery time was estimated in less than 24 hours. In the research, we focused on rainfall and wind blow-off effects on the concentration for both particles and PAHs. In the results, when rainfall was more than 5 mm/hr, we found the PM10 concentration was reduce significantly, i.e. there is no significant effect for rainfall events less than 5 mm/hr. There is no proof of rainfall affecting the PAH concentrations in fine-particles. This result matched the scavenging effect theory that rainfall only clean up coarse particle. In the result of relationship with wind speed and PAHs concentration, we found daily-average wind speed has a good linear regulation with total PAHs concentration which sampled by MOUDI, the correlation coefficient is 0.68. It concluded that high daily-average wind speed cause the low concentration of PAHs and particles. In the Principle Components Analysis(PCA) result, PAHs in various sized particles showed different results in summer and fall. The correlation of MOUDI’ s B5 to B6(0.53~1 μm) and B7 to B10(0.053~0.305 μm) was not significant in the fall season. Comparing with the summer results, the distributions of PAHs in 0.53~1 μm range are different with 0.053~0.305 μm range. All of the results in Typhoon samples show that particle-bound PAH recoveries for both concentrations and distributions were less than 1 day. It is because Taipei is a basin geographic landform, which air pollutants accumulate easily inside the basin, especially at the stable atmospheric condition after typhoons. Key word: PAHs, Typhoon, scavenge
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