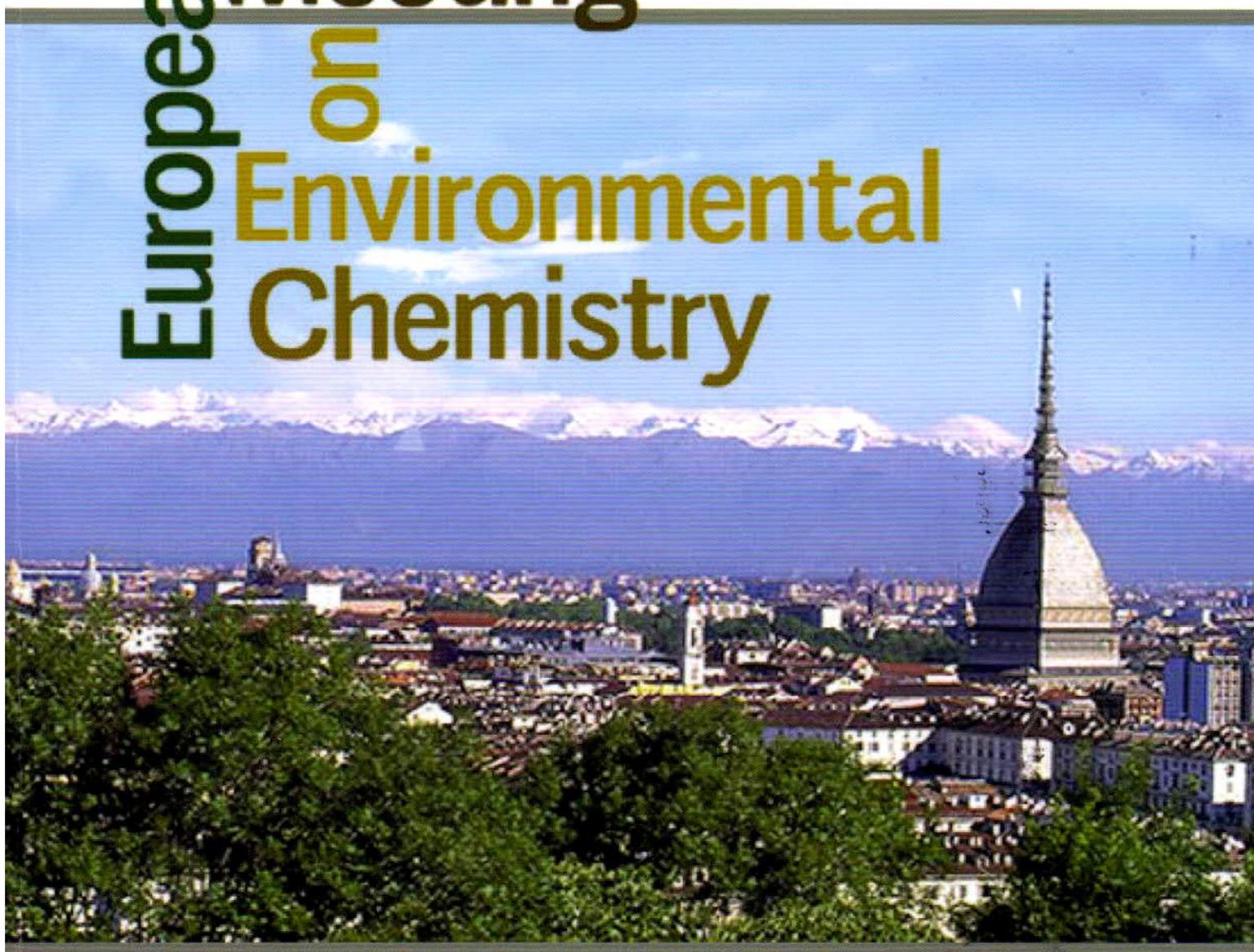


NOVEMBER 30 - DECEMBER 03. 2015

TORINO, ITALY

BOOK OF ABSTRACTS

European 16th Meeting on Environmental Chemistry



EMIEC16

“16th European Meeting on Environmental Chemistry”

November 30th – December 3rd 2015

Torino, ITALY

BOOK OF ABSTRACTS

Organized by

Maria Concetta Bruzzoniti and Davide Vione
(Department of Chemistry, University of Torino)

Environment Park S.p.A.

On behalf of

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Oil pollution in the vicinity of a heating plant in New Belgrade (Serbia) – influence on the ground water quality in alluvial plains of the Sava River

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The district heating plants in Belgrade (Capital of Serbia) have been using petroleum products as fuel for decades. The most used derivatives are heavy fuel oil, raw petrol and ecodiesel. One of the largest heating plants in Belgrade is a heating plant in New Belgrade. Within the area of this facility, there are several storage tanks of petroleum products and a decanter. Being located in the alluvial plains of the Sava River, close to its confluence to the Danube, this heating plant represents potential source of the oil pollution for the whole alluvial area. During the months of May and June 2015 an extensive investigation of the pollution of the ground water in the vicinity of a heating plant in New Belgrade (Serbia) was conducted. The samples were analyzed from the system of the 13 existing piezometers and from the 3 new wells.

The results proved that the whole investigated area was contaminated with diesel and a heavy oil fuel which have been used for decades in this heating plant. Additionally, the results showed that the contamination of surrounding soils and sediments was transferred to the ground waters. In this way the pollution of the solid phase of the investigated aquifer left a "fingerprint" of its composition in the neighboring ground waters.

Although these results did not indicate a significant contamination of the investigated ground waters with oil pollutant, presence of this contaminant in the aquifer means that this area should be under continuous monitoring.

OIL POLLUTION IN THE VICINITY OF A HEATING PLANT IN NEW BELGRADE (SERBIA) – INFLUENCE ON THE GROUND WATER QUALITY IN ALLUVIAL PLAINS OF THE SAVA RIVER

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INTRODUCTION

The district heating plants in Belgrade (Capital of Serbia) have been using petroleum products as fuel for decades. The most used derivatives are raw petrol, eodiesel and heavy fuel oil.

One of the largest heating plants in Belgrade is a heating plant in New Belgrade. Within the area of this facility, there are several storage tanks of petroleum products and a decanter.

Being located in the alluvial plains of the Sava River, close to its confluence to the Danube, this heating plant represents potential source of the oil pollution for the whole alluvial area.

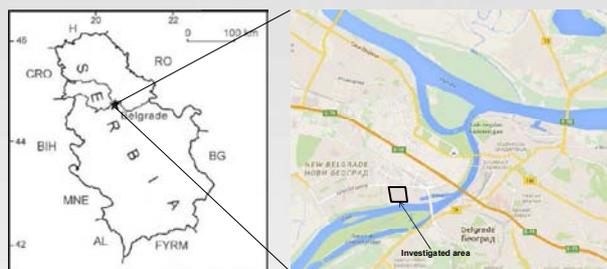


Figure 1. Location of the investigated area.

EXPERIMENTAL

During the months of May and June 2015, an extensive investigation of the pollution of the ground water in the vicinity of a heating plant in New Belgrade (Serbia) was conducted. The samples were analyzed from the system of 13 existing piezometers and from 3 new wells. Organic matter from the water samples was isolated with hexane in a separatory funnel. The extracts were precleaned on the column packed with Florisil® and analyzed by gas chromatography–mass spectrometry (GC–MS) techniques.

An Agilent 7890N gas chromatograph fitted with a HP5-MS capillary column (30 × 0.25 mm, 0.25 μm film; temperature range: 40 °C for 1 min; then 15 °C min⁻¹ to 100 °C for 1 min; then 10 °C min⁻¹ to 310 °C for 15 min and held for 15 min; with helium as the carrier gas (flow rate 1 cm³ min⁻¹) was used. The GC was coupled to a Hewlett– Packard 5972 MSD operated at 70 eV in the 45–550 scan range.

The peaks were identified according to the literature data (Peters et al., 2005., and references therein) or based on the total mass spectra, using mass spectra databases (NIST/EPA/NIH mass spectral library NIST2000, Wiley/NBS registry of mass spectral data, 7th ed., electronic versions).

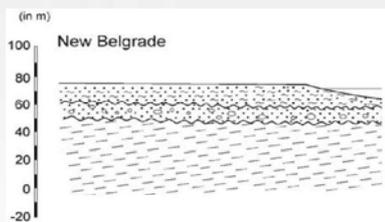


Figure 2. A simplified geologic cross-section of the Sava river bank in the investigated area (modified after Knežević *et al.*, 2012.).

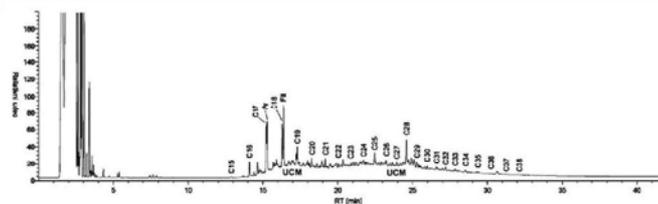


Figure 3. Gas chromatogram of an extract from a piezometric water (before flushing) sample.

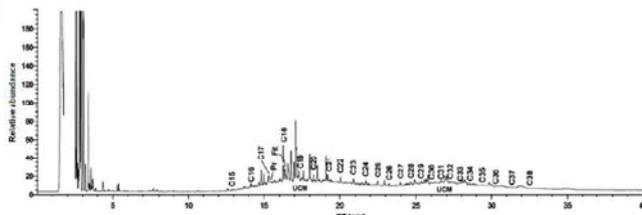


Figure 5. Gas chromatogram of an extract from a soil sample from the same locality.

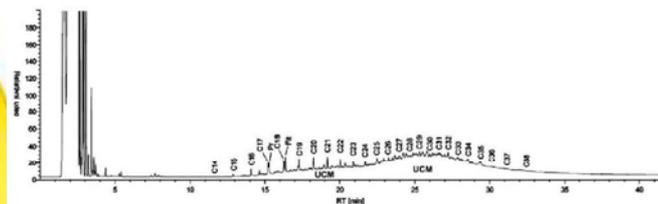


Figure 4. Gas chromatogram of an extract from a piezometric water (after flushing) sample.

RESULTS

The results proved that the groundwater in whole investigated area was contaminated with diesel and a heavy oil fuel which have been used for decades in this heating plant. Additionally, the results showed that the contamination of surrounding soils and sediments was transferred to the ground waters. In this way the pollution of the solid phase of the investigated aquifer left a “fingerprint” of its composition in the neighboring ground waters. Although these results did not indicate a significant contamination of the investigated ground waters with oil pollutant, presence of this contaminant in the aquifer means that this area should be under continuous monitoring.

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