



Air quality and trace gas observations at the GAW site Pha Din (Vietnam)

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We present air quality and trace gas observations at the regional Global Atmosphere Watch (GAW) station Pha Din (PDI) in rural Northwestern Vietnam. PDI is located in a sparsely populated area on the top of a hill (1466 m a.s.l.) [1], and frequently receives pollution plumes from large-scale fires on the Indochinese Peninsula [1]. We previously analyzed carbonaceous PM_{2.5} chemical composition in an intensive campaign conducted during 3 weeks in March-April 2015. The study included measurements of elemental and organic carbon (EC/OC) and more than 50 organic markers, such as sugars, PAHs, fatty acids and nitro-aromatics [2]. For this intensive campaign, we linked trace gas mixing ratios of CO, CO₂, CH₄ and O₃ to a statistical classification of large-scale fires, which was based on organic aerosol composition. We found increased CO and O₃ levels during medium and high biomass burning influence during March-April 2015. A backward trajectory analysis confirmed different source regions for the identified periods based on the organic aerosol cluster. The more polluted periods were characterized by trajectories from southwest, with more continental recirculation of the medium cluster, and more westerly advection for the high cluster. Cleaner air masses instead arrived from northeast, i.e., mainland China and Yellow sea during this period. These findings highlighted that biomass burning in Northern Southeast Asia significantly enhances the regional organic aerosol loading, chemical PM_{2.5} composition and the trace gases in northwestern Vietnam [2]. For our contribution to EGU22, we extend this analysis to a multi-year period and present continuous trace gas observations of CO₂, CH₄, CO, and O₃ conducted at PDI since 2014. The data are interpreted with atmospheric transport simulations, and add valuable insight on air quality and trace gas mixing ratios in a region of scarce data availability.

REFERENCES: [1] Bukowiecki, N. *et al.* Effect of Large-scale Biomass Burning on Aerosol Optical Properties at the GAW Regional Station Pha Din, Vietnam. *AAQR* 19, 1172–1187 (2019). [2] Nguyen, D. L, *et al.* Carbonaceous aerosol composition in air masses influenced by large-scale biomass burning: a case-study in Northwestern Vietnam. *Atmos. Chem. Phys.*, 21, 8293–8312 (2021) <https://doi.org/10.5194/acp-21-8293-2021>

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