PROGRAMMA SPECIALE PER LA PROMOZIONE DELLA COLLABORAZIONE INTERNAZIONALE TRA CNR ED ISTITUZIONI DI RICERCA STRANIERI ATTRAVERSO LA MOBILITA' DI BREVE DURATA DI STUDIOSI E RICERCATORI ITALIANI E STRANIERI - ANNO 2016

Il Fruitore: Dr. CLAUDIA GROSSI

Istituto di afferenza: INSTITUT CATALÁ DE CIENCIES DEL CLIMA (IC3), CATALONIA, SPAGNA

Istituzione ospitante: Istituto per i sistemi Agricoli e Forestali del Mediterraneo (ISAFOM) del Cnr

Periodo: 03-14/10/2016

Relazione scientifica sui risultati dell'attività di ricerca svolta

The need to characterize the different sources of greenhouse gas CO_2 is leading to the development of new measurement methods such as the $\delta^{13}C$ method. This method allows to characterize the different CO_2 sources thanks to the measurement of the ratio of their stable isotopes ^{13}C and ^{12}C. The knowledge of the variability of this ratio helps to identify the origin of the emissions. Within the framework of this research topic the present Short-Term Mobility project, arwarded to Dr. Claudia Grossi, aims to promote the scientific collaboration between the ISAFOM-CNR and the IC3 in the characterization of GHGs fluxes in coastal Mediterranean areas.

Actually, Claudia Grossi spent two weeks, in October 2016, at the ISAFOM-CNR of Ercolano, Naples to study the isotopic signature of atmospheric CO_2 fluxes measured in the framework of the BioQuar project at the Landfill area managed by the Gesen S.p.a. (www.bioquar.it, Figure 1). During her stay at the ISAFOM-CNR, Claudia Grossi, together with the head of the Laboratory of the Atmosphere and Oceans (LAO) of IC3 Josep-Anton Morguí, visited the urban station of San Marcellino, Naples (www.ariasana.org, Figure 2) and the Landfill station of Giugliano (Figure 3).

Figure 1 Location of the Landfill of Giugliano.

Figure 2 Twit on the visit to the urban station of San Marcellino, Naples, Italy (www.ariasana.org).

Figure 3 Twit on the visit to the Landfill of Giugliano, Italy (www.bioquar.it)

During the present STM several analysis were carried out:

- Study of the variability of CO_2 concentrations and their $\delta^{13}C$, continuously measured during summer 2016 at 20 m above ground level over the landfill area, in relation with the different wind sectors (Figure 4);
- Analysis of the diurnal cycles of CO_2 concentrations and their $\delta^{13}C$ in relation with plants activities such as respiration and photosynthesis (Figure 5);
- Analysis of the spatial distribution of CO2 fluxes, and their $\delta^{13}C$, measured across the landfill of Giugliano by accumulation chambers within the BioQuar project (Figure 6);
- Preliminary analysis of Keeling plots of $\delta^{13}C$ under influence of different Landfill's areas (Figure 7).

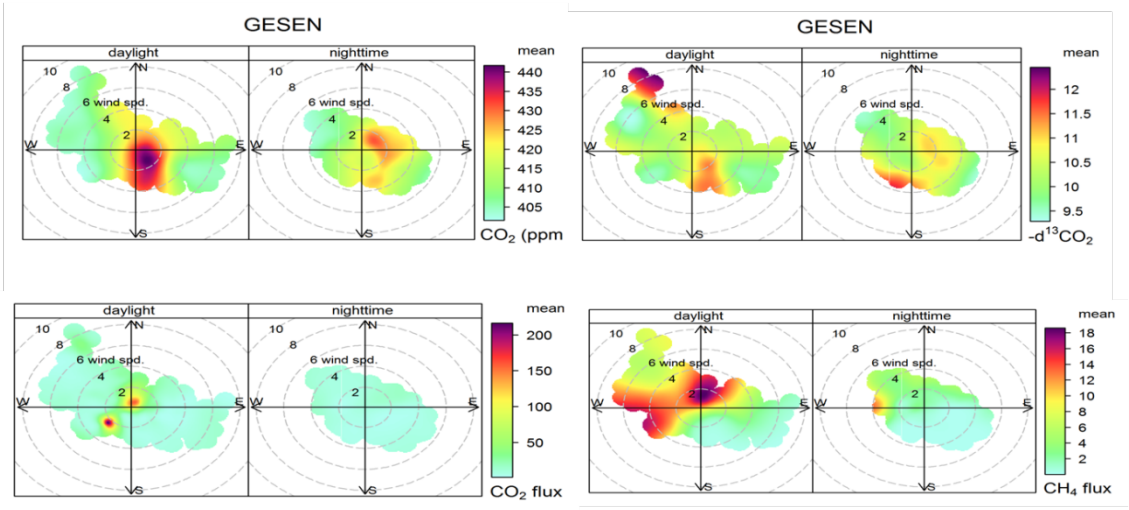

Figure 4 Polar plots of atmospheric concentrations and turbulent fluxes measured at the Gesen Tower (20 m. a.g.l.) between July and September 2016.

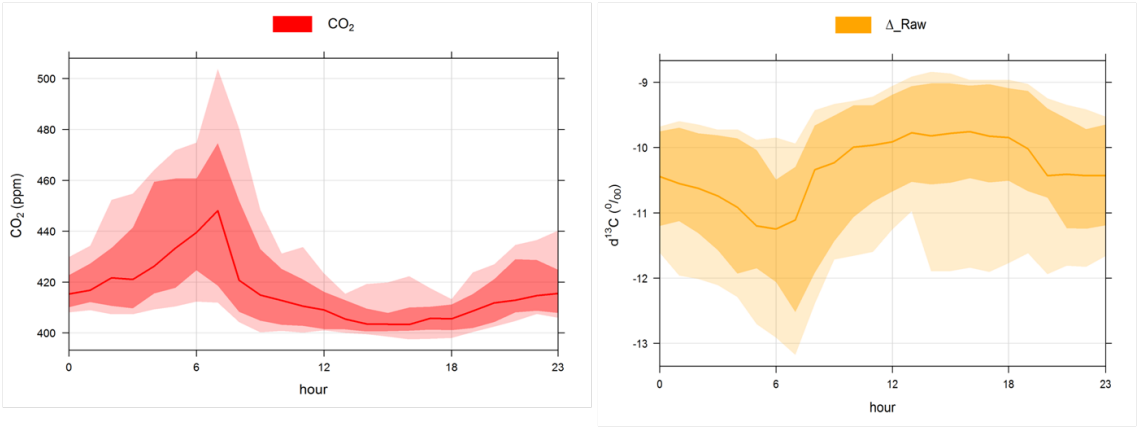

Figure 5 Daily cycles of CO_2 concentrations and $\delta^{13}C$ ratio continuously measured at Gesen tower between July and September 2016.

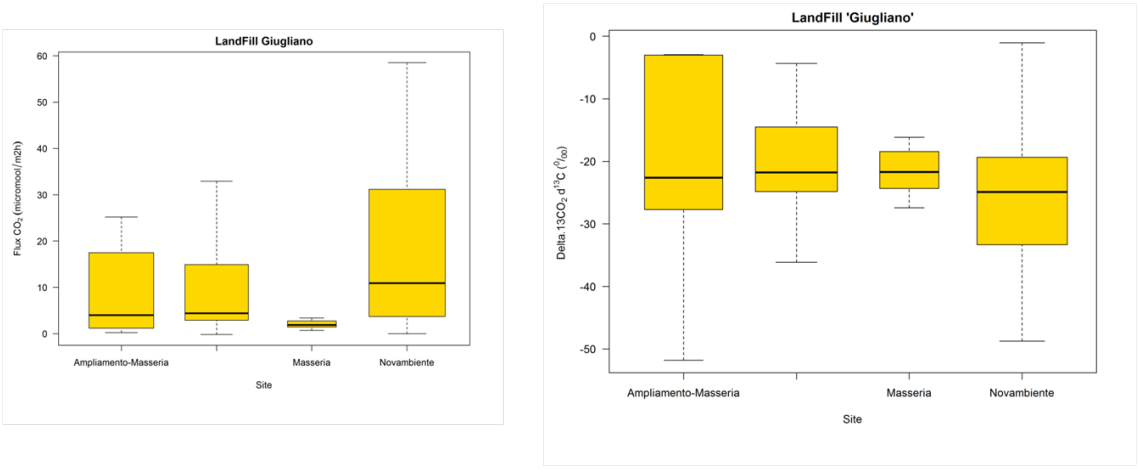

Figure 6 Box plots of CO_2 and $\delta^{13}C$ fluxes measured at the Giugliano's Landfill during 2015-2016.

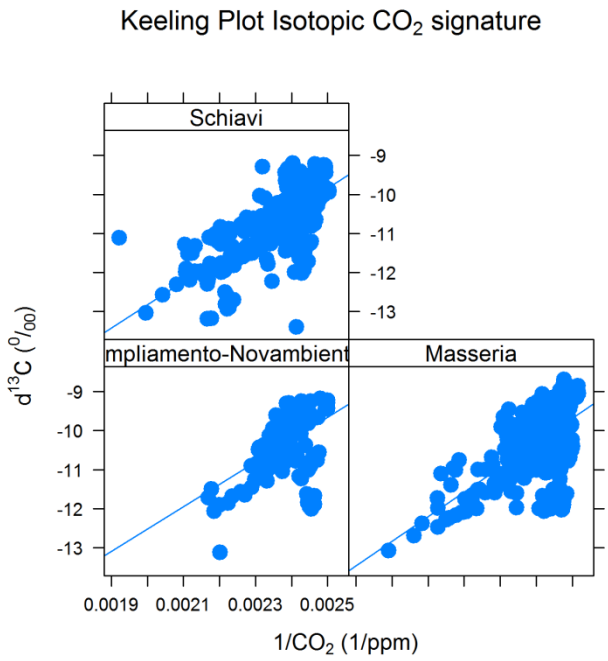

Figure 7 Keeling plots of $\delta^{13}C$ under influence of different Landfill's areas.

The present STM has been extremely useful to:

- promote the scientific collaboration between the ISAFOM-CNR and the IC3 in the mark of the characterization of CO_2 emissions over urban ecosystems, such as landfill and urban areas;
- organise a future intercomparison campaign between CO_2 fluxes, and their isotopic signature, measured at the urban coastal areas of Naples (Italy) and Barcelona (Spain);
- start the analysis of isotopic CO_2 signature due to different areas of a landfill region which is not homogenously distributed. These preliminary results will be further integrated and presented in a peer review journal.