ORAL PRESENTATIONS

[ID-O#089] Assessment of Toxic Emissions and Particulate Matter from Peat Burning Smoke in Peninsular Malaysia

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Peatland fires in Peninsular Malaysia occur unfailingly during the El Nino season releasing significant amounts of harmful and toxic compounds including particulate matter (PM). This abstract presents the assessment and quantification of the concentrations of polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofuran (PCDFs) and dioxin-like polychlorinated biphenyl (dl-PCBs) in the gas and particles phases of peatland fire smoke. Particulate matter (PM) is also characterised in terms of mass, size and number distribution including its sources using a Positive Matrix Factorisation (PMF). An Ezy Entrapper was used to collect smoke samples at fire sites during their occurrences at the National Reserve Forests in Kuala Langat, Selangor and Pekan, Pahang. Collected samples were analysed using gas chromatography- high resolution mass spectrometry (GC-HRMS). Real-time monitoring of PM was conducted using an Environmental Dust Monitor EDM 180. The total toxic equivalent (TEQ) concentrations of PCDD/ Fs and dl-PCBs ranged from 124.7 to 2467.7 fg/ m^3 during burning and 124.7 to 314.9 fg/m^3 post-burning, with 2,3,7,8-TCDD being the predominant congener. PM concentrations during fires were significantly higher than non-fire days, with PM2.5 levels exceeding the WHO and Malaysian standards by up to 4780% and 2050%, respectively. The PMF identified three contributing factors: accumulation mode, fine particles, and coarse particles, with accumulation mode particles dominating during peat fires. The findings highlight the substantial releases of toxic compounds from peatland fires, posing an environmental and health risks. The findings also underscore the needs for improved peatland management and fire prevention strategies to mitigate these toxic emissions.