

3.092 Characterization of carbonaceous aerosols emitted from peatland burning in Central Kalimantan Indonesia.

Presenting Author:

Puji Lestari, Faculty of Civil & Environmental Engineering, Institute of Technology Bandung (ITB), Bandung, Indonesia, pujilest@indo.net.id

Co-Authors:

Febri Juwita, Faculty of Civil & Environmental Engineering, Institute of Technology Bandung (ITB), Bandung, Indonesia

Isna Utami, Faculty of Civil & Environmental Engineering, Institute of Technology Bandung (ITB), Bandung, Indonesia

Jeffrey Reid, Naval Research Laboratory, 7 Grace Hopper Ave, Stop 2, Monterey, CA 93943-5502, USA

Abstract:

Peatland burning is a significant source of particulate matter ($PM_{2.5}$) and become the major source of transboundary haze pollution in Southeast Asia. However, only limited data exist on the emission characteristics from this source. An intensive field study was conducted at the burning site, Pulau Pisau, Central Kalimantan, during a peat fire episode in 2009. $PM_{2.5}$ samples were collected using two Mini Volume Samplers with Teflon and quartz fiber filters. Samples were also collected at a residential area in Palangkaraya city to provide an overview of the urban background site. The samples were analyzed to determine concentrations of $PM_{2.5}$, OC and EC. In this study carbon fraction of OC (OC1, OC2, OC3 and OC4) and EC (EC1, EC2, and EC3) were quantified at the DRI's Laboratory using a thermo-optical technique (Chow et al., 1993; 2001). $PM_{2.5}$ measured near the source were observed in high concentration of 504-12,406 $\mu g m^{-3}$, while average $PM_{2.5}$ concentrations at urban residential site were $69.7 \pm 38 \mu g m^{-3}$. The results indicated that the dominant chemical component of $PM_{2.5}$ from peat land burning were organic carbon (OC) which contributed about $69 \pm 9 \%$ of $PM_{2.5}$, and OC1 and OC2 were the primary compound of Total Carbon. OC1 accounted for $24.6 \pm 4.5 \%$ of TC in peat fire samples and only $2.5 \pm 3.4 \%$ in urban residential samples. OC2 accounted for $46.6 \pm 4.4 \%$ of TC and $28.1 \pm 4.3 \%$ of TC for Peat fire and residential area sites respectively. While EC contributed 1.5% to the total $PM_{2.5}$. In the urban residential site, contribution of OC and EC to $PM_{2.5}$ were 41% and 2% respectively. OC/EC mass ratio could indicate the origin of carbonaceous $PM_{2.5}$. In this study the ratio of OC/EC were 52 ± 22 and 9.6 ± 3.9 for burning site and urban residential site respectively.

Key words: $PM_{2.5}$, OC, EC