GHG EMISSIONS ESTIMATION OVER A MEDITERRANEAN CITY THROUGH DIRECT MEASUREMENTS AND INVENTORY APPROACH

Serena Marras\textsuperscript{1,2}, Costantino Sirca\textsuperscript{1,2}, Veronica Bellucco\textsuperscript{1}, Laura Sanna\textsuperscript{3}, Roberto Ferrara\textsuperscript{2}, Pierpaolo Duce\textsuperscript{3}, Donatella Spano\textsuperscript{1,2}

1. DIPNET-Department of Science for Nature and Environmental Resources, University of Sassari, Italy, serenam@uniss.it; 2. CMCC, Euro-Mediterranean Centre on Climate Change, Sassari, Italy; 3. CNR-IBIMET, Consiglio Nazionale delle Ricerche, Sassari, Italy

THE CITY OF SASSARI

Sassari is the second town in Sardinia, a large island located in the center of the Mediterranean Basin (Fig. 1).

As part of a Regional Project, a research activity has been carried out with the general aim to quantify urban fluxes and identify the main GHG emissions sources. A combined methodology is used for this purpose.

1. DIRECT CO\textsubscript{2} MEASUREMENTS

An Eddy Covariance tower was set up, in April 2015, in the Sassari city center to directly measure CO\textsubscript{2}, water, and energy fluxes. Gill-HS sonic anemometer and Li-7200 Enclosed gas analyser were used for this purpose. Meteorological and radiometric stations were also installed (Fig. 2).

CO\textsubscript{2} flux ranged from -12 to 63 μmol m\textsuperscript{-2} s\textsuperscript{-1} with an average value of 4.2 μmol m\textsuperscript{-2} s\textsuperscript{-1} (Fig. 4a). Emission peaks are clearly related to the rush hours during the working days (Fig. 4b).

Air temperature measurements revealed that temperature was above 25 °C for 14 days (i.e. for about half of the measurements periods).

2. GHG INVENTORY

A spatial and temporal high resolution GHG emissions inventory for the urban area of Sassari is currently under construction, in line with European and international standard protocols, to establish a baseline for tracking emission trends.

The first result of the Inventory approach was the classification of the urban emissions, catalogued by GHG, productive activity and emissive source (baseline year 2010) (Table 2).

Table 1. Measured values of air temperature (Tair), precipitation (Pcp), wind speed (WS), and relative humidity (RH).

<table>
<thead>
<tr>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tair (°C)</td>
<td>18.2</td>
<td>15</td>
<td>19.3</td>
</tr>
<tr>
<td>Pcp (mm)</td>
<td>85</td>
<td>142</td>
<td>-</td>
</tr>
<tr>
<td>WS (km/h)</td>
<td>25.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RH (%)</td>
<td>57.6</td>
<td>86.9</td>
<td>79.2</td>
</tr>
</tbody>
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Table 2. Inventory categories of GHG emissions in the town of Sassari, Italy.

REFERENCES

- Gurney et al. - Quantification of fossil fuel CO\textsubscript{2} emissions on the building/dist scale for a large U.S. City. Environment Science & Technology, 46: 12194-12202

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