

Air Quality Study within Steel Works Town in the UK

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In April/May 2012, aerosol filter measurements were carried out in and around the coastal town of Port Talbot in South Wales which has an approximate population of 35,000 and is located on the M4 corridor (51°34' N and 3°46' W). The town sites one of the UK steel manufacturing plants owned by Tata and is the main source affecting air quality in the area (AQEG, 2010). The site covers approximately 28 km², comprises of ~50km of roads, 100 km of railway, and 25,000 vehicle movements per day. The production capacity is around 5m tonnes per year with the main processes in the steelworks being iron-making (sintering, blast furnace and raw materials), steel-making (basic oxygen steel-making (BOS) and coking) and rolling mills (hot and cold mills) (Moreno et al., 2004; Dall'Osto et al., 2008).

Instruments were deployed at four sites around the perimeter of the steel works (one at a coastal site (Little Warren LW) and the remain in 3 inland sites placed along the length of the works (Fire Station FS, Prince Street PS and Dyffryn School DS) in the study area for a four-week campaign (16th April to 16th May, 2012) (see Figure 1). With a view to measuring elements and water soluble ions within the fine and coarse fraction, our main site was located at FS where we deployed: a micro-orifice uniform deposit impactor (MOUDI) (3 day samples); a Partisol Dichotomous sampler (daily sample); a Streaker sampler (hourly samples); an Aerosol time-of-flight Mass Spectrometry (ATOFMS); a GRIMM particle size spectrometer and an Aethalometer.



Figure 1. Overview of the sampling sites used in Port Talbot.

Gaseous and meteorological data measured during the period of sampling were also collected from the Automatic Urban and Rural Network (AURN) located next to the FS site. This main site was in itself

complemented by 3 other sampling sites where we deployed another 3 Partisol samples (24 hr sampling rate). At our coastal site, we ran a second Streaker sampler, which when paired with the FS Streaker, collected data to measure the increment in PM caused by the steel works.

An example of the results with huge peaks of Fe and Mn detected in one of the sites nearby the steel works is reported in Figure 2.

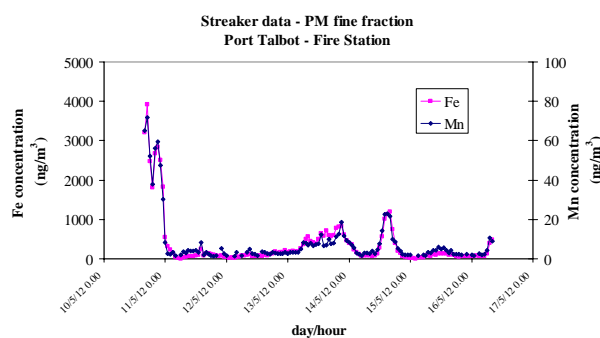


Figure 2. Fe and Mn hourly concentration (in ng/m³) detected in Port Talbot (FS site).

Given this large data set of elements, ions and chemical species, our aim was to assess the impact of the steel works on the local area and in particular understand the nature of PM episodes detected by ongoing continuous PM measurements within the area which were suspected to be generated by fugitive dusts.

References.

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