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MEASURING AIR POLLUTANTS IN AN INTERNATIONAL ROMANIAN AIRPORT WITH POINT AND OPEN PATH INSTRUMENTS

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BACKGROUND ...

The general purpose of the study is to evaluate the potential air quality and health risks associated with operations of an international airport TRAIAN VUIA, Timisoara, located in the west side of Romania. Two monitoring stations were established near apron and equipment was set up to monitor Volatile Organic Compounds (VOC's), fine particulate matter (PM_{2.5} and PM₁₀), nitric oxides NO, NO₂ and NO_x, carbon monoxide CO, ozone O₃, sulfur dioxide SO₂, and other gaseous compounds (continuously measured by open path monitors), as well as wind speed and direction, traffic and aircraft activity. The results obtained during the three day continuous measurements and the correlation between air quality and the airport traffic are presented.



Notably, significant improvements have been made over the past two decades regarding aircraft fuel efficiency and other technical improvements to reduce emissions.

However, these advancements may be offset in the future by the forecasted growth of airport operations and other aviation activities.

It is also considered essential to effectively manage:

- ✓ emissions from terminal
- ✓ maintenance and heating facilities
- ✓ airport ground service equipments
- ✓ various ground transport traveling around, to and from airports. optimizing airport design, layout and infrastructure; modifying operating practices for greater efficiencies

From the Romanian perspective it is the first time that research in this direction have been conducted. The impact of Romanian airports over the air quality is basically unknown; the Romanian National Air Quality Monitoring Network is still in a development phase and is not covering airports vicinity.



EXPERIMENTAL SETUP ...



The measurements have been conducted with equipment and specialists from University “Politehnica” of Timisoara and National Institute of R&D for Optoelectronics, in 2008.





INSTRUMENTS (MEASUREMENTS METHODS) USED:

- ✓ **SO₂** measured with two Horiba APSA370 instruments, measurement principle is UV fluorescence, reference method: EN 14212:2005;
- ✓ **NO**, **NO₂** and **NO_x** measured with two Horiba APNA370 instruments, measurement principle is chemiluminescence's, reference method: EN 14211:2005;
- ✓ **O₃** measured with two Horiba APOA370 instruments, measurement principle is UV photometry, reference method: EN 14625:2005
- ✓ **CO** measured with two Horiba APMA370 instruments, measurement principle is NDIR (Non Dispersive Infrared), reference method EN 14626:2005;
- ✓ **CH₄**, **NMHC** and **THC** measured with two Horiba APHA370 instruments, measurement principle is FID (flame ionization detection), reference method EN 12619:2002
- ✓ **PM₁₀** measured with two Leko LSV3 instruments, gravimetric measurement principle, reference method EN 12341:2002;
- ✓ Other gases have been measured with DOAS Instruments



RESULTS AND DISCUSSIONS ...

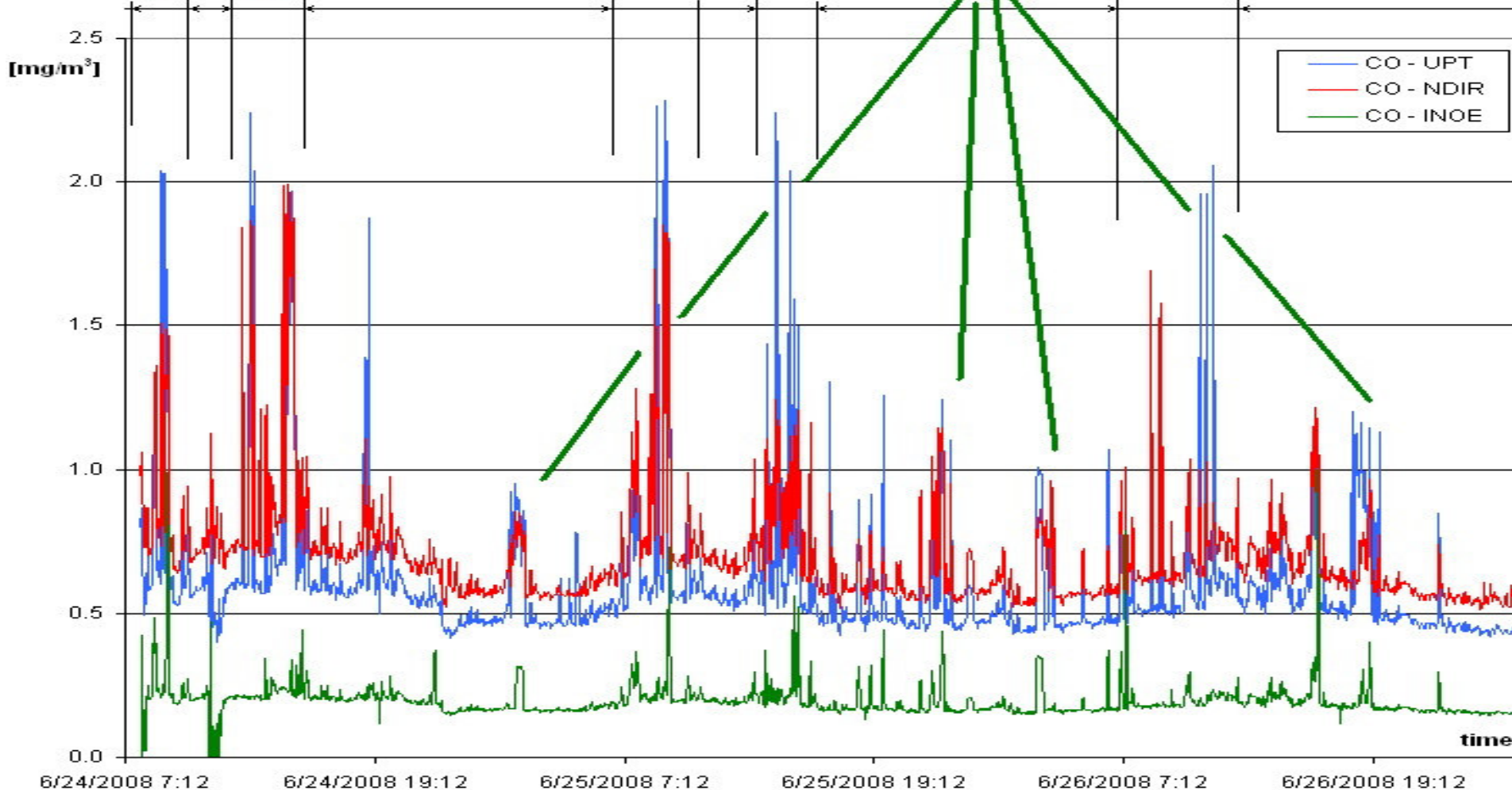
6:00 up to 10:00 departure of national/regional flights

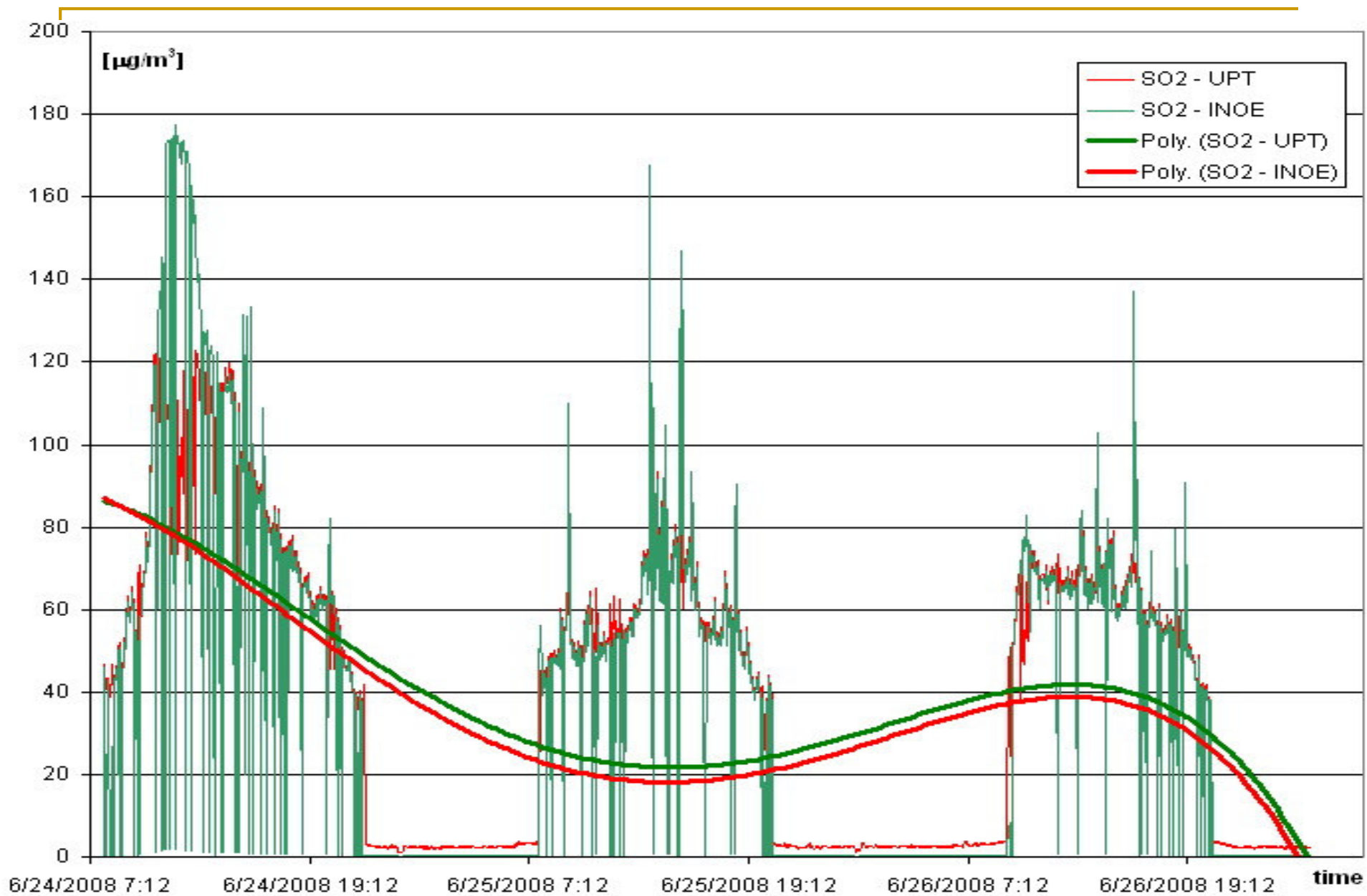
~ 15 plains

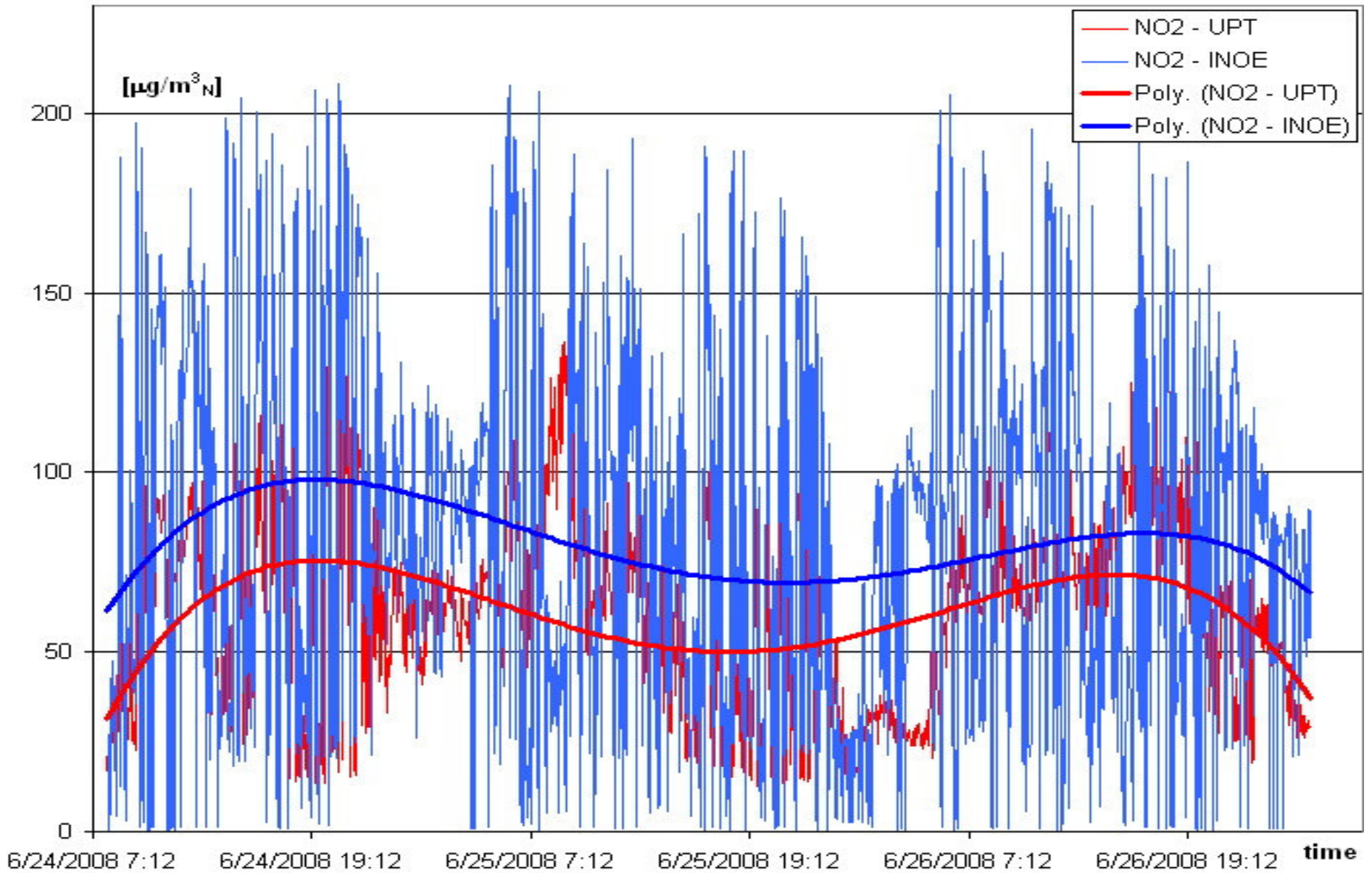
11:00 to 14:00 departure/landing of international flights

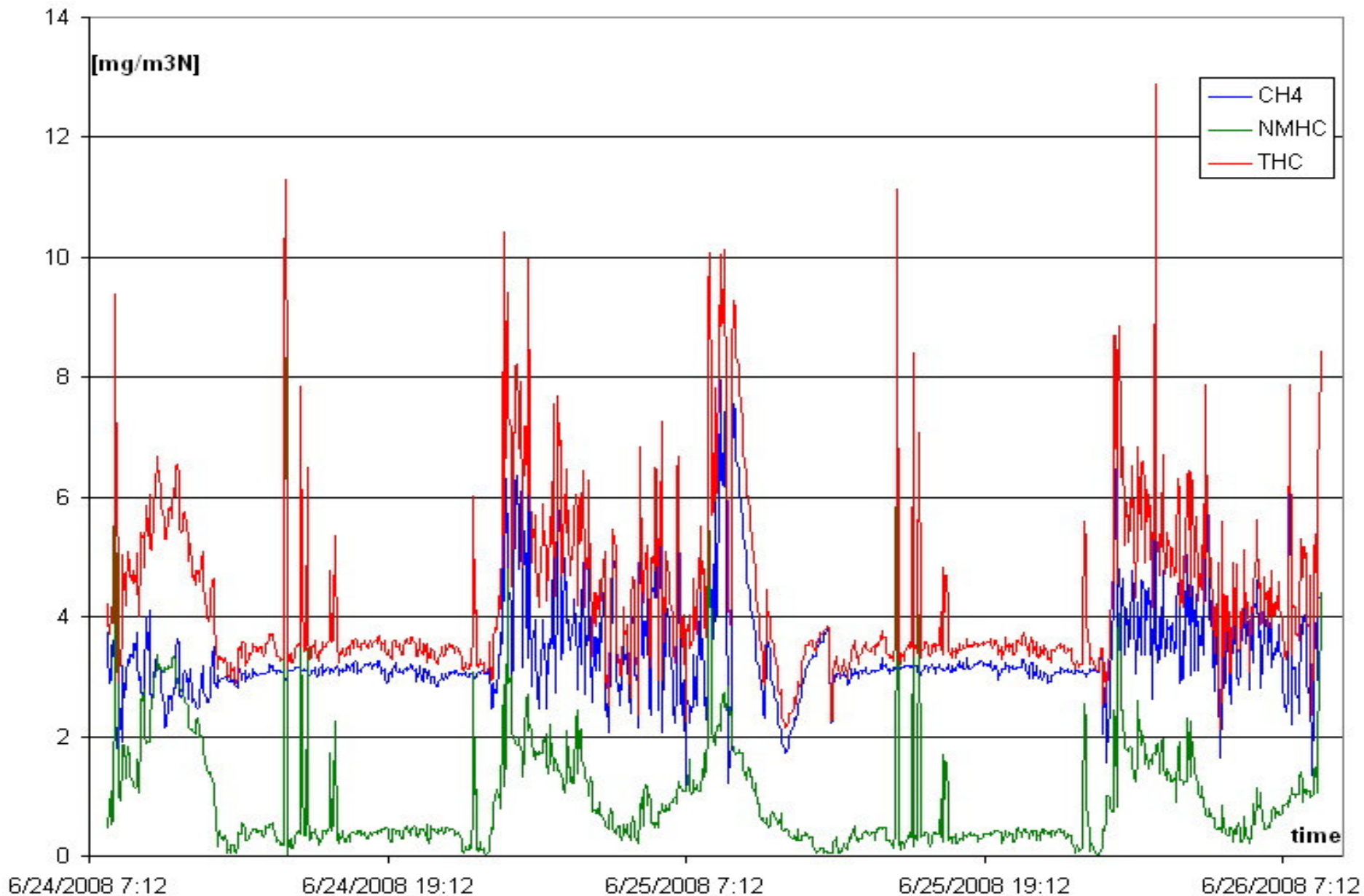
~ 20 plains

summer / charters to Greece Islands











CONCLUSSIONS ...

The most serious concern is about the measured values for VOCs, of up to 3 mg/m³N. As discussed, these values appear mostly when the airplanes are fueling. A matter of concern is the fact that the airplane parking/fueling area is near (~80 meters) the airport facilities, and that in time between “check in” and departure the passengers are exposed to high concentrations of VOCs for more than one hour. A very simple solution for this problem is to move the airplanes taxing area in the opposite side of the airport.

This solution will represent an advantage for passengers also regarding the NO₂ and SO₂ exposure. The aircrafts should be stationed and maintained as far as possible and the airplanes should come near the airport passenger facilities only before departures.



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